Rising Heat Waves in Northern Nigeria: Public Health Implications and Sustainable Mitigation Strategies

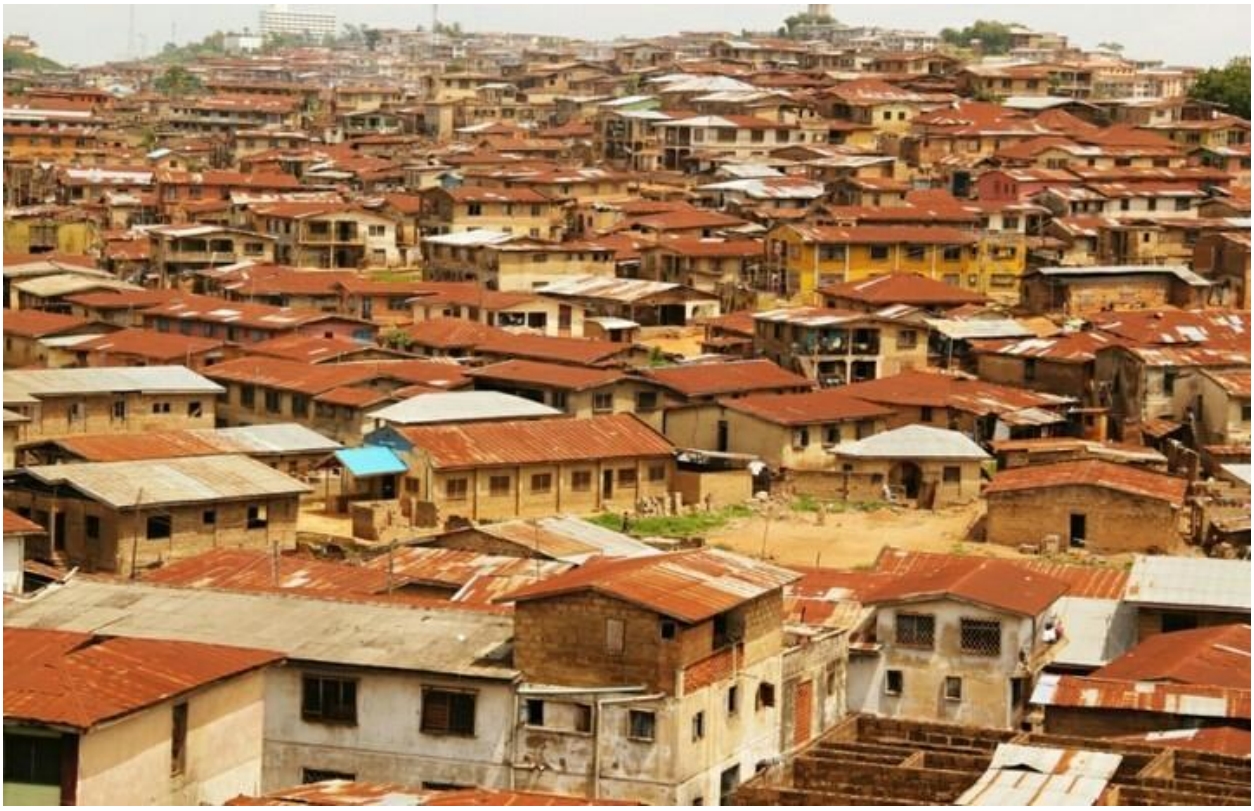
The Nigerian Meteorological Agency (NiMeT) has recently warned of escalating heat waves in Nigeria, particularly the northern region, where temperatures rise up to 42°C [1]. This extreme heat poses a serious risk to public health by increasing disease transmission and even triggering complications like premature delivery. Rapid urbanization intensifies the situation by creating Urban Heat Island (UHI) effects that trap heat in cities and urbanizing rural areas. Despite Nigeria's climate action progress, local effects like UHI receive less attention. Therefore, targeted urban planning with heat-reflective roofing systems serves as an effective mitigation approach to the impact of heat waves.

According to research by NiMeT [2], high heat waves are caused by climate change and worsened by the Urban Heat Island (UHI) effect. UHI is a phenomenon in which materials in cities trap heat within themselves and release it slowly into the environment. So, when regional heat waves occur, UHI contributes to additional thermal stress, raising temperatures from merely uncomfortable to potentially lethal levels.

The cause of UHI is modern construction materials like concrete, asphalt, and, most significantly, iron roofing. It is important to note that this problem is not exclusive to cities. As many rural areas are urbanizing rapidly and replacing traditional plant-based roofing with modern materials, certainly, the ember that scorches the town can also reach the village with time.

Studies [3] have shown that the main factor contributing to UHI in northern Nigeria is the use of corrugated iron roofing. One shocking aspect of these roofs is that, in addition to releasing trapped heat slowly at night, they also significantly raise indoor temperatures during the day, reaching up to 45°C [4]. This can make moving from the hot sun into a room feel like moving from a frying pan into a fire.

A cityscape showing the prevalence of corrugated iron roofs. (source [9])



Although high heat waves are known to cause severe economic and environmental impacts, their most important yet often overlooked effect in Nigeria is on public health[5]. Heat waves increase disease transmission by accelerating pathogen growth and weakening immunity. For example, in the current summer, the Kebbi State government confirmed an outbreak of meningitis in three LGAs, with 248 suspected cases and 26 fatalities recorded[6]. Also, in the same summer, an outbreak of malaria was recorded in Kano State. These, along with other similar cases, highlight the impact of heat waves on the spread of diseases.

Moreover, the consequences of heat waves can reach unimaginable levels. Data from a number researches[7] have revealed that heat stress can cause premature delivery—that is, the birth of a baby before it is fully developed, which can result in death or severe disability. This is especially concerning, considering that Nigeria, particularly the northern region, is already struggling with high maternal mortality.

Even though these effects are assumed to expose only vulnerable populations in danger, such as children, the elderly, pregnant women, and people with pre-existing health conditions like asthma. However, the coincidence of the heat waves with Ramadan fasting, recent power outages, and the fact that most of the northern population relies on hard labour to survive, along with the constantly expanding population of the northern states, are factors that put even the non-traditionally vulnerable population at risk.

A man pouring cold water on his head to cool off during Ramadan fasting in Kano, Nigeria. (source [9])

The 2024 SDG report shows that SDG 13 (climate action) in Nigeria is on track to achievement[8]. This proves that the country's response to climate change is paying off. This response includes the Climate Change Act of 2021, the update of Nationally Determined Contributions (NDCs) that pledge to reduce greenhouse gas emissions and foster adaptability to the impact of climate change, and the development of a National Climate Change Policy. However, it appears that most efforts are focused on reducing gas emissions, while adaptability measures like tackling the local Urban Heat Island (UHI) effect to reduce the impact of heat waves have received comparatively less attention[4]. This is primarily because UHI is seen as a state or local issue, making the responsibility of handling it rely on local authorities.

Therefore, realizing the importance of state and local authorities in solving this problem, we propose that northern states' urban planning and development authorities—such as KNUPDA in Kano and KASUPDA in Kaduna—should include the use of at least aluminum roofs as a requirement for approving new buildings. Apart from aluminum roofs, other types of heat-reflective roofing should also be considered. Aluminum roofing should be given priority because, beyond heat wave relief, it is also cost-effective. Aluminum reflects 70% of solar radiation compared to iron's 30%[4]. Though slightly costlier, aluminum lasts twice as long as iron, making it more economical.

However, even if all urban centers adopt this, gradually, urbanizing rural areas will face the same problem as cities. Therefore, the government and climate action NGOs should collaborate to educate these communities through campaigns via radio and local programs to promote the adoption of aluminum roofing. This approach would help address the problem in urban areas and prevent future challenges in rural communities undergoing urbanization.

In conclusion, the increasing heat waves across northern Nigeria create serious climate hazards that endanger public health and are exacerbated by the Urban Heat Island (UHI) effect stemming from rapid urban development. Although Nigeria has achieved progress in climate change response, insufficient attention to UHI maintains public health risks. The interplay between these challenges and urban infrastructure choices highlights the urgent need for localized climate adaptation measures. Implementing heat-reflective roofing materials, particularly aluminum, can help reduce thermal stress and protect public health. Ultimately, as climate challenges intensify, addressing localized issues like UHI is just as important as reducing global emissions, which aligns with the NDC objective that emphasizes both emission reduction and climate adaptation.
"The wise adapt themselves to circumstances, as water molds itself to the pitcher." — Chinese Proverb

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