Future proofing health in response to climate change and rapid urbanisation in Africa

Community oriented, integrated climate and health systems should include indigenous knowledge systems and capitalise on Africa's young demographic, harnessing mobile technology to unleash a cadre of youth community climate health workers, argue **Monika Kamkuemah and colleagues**

Climate change can drive rapid urbanisation, particularly in low and middle income countries (LMICs), which are said to be undergoing epidemiological and environmental transitions.[1] [2] LMIC cities, especially in Africa, experience climate driven urbanisation, where extreme weather events force people to migrate to cities.[3] This unplanned urbanisation worsens climate change by increasing emissions, air pollution, and deforestation.[4] [5] Similarly, rapid urbanisation contributes to climate change through increased consumption of energy and depletion of resources.[6]

The intricate link between climate change and urbanisation requires action to lessen the detrimental effects. Cities can adopt measures such as emissions reduction, sustainable transport, and energy efficient buildings.[7] [8] However, challenges such as security concerns and insufficient infrastructure hinder climate adaptation in urban areas.[9]

Rapid urbanisation, especially in LMICs, leads to informal and sprawling cities that put pressure on health, social services, and sustainable livelihoods.[10] Urbanisation poses health risks through air pollution, traffic injuries,[11] noise stressors,[12] sedentary behaviours,[13] and inadequate waste management, which can lead to the spread of diseases and pollution of water and soil.[14]

The impacts of rapid urbanisation are disproportionately carried by vulnerable populations, including individuals and families with low incomes, informal workers, and migrants seeking better opportunities. These populations may face difficulties accessing adequate healthcare and worse health outcomes. Additionally, their informal livelihoods may be insecure and susceptible to disruption, further contributing to loss of livelihoods.

Climatic hazards such as urban heat islands, extreme weather related disasters, and rising sea levels intersect with urbanisation, compounding existing health risks, and they may create new ones—for example, heat stress and waterborne and vector borne diseases such as malaria and dengue fever.[15] The effects of climate change on displacement and migration are seen directly in sub-Saharan African cities such as Lagos and Accra, with increased vulnerability to floods, coastal erosion, or rising sea levels.[15] [16]

Vulnerable groups such as elderly people, young children, and pregnant women are at high climate risk, but young people aged 15-24 are disproportionately affected, facing occupational risks, mental health challenges, displacement, and limited access to resources.[17] [18] Although predominantly caused by current adults, the worst consequences of climate change will occur during the lifetimes of today's children and young people.[19]

Increasingly, it is young people moving to urban areas and residing in slums and informal settlements.[20] Furthermore, young people, especially those from disadvantaged backgrounds, may have limited access to resources and support systems to cope with the impacts of climate change that exacerbate pre-existing socioeconomic inequalities and stress.[21]

Indigenous knowledge

Indigenous knowledge, including practices such as indigenous agroforestry, medicine, and water management, has been passed down from generation to generation and can provide insights into disaster prevention and mitigation as well as adaptive coping strategies. For instance, communities in hazard prone areas of sub-Saharan Africa subject to extreme weather events like droughts and flooding use their understanding of local conditions and practices, such as observing the behaviour of animals and insects, to predict and respond to disasters.[22]

Mainstream efforts to mitigate the health impacts of climate change are anchored in western scientific knowledge, often ignoring indigenous knowledge owing to a lack of understanding and engagement with indigenous communities.[23] Incorporating indigenous knowledge into climate adaptation plans could inform effective health interventions and build trust and engagement with local communities, leading to strengthened resilience for communities facing disasters.

Health systems in Africa's cities are largely ill equipped to anticipate and manage emerging health needs induced by climate change and rapid urbanisation. This is partly because they were designed to tackle conventional health risks and may not have the capacity to respond to new and emerging threats.[24]

Climate care

It is vital to integrate climate concerns into health systems to provide "climate care." This entails recognising environmental health influences, preparing for climate

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KEY MESSAGES

- Climate change drives rapid urbanisation, and, conversely, rapid urbanisation drives climate change in cities in low and middle income countries

- Rapid urbanisation may exacerbate inequality, leading to poor health and loss of livelihoods for marginalised communities

- Health systems in Africa's cities are currently largely ill equipped to manage emerging health needs induced by climate change and rapid urbanisation

- A different approach is needed that capitalises on Africa's demographics, informality, and Ubuntu values

- A community oriented, integrated climate and health system and strategy is needed that mobilises Africa's growing youth population and uses mobile technology

induced health events, devising health system adaptation and mitigation strategies, and promoting behaviour change in communities that is climate resilient, including disaster preparedness and adaptation to climate related health risks such as heat waves and increased prevalence of zoonotic diseases. The recent World Health Organization primary healthcare monitoring framework is a crucial step towards more comprehensive health system planning, but it does not encompass the specific challenges that African cities face to anticipate and manage emerging health needs induced by climate change and rapid urbanisation.[15 25]

In the short to medium term, health systems and programmes must be able to adapt to changing conditions and respond quickly to emerging health risks, while building resilience and sustainability over the longer term to anticipate and prevent disease. Efforts to protect and advance health in the context of these existential threats must entail rethinking what a health system is and the different sectors that need to have a role in future proofing the health of populations.

This may include new roles in climate care delivered by community health workers , who are increasingly the first responders of the health workforce in several African countries with community oriented primary healthcare programmes. Community oriented primary care (COPC) is a patient centred and community driven model of primary care that emphasises proactive health promotion, prevention, and comprehensive care.[26] It aligns with the principles of equity, accessibility, and social justice to improve the health and wellbeing of communities and populations, and it aims to deliver comprehensive, accessible, and culturally appropriate healthcare that is driven by the needs and strengths of the community it serves. COPC draws inspiration from the Alma Ata Declaration's vision of primary health care for all[27] and the innovative approach exemplified by the Pholela Health Centre established in the 1940s in South Africa.[28]

More recent innovative COPC approaches include models in Ethiopia, where community health workers are also trained to identify and tackle the health impacts of climate change, such as waterborne diseases, drought, and food insecurity, and to promote climate resilient behaviours in their communities. This is done through strong communication networks and feedback mechanisms between community groups and the health system, thereby alerting decision makers on the changing needs of the community and identifying community members in greatest need during the drought response.[29] The Rwandan Ministry of Health recently launched the community based environmental health promotion programme, which has recruited almost 45 000 community health workers and established community hygiene clubs in villages across Rwanda. The clubs have empowered communities to identify their personal and domestic hygiene and environmental health related problems (including safe drinking water and improved sanitation) and to participate actively in problem solving.[30]

By adopting a COPC approach and integrating climate considerations, the health system can be better equipped to tackle the diverse and evolving health needs of communities. Although similar COPC and community health worker programmes have been proposed that include environmental health promotion, integration of planetary health remains a challenge owing to inadequate capacity, lack of monitoring systems, inadequate compensation, and lack of cross sectoral collaboration.[31]

African cities
A different approach is needed to tackle the health impacts of climate change and rapid urbanisation that capitalises on assets in African cities. This approach should consider the characteristics and strengths of these cities and their people.

Africa has the youngest population in the world, with a median age of 19.4 years.[32] This demographic dividend presents a unique opportunity for its youthful population to drive development.[33] However, high levels of youth unemployment and lack of opportunities undermine the potential of youth to drive innovation and growth.[34] Young people should be included in decision making and given appropriate opportunities for work and innovation; otherwise they may feel marginalised, leading to increasing disenfranchisement and disgruntlement (a cause of the protests in Nigeria, for example).[35]

Young people are often highly adaptable and innovative, unencumbered by conventional ways of doing things, and they can offer valuable insights into new and emerging health risks. A growing critical mass are also engaged with, and keen to contribute to, climate action and social justice, and evidence indicates that participatory mechanisms improve political self-efficacy. One example is the Cityzens for Clean Air Campaign, during which young citizen scientists influenced policy makers and local authorities to prioritise air quality improvement measures as evidenced through youth dialogues engaging with local authority representatives and continued collaboration with the Lagos State government.[36] However, this engagement is largely siloed into activism and often remains disconnected from comprehensive climate adaptation strategies that encompass health governance.

African cities are dynamic, culturally rich, and increasingly digitally connected, with informality embedded in everyday living that necessarily embraces more adaptive ways of working.[37] Adaptable healthcare systems are required to meet the evolving health needs of youthful urban populations, especially in informal settlements.[38]

To address emerging health risks, flexible and agile effective public health interventions should be co-designed and co-created with community residents who form an integral part of the dynamic urban environment. Such a participatory approach fosters community ownership and ensures interventions are tailored to meet local needs, as COPC approaches envisage. Making use of informal networks and services, including the informal economy, can facilitate the delivery of health services and awareness campaigns to underserved populations.

Ubuntu's principles
Ubuntu is a collection of values and practices that African people view as making them part of a larger and more important relational, communal, and environmental world. Drawing on Ubuntu's principles—that is, emphasising community based approaches, youth empowerment, and participatory governance—could help bridge diverse ethnic groups and promote dialogue among communities, enabling trust and support and promoting collective wellbeing, social cohesion, and interconnectedness.[39]

Incorporating indigenous knowledge in educational messaging for climate change fosters cultural preservation, empowers communities, and increases climate resilience.[24] Using culturally relevant methods, such as storytelling and local arts and crafts through community dialogues and participatory learning, initiatives can reach communities and contribute to their understanding of, and preparedness for, climate related challenges. Sharing indigenous knowledge alongside scientific information is a comprehensive and adaptive approach

to climate resilient health strategies even in remote areas with no or limited digital connectivity through promotion of intergenerational exchange and preservation of oral traditions.

A comprehensive approach to climate resilient health strategies incorporates financial mechanisms, emergency preparedness, intersectoral collaboration, and community engagement. We propose a rethinking of culturally sensitive approaches co-created with communities to promote health by minimising the impact of climate change on health and livelihoods while conceptualising new employment opportunities that contribute to this goal. This community oriented approach entails actively engaging community members in a participatory manner.

Community oriented response

A shift to community oriented, integrated climate and health systems and strategies is a cost effective way to tackle the health effects of climate change and rapid urbanisation in African cities. It builds the capacity of local communities to identify and tackle social and environmental determinants of health.

A participatory approach entails working with communities to identify their specific health needs and concerns and to develop tailored interventions in a culturally appropriate and sustainable manner. Sensitising communities about the link between climate change and vector borne diseases, such as malaria or dengue fever, may lead to early detection and reporting of disease outbreaks, enabling health authorities to respond promptly and prevent further spread.

Community climate health workers

Creating a re-conceptualised community climate health worker cadre, equipped with climate care, education, and technology tools, could reduce the health impacts of climate change and rapid urbanisation in African cities while creating new climate relevant employment opportunities. This approach combines the conventional role of a community health worker with a focus on climate change and environmental health, making use of the perspectives of young people who are the majority demographic.[40][41]

Health challenges arising from climate change affect other sectors, including energy, water, and transportation. Youth community climate health workers could work in a holistic way to tackle these impacts using integrated cross sectoral

data sources. Digitalisation and the use of Internet of Things (IoT) enabled devices, for example, would enable cross cutting data exchange such as between citizens, waste management systems, and public transportation systems. Their adaptability and technological aptitude make them well suited to meet the challenges as African cities become more technology centred with increased data collection, monitoring, and communication and data informed solutions.

Youth community climate health workers could complement existing community health workers, adding a primary care and climate focus and a youth perspective to community health interventions. Existing services for youth employment could be harnessed, such as the National Youth Service in Nigeria, the Youth Empowerment Program in Kenya, and the Youth Mobility programme in South Africa, to further capacitate youth with climate health work skills. Such innovation could promote economic development, social mobility, and self-sufficiency in local communities while building resilience.

A localised community climate health worker approach to urban and global health has global relevance, similar to the adoption of the community health worker concept worldwide. The global and transboundary nature of the climate crisis means that a localised approach to urban and global health is relevant beyond Africa. Just as the concept of community health work has been adopted worldwide to tackle local health challenges, the concept of youth community climate health workers with a focus on climate resilient health can also be applied in global contexts.

Youth governance

Building resilience to climate change and rapid urbanisation requires strong governance that is responsive to the needs and concerns of local communities. This mechanism should be participatory and inclusive and should include local communities and stakeholders in the design and implementation of public health interventions.

Engaging youth in community health governance can boost civic pride and social cohesion.[42] Youth involvement in decision making processes regarding community health fosters ownership, responsibility, and a stronger sense of attachment to their neighbourhoods.[43] Involving youth in governance enables them to express their ideas, potentially shaping climate and health policies and initiatives that are relevant and effective for young people.

Mobile technology

Africa has developed innovative and sustainable solutions—for example, mobile phone based solutions ranging from financial services, such as M-Pesa (mobile phone based money transfer),[44] to mHealth, such as MomConnect (a South African government initiative to support maternal health using mobile phone technology.[45] Mobile technology could support potential climate adaptation strategies without the need for frequent travel or motorised transport that contribute to carbon emissions and would be impossible during floods. Such innovative solutions for community health can serve as a model for other countries to adapt and implement and show Africa's commitment to sustainable development and tackling global health challenges.[46]

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