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# BUILDING CLIMATE RESILIENCE IN NIGERIA'S URBAN INFORMAL SECTOR

**Emmanuella Chinenye Onyenechere[1]* & Chinedu Bede Ajuruchi[2]**

[1]Department of Geography and Environmental Management, Faculty of Environmental Sciences, Imo State University, Owerri, Imo State, Nigeria

[2]School of General Studies, Imo State Polytechnic, Omuma, Oru East, Imo State, Nigeria

*emmanuellaonyenechere@gmail.com

**ABSTRACT:** The informal sector serves as a critical economic foundation for millions of Nigerians, contributing significantly to employment, accounting for 58.2% of GDP, and shaping communities. In Nigeria's urban areas, informal sector operators (ISOs) face increasing challenges due to rising temperatures and unpredictable weather patterns linked to climate change. Leveraging the creativity and experience of ISOs is essential for developing effective adaptation strategies. This paper adopts a policy advocacy perspective to examine approaches for fostering climate resilience within the informal sector of Nigerian cities. It specifically explores the unique impacts of climate change on the informal sector, documents experiences from selected cities, and presents inclusive strategies for strengthening resilience and integrating the informal sector into broader urban climate adaptation frameworks through desk research. The study finds that both the 2021 National Climate Change Policy Document and the 2020 National Adaptation Plan (NAP) framework of the Federal Republic of Nigeria lack dedicated sections addressing the informal sector, particularly the urban informal sector. Revising the existing NAP through robust stakeholder engagement can ensure that the local knowledge, creativity, and resourcefulness of informal sector participants are fully utilized. Innovative, tailored solutions are necessary to address climate change and related environmental challenges in Nigeria. Enhancing the resilience of the urban informal sector to climate change is imperative for creating sustainable urban environments and maximizing the sector's role in poverty alleviation.

**Keywords:** Cities, Adaptation, Climate Change, Informal Sector, Nigeria

## INTRODUCTION

Climate change, which embodies extreme weather events, is increasingly recognised as one of the most pressing challenges confronting cities in the Global South (Dodman et al., 2023). Environmental hazards threaten the lives, livelihoods, and infrastructure that support urban living. Due to the fact that the formal sector, infrastructure, and services worldwide are unable to meet the demands of an ever-increasing number of city dwellers, people often seek alternative solutions outside the formal sector. Therefore, informality inevitably becomes one of the defining features of urban life (Satterthwaite et al., 2020). Consequently, the almost unavoidable creation of informal settlements and services on hazard-prone sites, especially in the face of climate change, exposes people to significant risks (Dodman et al., 2019). Chen (2016) and the International

Labour Organisation (ILO) (2018) affirm that informal sector workers and most of the informal economy are housed in informal settlements. Thus, poor women and people residing in these informal settlements with poor living conditions are likely to be more vulnerable to the impacts of climate change.

According to Leck et al. (2025), there is a considerable overlap between being poor and vulnerable, and working and operating informally, as a means of survival in the face of limited formal opportunities. The informal economy encompasses enterprises, workers, and activities operating outside of legal and regulatory frameworks. There is a great variation in the informal economy, ranging from unincorporated small and micro enterprises to informal employment, such as domestic work, transport work (including motorbike driving), and low-end service occupations like cleaning and gardening (Dodman et al., 2019). Chen (2014) and Satterthwaite et al. (2020) identified various components of the urban informal economy, including construction work, domestic work, home-based production, street trade, transport work, and waste picking, among others. Remarkably, women are predominantly found in the lower-paid sections of the informal economy (Chen, Roever, & Skinner, 2016).

Generally, 'informal employment' includes all livelihoods lacking in legal or social protection, whether in informal enterprises, formal enterprises, or households (ILO, 2018). The informal sector provides more jobs all over the world than the formal sector. This is attested to by the ILO (2018) report, which holds that nearly two billion workers, or 61.2% of the world's labour force, are in informal employment. Accordingly, up to 88% of employment in sub-Saharan Africa and South Asia is informal (WIEGO, 2022). ILO (2018) asserts that informal labourers make up most of the workforce in low- and middle-income countries (LMICs), and they can potentially play a vital role in fostering social development and climate resilience. Although informal workers can be highly vulnerable to climate-related risks, their work can substantially promote environmental sustainability and urban food security. However, it must be noted that even though the informal sector helps to reduce unemployment by providing job opportunities for both unskilled and semiskilled workers and retrenched city dwellers, its activities can be detrimental. They can pose a serious threat to the environment in terms of waste proliferation and environmental degradation (Onyenechere, 2011).

The informal sector in Nigeria contributes up to 58.2% of the nation's GDP (Agwaibor, 2024). In Nigerian cities, the sector encompasses a wide range of economic activities, including street vending, informal transport, waste recycling, informal construction, artisanal mining, domestic work, etc. It is known to contribute significantly to employment and economic output, particularly for low-income populations. Nwaka (2005) stated that the informal sector formed about 45% to 60% of the workforce in Nigerian urban centres in 2004. The informal workers often operate in precarious conditions, lacking access to social protection, formal infrastructure, and secure tenure—all of which exacerbate their vulnerability to climate shocks. Climate change remains by far the most profound challenge facing humanity at the moment; for instance, livelihoods have been destroyed and millions have been displaced as a result of the devastating annual floods across Nigeria (National Council on Climate Change (NCCC), 2022). In spite of the national 2021 Climate Change Act (mandating a national climate action plan and adaptation funding), informal sector operators and workers remain marginalized in adaptation frameworks. In order to

successfully respond positively to the threat of climate change, Nigeria needs to strengthen the resilience of the informal sector to climate change.

The Intergovernmental Panel on Climate Change (IPCC) (2014) explains climate change vulnerability as how a system is unable to deal with the negative consequences of climate change, such as climate fluctuations and extreme weather events, when they occur. On the other hand, Dodman et al. (2019) refer to resilience as the ability of social, economic, and environmental systems to manage a hazardous event or trend or disorder, responding or rearranging in ways that sustain their essential purpose, identity, and structure, while also sustaining the ability for adaptation, learning, and transformation. The resilience of individuals and households depends on a number of factors, including social, economic, political, and physical factors. To foster resilience, it is essential to address each of these areas. While physical resilience may be the most straightforward in terms of interventions, there are ways this can be fostered while also strengthening social, economic, and political factors (Dodman et al., 2019).

There are 17 Sustainable Development Goals (SDGs) that were adopted by all United Nations member states in 2015. In order to address climate change and its impact, the United Nations dedicated SDG 13 to it. Beyond the SDGs are the Paris Agreement and the New Urban Agenda. UN–Habitat (2016) identified urban areas as major contributors of greenhouse gas emissions and major consumers of energy in the world. However, there are scholars who have attested to the positive role of cities in mitigating and adapting to climate change (Bununu, 2019; Abubakar et al., 2025). Most of the existing studies have prioritised climate change impacts and mitigation in Nigeria over the informal sector's adaptation to climate change, particularly in cities. For the reduction of the vulnerability to climate change to be truly inclusive, this observable gap in knowledge needs to be closed.

While the National Council on Climate Change (NCCC) addresses a wide array of concerns spanning multiple sectors and governmental tiers, its primary focus remains the implementation of the National Adaptation Plan (NAP) framework. However, to ensure comprehensive protection of Nigeria's diverse sub-sectors, including those most vulnerable to climate change, it is imperative that tailored adaptation measures are systematically integrated into national policy frameworks. Accordingly, this paper seeks to answer the following research question: How do current climate adaptation policies in Nigeria fall short in addressing the specific needs of the urban informal sector, and what inclusive strategies can be developed to enhance the sector's resilience and ensure its effective integration within the broader urban climate adaptation policy framework? By critically examining this gap, the study aims to develop evidence-based recommendations for more inclusive and context-specific policy interventions.

## METHODOLOGY

Academic articles that aim to influence policy suggest policy amendment through evidence-based discourse that employs data and literature. This paper, being a conceptual and policy review, uses the method of desk research. The approach involves a thematic analysis of existing literature and data from both government publications and online materials to reveal significant insights and suggest potential solutions.

**Impact of Climate Change and Vulnerabilities of the Informal Sector**

The impact of climate change on health in urban areas is increasingly well understood, as evidenced by higher mortality rates from heatwaves (Fernandez & Creutzig, 2015; Dodman et al., 2022). Others are worsened respiratory illnesses through the combination of higher temperatures and air pollution, the spread of infectious diseases associated with flooding, kidney disease associated with heat stress, and higher levels of diseases from contaminated groundwater during droughts (Kubicz et al., 2021; Alcayna et al., 2022). While these impacts may disproportionately affect the health of low-income urban residents, some are particularly salient for informal workers.

Due to their unregistered status, informal workers are often overlooked in official data and neglected by interventions aimed at promoting occupational health and safety (OHS) (Lund et al., 2016). Typically, informal workers have lower incomes and less training than formal workers, in addition to poorer access to protective equipment (Chen, 2016; Onyenechere et al., 2022). Notable research on Accra and Tamale (Ghana) explored the impacts of both heat and flooding on informal livelihoods (Gough et al., 2019). During heat waves, informal workers struggle to operate in their usual workplaces, such as a single room or kiosk built of metal or wood. Temperatures of up to 50.3 ◦ C were recorded in metal kiosks where seamstresses were working, and the highest recorded temperature was 61◦C in a blacksmith's wooden structure (Gough et al., 2019). Additionally, the same informal sector workers in Ghana's cities are vulnerable to flooding, and they may spend several days cleaning, drying, and trying to salvage their items after floods (Chen, 2014).

According to research conducted by Dodman et al. (2019), informal workers in India and Zimbabwe already face hazardous living and working conditions that interact with a range of climate-related risks. While the effects of climate change rarely operate in isolation from other socio-economic, political, and environmental factors, they will nonetheless exacerbate some issues and create additional ones for informal workers (Khosla & Bhardwaj, 2018). Low-quality shelter and working conditions often deteriorate further due to extreme weather events, with the potential to result in escalating ill-health and deepening poverty amongst informal workers (Dodman et al., 2019).

Zimbabwe's changing rainfall and temperatures due to climate change are expected to exacerbate longstanding concerns, such as deficient water, sanitation, and hygiene (WASH), and many informal workers already experience major challenges with heat and water scarcity. Extreme heat has substantially affected workers in both waste-picking and urban agriculture (TARSC, ZCTU & ZCIEA, 2021). It is reported that in Indore (India), extreme heat and heavy rains are the main climate-related hazards that affect informal workers, which can amplify their food insecurity and gendered inequalities while also heightening inadequate working and living conditions (Dodman et al., 2019). For instance, informal factory labourers already face elevated levels of heat from working in enclosed, poorly ventilated spaces and near to machinery that emits heat (Agarwal et al., 2022). Street vendors identified summer afternoons as the hottest and most difficult time to work, but drinking extra water to alleviate the situation was usually impractical due to the absence of workplace toilets (Alfers et al., 2019).

Climate change impacts the various sectors and systems in the environment, including business, infrastructure, agriculture, industry, and biodiversity. These impacts create a situation of vulnerabilities in the environment. According to the Nigeria Climate Change and Health Report (2025), climate change in Nigeria causes and exacerbates socioeconomic and health inequalities, and the risk will continue to increase. In Nigeria, the weather is being/will be affected by climate change (See Table 1).

**Table 1: How Nigeria's Weather will be affected by Climate Change**

| Temperature | Extreme heat | Rainfall | Sea levels |
|---|---|---|---|
| Will continue to rise across Nigeria by approximately 1.0 -1.1 0C between 2020 and 2050 under mild climatic scenarios. Under more extreme scenarios it is expected to rise by at least + 3.00C | Nigerians exposed to heat waves each year will quadruple from 6% in 2000 to 19 22% by 2080. Deaths from heat are expected to double, increasing from 2.5 to 5 per 100,000 people per year by 2080 | 800,000 individuals are at risk from riverine flooding by 2030 and approximately 550,000 people each year could be affected annually by flooding from rising sea levels by 2070 | Predicted to rise between 0.5 and 1.0 meter by the end of the century which will have a significant impact, increasing the risk of flooding for coastal towns, and which will after patterns of infectious and vector borne disease transmission |

***Source: Nigeria Climate Change And Health***

**Health National Adaptation Plan March 2025**

Thus, Nigeria is a nation that is vulnerable to climate change, with the most vulnerable groups being farmers, fisher folks, the elderly, women, children, and poor people who eke out their living from the informal sector. The Federal Ministry of Environment (FME) (2014) defines vulnerability as the element of sensitivity to climate change that relates to how readily a specific system responds to changes in the climate. Exposure refers to the extent of climate stress to which a particular unit or system is exposed, or the presence of people, livelihoods, species, environmental functions, services, and resources, as well as infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected (FME 2014).

According to NCCC (2022), Nigeria is highly vulnerable to climate change, particularly in its agriculture, water resources, public health, and settlements sectors. Both the informal settlements and informal business enterprises located in Nigerian cities are particularly vulnerable to flooding and extreme heat, which is evidence of climate change. Informal economic activities, though vital for driving urban economies, are plagued by both insufficient formal support and susceptibility to significant climate-related risks. Waste management in Nigerian cities, which is already constrained by few or non-existent recycling and composting facilities, is further exacerbated by climate risks. This is because the bustling informal transport businesses are not integrated into programmes designed to make public transport environmentally friendly in Nigerian cities; they

continuously contribute to overall carbon emissions in the environment. Crawford and Church (2019) identified a lack of information and capacity as causal factors. On the contrary, Jenkwe et al. (2024) revealed that most households in the informal settlements around the FCT, Abuja, in Nigeria are aware of local climate change trends, and their perception closely aligns with scientific insights. Mashi et al. (2025) identified the key factors that influence informal sector dwellers' response to climate change in Nigeria, namely, finance, knowledge, and infrastructure. The study concluded that climate change responses in informal sector dwellings were uncoordinated, reactive, and lacked institutional support.

**Climate Change Experiences of Selected Nigerian Cities**

Not much attention is being given to climate change adaptation in most Nigerian cities, which have been known to contribute to carbon emissions (Abubakar et al., 2025). Since the informal sector is not isolated from the formal sector in the case of the impact of climate change, we shall regard the impacts on the city as representing the impact on the informal sector. In this case, we shall consider a few Nigerian cities, namely, Port Harcourt, Lagos, Kano, and Owerri.

***i. Port Harcourt***

The Intergovernmental Panel on Climate Change has since confirmed the impact of and vulnerability of African cities to climate change (IPCC, 2011). Port Harcourt, which is the capital of Rivers State, is a prominent city in the Niger Delta region of Nigeria. Some authors have predicted its exposure to climate change risks. For instance, Odjugo (2005) reports that variability in rainfall and the potential for the number of rainy days would decrease throughout the country, by around 14% in the Niger Delta coastal areas. While the number of rainy days may be decreasing, there would be an increase in the frequency and magnitude of wind and rainstorms (Odjugo 2009). There is also the problem of rising sea levels and flooding in the area, which significantly impacts agriculture and water provision due to saltwater intrusion (Matemilola, 2019; Akande et al., 2017; Duru & Emetumah, 2016).

Precipitation with increased temperature will most likely have a serious impact on the socio-economic state of people living in the coastal area of Nigeria. Heavy rainfall could induce waterlogging, increase the frequency of floods, and cause serious soil leaching and erosion. This increase in rainfall and temperature indicates evidence of climate change, which precipitates other ecological hazards, such as the urban heat island effect, the 2012 flood, and acid rain in the area, and thus negatively impacts the economy of Port Harcourt (Efe & Weli, 2015). Sea level rise could result in the submergence of all coastal cities in the Niger Delta area, including Port Harcourt and a significant portion of Lagos (Ekanade et al., 2011).

***ii. Lagos***

Lagos is one of Africa’s most populous megacities, and the second most climate-vulnerable city (Abubakar et al., 2025). More than half of Nigeria's industries are located in Lagos. Findings show that the features of Lagos State, such as its flat topography with minimal elevation above sea level, less than 1.5m of wetlands, and water bodies accounting for approximately 40 per cent, make the

city vulnerable to climate change (Akinola, 2022). Akinola (2022) found that climate-sensitive sectors of the economy, including agriculture, transportation operations, energy production, road construction, and oil and gas operations, have been adversely affected by climate change.

Various indicators of climate change such as high temperatures, sea level rise, extreme weather events are manifest in the city of Lagos, and the impacts are being felt in many sectors, including agriculture and food security; water resources; wetlands and freshwater ecosystems; coastal zone and marine eco-systems; land use, forestry and biodiversity; energy; transportation; industry and commerce; financial services; human settlements and health; and disaster management (Building Nigeria's Response to Climate Change (BNRCC), 2012). The impacts include: loss of land to the sea; loss of livelihoods; loss of physical infrastructure (transportation, industrial, energy, water storage/ supply; real estate, etc.); displacement of settlements and population; loss of ecosystems and biodiversity; pollution of surface water and groundwater; increased frequency and magnitude of climate-related disasters; and increased risk of water-borne diseases (Beachland Land Resources (BLR), 2011).

According to Abubakar et al. (2025), Lagos is now home to 73.4% of Nigeria's green building floor areas, generates five megawatts of renewable energy, implements several urban renewal and greening schemes, partners with 434 private companies in garbage collection and recycling, and establishes wastewater treatment and recycling systems. This implies that the Lagos State Government, in partnership with the private sector, is currently implementing various climate change mitigation strategies in aspects of the city, including buildings, transportation, infrastructure, and urban greening (Abubakar et al., 2025). However, it has been observed that Lagos megacity has no adaptation programme specifically targeted at building the resilience of the informal sector, despite its recorded advancement in addressing climate change threats.

### *iii. Kano*

A study by Usman et al. (2024) revealed that higher drought frequency and intensity were recorded in Kano from the 1970s to the 1990s than in any other period of the study. This affected agricultural production and water resources negatively in most parts of the area. Naturally, future increases in drought frequency coupled with increasing human and livestock populations are likely to result in a series of environmental and socioeconomic problems in the area. The likely increases in temperature, drought frequency, and intensity are bound to affect surface water bodies through increased evaporation, groundwater through decreased aquifer recharge, and crop and livestock productivity through increased heat and water stress (Pomposi et al., 2020). They are also likely to exacerbate land degradation through an increase in the rate of desertification, the shrinking of wetlands and stream flow, which are bound to affect the productivity of crop and grazing lands, as well as livestock productivity (Usman et al., 2024).

### *iv. Owerri*

Owerri is the capital of Imo State, located in South-eastern Nigeria. In the area, deforestation has triggered soil erosion, compounded by heavy seasonal rainfall that has led to the destruction of farmlands, houses, and roads, as well as flash flood disasters, which are associated with diseases

and epidemics. According to Okorie et al. (2012), heat waves, communicable diseases, and disease vectors are evidence of climate variability and change, as well as increased surface air temperature, enhanced evaporation that affects streams and rivers, landslides, and land degradation, and other climate-related disasters. The impact of climate change is evident in the city centre. Parts of Ikenegbu Layout Road and Works Layout Road in Owerri have been threatened and destroyed by gully erosion due to excessive rainfall. The study further revealed that some residents are presently being displaced and have abandoned their buildings, submerged in floodwaters. This occurs due to flash floods following seasonal torrential rainfall (Okorie et al., 2012).

Global warming produces an increase in global temperature, which has a direct impact on human life and the natural environment. Increasing temperature is having serious effects and consequences on the area. The changes in urban temperature, which exhibit high fluctuations, are also related to changes in the amount and pattern of precipitation, as well as more severe weather, such as warmer evenings and increased heatwaves. These are manifestations of the changing climate in this area (Ukaegbu et al., 2017). The impact of climate change and the corresponding vulnerabilities it creates in Nigerian cities, including Owerri, is a major challenge to the informal sector. This is because in Nigeria, this sector accounts for a bulk of city dwellers. In other words, the impact of climate change in Nigerian cities is the same as its impact on the informal sector (WIEGO, 2022).

Generally, these findings on the selected Nigerian cities indicate the presence of key underlying drivers of the risk facing informal sector operators and workers. Taken together, environmental hazards may combine with the impacts of climate change to exacerbate ill health and socioeconomic exclusion. Many informal workers are unable to work as a direct result of extreme weather events, which can lead to significantly deteriorating shelter and working conditions (Kangasniemi et al., 2020). Heat waves and related challenges of accessing adequate water, sanitation, and health profoundly affect informal workers in all cities, with substantial constraints on working hours and/or productivity. While these climate drivers may not, in themselves, result in tremendous hardship, they may combine with and compound other local issues (e.g., air pollution) to worsen the health outcomes of informal sector operators and their employees/workers.

**Fostering Resilience of the Informal Sector to Climate Change**

Fostering resilience to climate change in the informal sector requires multiple approaches. On a broad scale, the primary steps towards achieving resilience in the informal sector are education and self-help. With proper sensitisation by the authorities and Non-Governmental Organisations (NGOs), informal sector operators and workers can form groups to promote community assets and other bottom-up actions, as well as enhance education to address climate-related concerns and strengthen livelihoods. For instance, in Port Harcourt, two indigenous organisations, namely, Collaborative Media Advocacy Platform (CMAP) and Chicoco Collective, were born out of the need to strengthen the resilience of informal waterfront communities in the city. They participate in climate change-based education programs and serve as advocacy groups for the inclusion of informal waterfront communities in government-sponsored adaptation plans (Greenwalt et al., 2021).

Education is particularly important for urban agriculture workers to improve yields and respond to climate-related risks, including through novel approaches for water conservation, land preparation, and reduction of post-harvest losses. Civil society organisations (CSOs) can foster state recognition and access to social protection, as demonstrated by grassroots advocacy, inclusive partnerships, and collective organising in Port Harcourt. This approach can be improved upon and replicated in other Nigerian cities where it is nonexistent. Access to assets can also strengthen informal workers' resilience to climate change, especially when they can benefit from social protection and utilise multiple strategies at once (Moser & Satterthwaite, 2010). The combination of state-provided social protection with individual-level responses can significantly promote the resilience of low-income urban residents. Social welfare schemes can provide a strong cushion for informal workers in the face of climate change (UNDP, 2021; Rana et al., 2022).

City and ward-level officials will need to recognise climate change as a significant threat to informal workers' health and livelihoods, which has sweeping impacts and intricate links with urban development trajectories. Bharadwaj (2022) suggests the need to integrate informal workers into social protection schemes, which is perhaps the single most significant policy change that can build climate resilience for this group. Moving forward, the provision of social protection can be expanded in response to the specific challenges posed by climate change by providing income supplements when workers are unable to work due to heatwaves or floods. Policymakers will need to extend access to social protection through proactive, comprehensive strategies that can benefit urban low-income residents, who are underrepresented in past research on climate-responsive social protection (Rana et al., 2022). The design of such schemes should also be gender-sensitive, including consideration of childcare, parental leave, and other gendered concerns in the diverse informal economy (United Nations Development Programme (UNDP), 2021).

Further action research is needed to explore and bolster grassroots strategies in the face of climate change, drawing on detailed mixed-methods data on multiple risks and workers' key concerns. Researchers can delve into the climate-related health and economic risks facing informal workers through the use of heat monitors, GIS data collection of flooding risks, for instance, and analysis of the associated health impacts, combined with qualitative data on workers' strategies and priorities to foster resilience (Taylor et al., 2020).

There is also a need to quantify informal workers' climate-related losses, thereby providing the basis for appropriate remedial measures. Crucially, future studies can continue to explore how climate-related threats interact with existing vulnerabilities (across informal workplaces and residences) and build upon ongoing risk-mitigation efforts. Researchers should also analyse how these risks vary spatially and between informal workers (differing in age, gender, disability, etc.), which can inform equitable and appropriate interventions designed in close collaboration with these workers (Dodman et al., 2019).

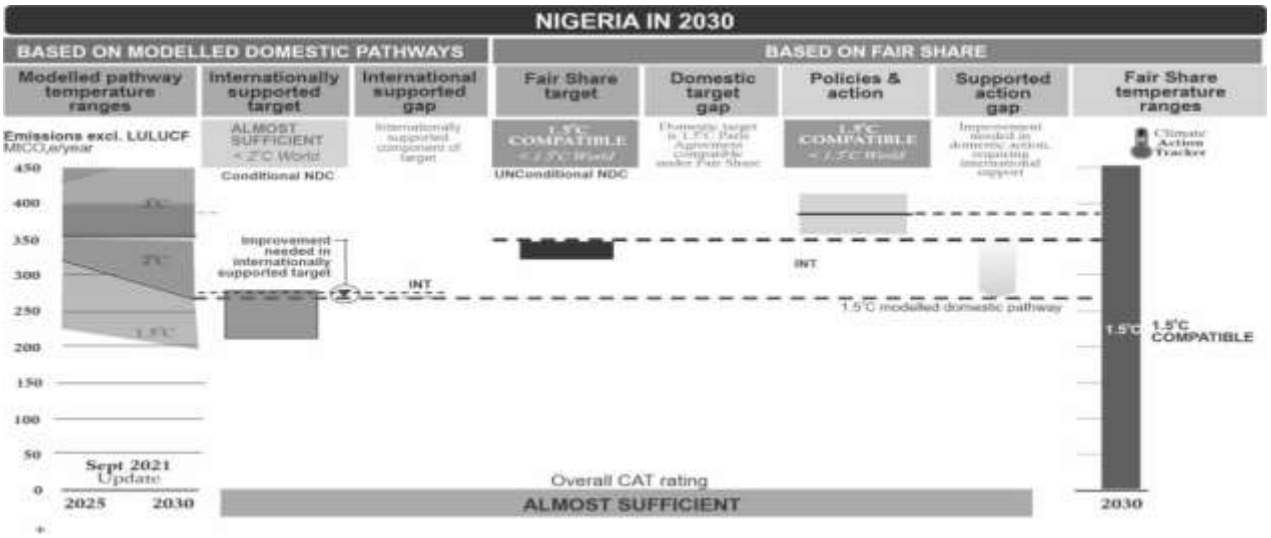
Effective responses to reduce the climate risks facing informal workers will require partnerships between governments and CSOs. Community organisations and informal worker groups often have existing mechanisms to support vulnerable people, which can provide the foundation for targeted measures, such as identifying recipients of social protection schemes (UNDP, 2021). Climate change responses can present considerable opportunities for informal workers, with

promising entry points in waste reuse and clean energy provision, amongst others. Government policies and investments that promote low-carbon livelihood opportunities can substantially benefit low-income urban residents, including informal workers in the circular economy (Brown et al., 2014). The informal economy already plays a significant role in waste reuse and recycling, although often with poor working conditions for informal waste pickers (Díaz, 2016). Appropriate policy recognition could help provide safeguards for waste-pickers and other informal workers, while also upgrading their skills and supporting the regularisation of their value chain (Agarwal et al., 2022).

According to Dodman et al. (2019), resilience-fostering requires a multi-pronged approach that addresses not just physical conditions, but also social, economic, and political capacities. Taking cognisance of the increasing menace of climate change, it is important that while embarking on structural transformation of cities, those working within the informal sector are provided with opportunities and safety nets that strengthen their resilience to climate shocks. These safety nets include cash transfer programmes, which provide direct financial support to households, helping them cope with income losses due to economic shifts. Social insurance schemes, such as health and unemployment insurance, protect individuals from economic shocks and ensure they can adapt to structural changes (Kangasniemi et al., 2020).

**Specific Pathways for Adaptation of the Informal Sector to Climate Change in Nigeria**

Nigeria is one of the fifty-four countries in Africa that have ratified the Paris Agreement and submitted their Nationally Determined Contributions (NDCs). These efforts are towards global climate change mitigation and adaptation (see Figure 1). However, more concrete actions are needed if Nigeria truly desires to demonstrate a unified commitment to strengthening national




+Modelled domestic pathways reflects a global economic efficiency perspective with pathways for different temperature ranges derived from global least-cost models

**Figure 1: Policies & Action**

***Source: climateactiontracker.org (2021)***

adaptation efforts. Any informal sector policy in an emerging economy that does not mainstream climate action is doomed to fail. The Climate Change Act of 2021 cannot effectively enhance the resilience of Nigeria's economy and environment if the informal sector is left out. The statement in the policy on covering all sectors is generic and cannot be said to address the peculiarities inherent in the urban informal sector comprehensively.

Likewise, the Nigerian NAP framework of 2020, which emphasises a sectoral approach, failed to focus on the vulnerabilities of informal settlements and the informal economy in identifying adaptation priorities and programmes. The National Adaptation Strategy and Plan of Action on Climate Change for Nigeria (NASPA-CCN) of 2011, the National Agricultural Resilience Framework (NARF) of 2015, and the Health National Adaptation Plan (HNAP) of 2025 are other Nigerian climate adaptation initiatives.

The best approach in Nigeria must be through the application of integrated strategies, namely, capacity building, financial access, infrastructural development, and participatory governance. Practical steps towards its attainment are as follows; implementation of micro-insurance and accessible finance; development and usage of weather resistant shelters (i.e. shops/stores/kiosks/warehouses/workshops etc.); integration of climate risk in urban planning and early warning systems; and the development of locally–led, inclusive governance to empower the informal sector operators and workers and create tailored adaptation strategies.

Regular workshops should be organised to train operators and workers on climate change and climate risks, thereby developing adaptation measures suitable for addressing the vulnerabilities of different informal economy sub-sectors. Micro-insurance schemes should exist in all the neighbourhoods in a city to offset any weather-related losses that may be incurred by operators and workers. To improve operators' access to finance, several digital platforms and micro-financing should be established. Incentives should be provided to drive operators to embrace digital marketing and the acquisition of mobile apps that provide real-time climate information and business support. Operators should be the Government at the sub-national level, which should develop financial products that aid both foreign and local investments in climate-resilient infrastructure and adaptation measures. This is because outdoor vendors mostly require weather-resilient structures such as mobile shelters. More effort is needed in the implementation of early warning systems and rainfall predictions by the government.

Other specific pathways for the Nigerian government are the integration of climate risk into urban planning and land use management, as indicated in an earlier study by Onyenechere (2010), the rapid implementation of zoning regulations, and the application of risk maps in deterring development in disaster zones/high-risk areas. To avoid actors working in silos and to promote locally-led actions, a joint forum of government, informal sector operators, other private sector actors, and CSOs is needed for the design of sustainable solutions, a fact corroborated by Abubakar et al. (2025). The operators should be involved in assessing vulnerabilities, incorporating informal sector tailored models/solutions into Nigeria's policy framework, and implementing these solutions for them. According to Daze (2019), everyone should have a say in how climate action occurs, and everyone should benefit from investments in adaptation in an equitable manner, because adaptation needs vary depending on residence, livelihoods, communities, etc.

## Conclusion

The study explored the influence of climate change on the urban informal sector in Nigeria and presented specific pathways for successful adaptation. It underscored the fact that fostering climate resilience in Nigeria's urban informal sector requires centring the lived experiences, voices, and ingenuity of informal workers. Locally-led adaptation anchored in participatory governance, social mobilisation, and enabling policies offers a grounded path to equitable urban resilience. Following specific pathways such as capacity building through continuous climate resilience training workshops, adoption of nature-based solution such as greening of the environment and rainwater harvesting, building and maintenance of climate resilient infrastructure and provision of financial assistance to ISOs to boost their self-help resilience efforts and application of sustainable business practices such as transiting to digital economy can transform residents of informal sector-dominated neighbourhoods from climate victims into adaptation leaders.

Without adequate attention being paid to increasing the climate resilience of the informal sector, which constitutes a very important aspect of Nigeria's economic resource base, such climate-based frameworks as the National Climate Change Policy Act of 2021 and the National Adaptation Plan of 2020 by the Federal Ministry of Environment cannot achieve any meaningful result. For this reason, climate justice, which prioritises inclusion of vulnerable groups and their empowerment, must be applied in fostering the resilience of the urban informal sector to climate change.

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