

Climate Change Adaptation and Mitigation: The Informal Sector's Experience in Ile-Ife, Nigeria



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ABSTRACT

Climate change increasingly threatens urban livelihoods, particularly within the informal sector, which often lacks institutional protection and adaptive capacity. Despite the importance of the informal economy in Nigerian cities, limited research has examined how informal sector operators perceive and respond to climate-related risks. This study explored how the informal sector activities are interacting with the climate change mitigation and adaptation strategies in Ile-Ife, Nigeria. A multi-stage sampling technique was employed to select 131 informal sector operators across three residential density zones (core, transition, and suburban areas). Data were collected through structured questionnaires and analyzed using descriptive statistical techniques including frequencies and percentages. The findings revealed that 61.8% of respondents experienced climate-related disruptions to their business activities, mainly due to irregular rainfall, flooding, and heat waves. These disruptions resulted in reduced daily sales, financial losses, and health challenges. Although about 79.4% of respondents reported awareness of climate change, the depth of understanding and implementation of adaptation strategies remained low. The most common adaptation strategy was modification of business shelters, while institutional support and climate-related training were limited. The study conclude that climate change significantly affects informal sector activities in Ile-Ife, while institutional responses remain inadequate. The study therefore recommended that there is a need for the integration of informal sectors concerns in the local climate policy models, expansion of awareness and training programmes by the government and increased access to credit facilities to strengthen resilience and enhance sustainable living.

Keywords: *Adaptation, Climate Change, Ile-Ife, Informal Sectors, Mitigation, Nigeria*

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1. Introduction

Climate change has become a central concern in urban and regional planning because its impacts are increasingly concentrated in cities, settlements, and livelihood systems that have limited capacity to absorb shocks. The IPCC states that climate change has already caused widespread impacts and related losses and damages to human systems, with vulnerable communities facing higher risks from extreme heat, heavy rainfall, flooding, and livelihood disruption (IPCC, 2023). This global concern is closely linked to the informal economy, which supports a large share of urban livelihoods but often operates without adequate social protection, secure workspaces, occupational safety, or access to climate-related support. Recent studies show that informal workers are highly exposed to climate risks because many conduct their activities in open or semi-open spaces, depend on daily income, and have limited resources to recover from repeated disruptions. Dodman et al., 2023, based on cases from India and Zimbabwe, argue that informal workers are vulnerable to heat, intense rainfall, flooding, and poor working conditions, while social protection and urban climate interventions often fail to reach them. A scoping review of African urban vulnerability also shows that climate change affects poor urban populations through food insecurity, water stress, livelihood loss, infrastructure disruption, health problems, sanitation stress, and unemployment (Ansah et al., 2024). In addition, recent research on street vendors confirms that climate-related hazards directly affect informal work through reduced productivity, health risks, and income instability (Sepadi, 2025). These discussions indicate that studying climate change adaptation and mitigation among informal sector operators is globally relevant because it connects climate risk, urban livelihood security, and the need for more inclusive local climate planning.

The topic remains highly relevant because recent studies show that climate adaptation in the informal sector is no longer a marginal issue, but a growing concern in urban climate research. Globally, about 2 billion informal workers lack social protection while facing occupational, public health, and climate-related risks, including heatwaves, flooding, drought, and poor access to water and sanitation (Sverdlik et al., 224). In Nigeria, the relevance is even clearer. Mashi et al. (2025) surveyed 388 households in five informal settlements in Abuja and found that although 55% to 83% of respondents were aware of climate change response strategies, actual adoption remained low: only 27% used fans or air conditioners for cooling, 10% adjusted seasonal activities, and most other responses, such as solar energy use, flood prevention, tree planting, migration, and infrastructural adjustment, were each adopted by less than 7% of households. The same study identified lack of knowledge (24%), inadequate infrastructure (23%), financial constraints (21%), and time limitations (19%) as barriers to climate response, confirming that awareness does not automatically translate into adaptive capacity. Recent work on climate knowledge among informal-sector residents in Abuja also confirms that understanding of climate change remains uneven, which makes local-level studies necessary for policy design (Jenkwe et al., 2024). Beyond Nigeria, studies in African cities show similar concerns. Yazdanie et al. (2024) found that when informal economy growth, climate migration, and rising temperatures are included in urban energy planning for Accra, energy demand could become up to 43% higher by 2050 under the worst-case scenario. Opoku-Boateng et al. (2024) show that social capital shapes climate resilience in informal urban neighbourhoods in Kumasi, while Mkhize et al. (2025) demonstrate that climate risks interact with market shocks and urban governance to affect informal vendors' income and food systems in Durban. These findings indicate that research on climate change adaptation and mitigation in Nigeria's informal sector remains current because it addresses a measurable gap between exposure, awareness, institutional support, and the practical capacity of informal operators to protect their livelihoods.

Nigeria provides a relevant setting for this study because climate risk intersects with a large and spatially diverse informal economy. Recent evidence from Nigerian cities shows that informal activities are shaped by demographic, regional, and ecological differences, meaning that climate responses cannot be treated as uniform across locations (Onyenechere et al., 2023). Climate adaptation studies in Nigeria have also remained concentrated in large cities, informal settlements, and agriculture. For example, Mashi et al. (2025) found that informal settlement dwellers in Abuja had relatively high awareness of climate response strategies, between 55% and 83%, but actual adoption was low, with only 27% using fans or air conditioners and only 10% adjusting seasonal activities. In Southwestern Nigeria, Odelola et al. (2025) reported annual increases in rainfall and temperature of 2.2 mm/year and 0.02°C/year respectively, while 84.6% of farmers

linked declining agricultural output to climate change. These findings show that climate impacts are already affecting livelihoods in Nigeria, but the experience of urban informal operators in medium-sized cities remains less documented. Ile-Ife was selected because it is a medium-sized urban centre in Osun State where informal activities such as street vending, informal transport, petty trading, food vending, and handicraft services form part of everyday livelihood systems. The city has a tropical wet and dry climate, with annual rainfall of about 1,200 to 1,500 mm and average temperatures of 25°C to 32°C, conditions that support informal economic activity but also expose operators to flooding, soil erosion, rainfall disruption, and heat stress. The study therefore uses Ile-Ife to examine how informal sector operators across core, transition, and suburban residential zones experience climate-related disruptions and adopt adaptation or mitigation responses in their daily work.

Many previous studies have examined climate change, informal work, and urban vulnerability, but they approach the issue from different entry points. Mashi et al. (2025) focus on informal settlement dwellers in Abuja and show that climate responses are mostly reactive and weakly supported by institutions, but their analysis is centered on households in informal settlements rather than operators of informal sector activities across residential density zones. Jenkwe et al. (2024) examine climate change knowledge among residents of informal sectors in Abuja, which is useful for understanding awareness, but it does not directly connect climate knowledge with business disruptions, financial losses, health effects, and coping practices among informal operators. Michael (2024) studies women traders in flood-prone riverine communities of Bayelsa State and highlights gendered experiences of flooding, supply chain disruption, damaged goods, and constrained market access, but the study is qualitative and focused on women traders in riverine settings rather than a mixed group of informal operators in an inland medium-sized city. Sepadi and Nkosi (2025) review the impacts of climate change on informal street vendors and show that extreme weather affects income, working hours, operating costs, and health, but the review is not location-specific and does not provide empirical evidence from Nigerian urban contexts. Mkhize and Cele (2025) examine street vendors in Durban and link market shocks, climate vulnerability, and income loss in informal food systems, but the study is situated in South Africa and focuses on food vending rather than a wider range of informal activities. Thorn et al. (2025) discuss climate justice and informal traders' access to urban green spaces in Windhoek, showing how heat stress and flash flooding shape traders' productivity and customer movement, but the study emphasizes green infrastructure and spatial justice rather than adaptation and mitigation practices at the business level. Onyenechere et al. (2023) analyze sociodemographic factors associated with informal sector activities in selected Nigerian urban areas, but their focus is not specifically on climate-related risks and responses. Therefore, this article contributes to the literature by examining how informal sector operators in Ile-Ife experience climate-related disruptions, understand climate change, and adopt adaptation or mitigation responses across core, transition, and suburban residential zones. Its contribution lies in connecting socioeconomic profile, perceived climate impacts, awareness, information sources, and practical coping strategies within a medium-sized Nigerian city that has received less attention than major metropolitan or riverine flood-risk settings.

This article aims to examine how informal sector operators in Ile-Ife, Nigeria experience climate-related risks, understand climate change, and adopt adaptation and mitigation responses in their daily economic activities. Specifically, the study analyzes the socioeconomic characteristics of informal sector operators, identifies the main climate-related events affecting their work, assesses their level and sources of climate change awareness, and examines the coping strategies and forms of support needed to strengthen livelihood resilience. The article is organized into four main sections. The introduction presents the global and Nigerian context, reviews relevant studies, and identifies the research gap. The methods section explains the study area, sampling procedure, data collection, and descriptive analytical techniques. The results and discussion section presents findings on respondents' socioeconomic profile, climate-related disruptions, awareness, and adaptation or mitigation strategies across core, transition, and suburban residential zones. The conclusion summarizes the main findings and proposes policy recommendations for integrating informal sector concerns into local climate planning in Ile-Ife.

2. Methods

The study area, Ile-Ife is situated in the Ife Central and Ife East Local Government Areas. The climate of Ile-Ife is classified as tropical wet and dry, it experiences two distinct seasons: a wet season that typically spans from March to October, and a dry season from November to February. The annual rainfall ranges from 1,200 mm to 1,500 mm, with average temperatures ranging between 25°C and 32°C throughout the year. Relative humidity is generally high, particularly during the rainy season. These climatic characteristics support both urban agriculture and informal economic activities like street vending, petty trading, and transportation, but also make the area susceptible to climate-related risks such as flooding, soil erosion, and heat stress.



Figure 1. Map of Osun State in the Context of Nigeria
 Source; National Space Research and Development Agency [NASRDA] (2023)

Multi-stage sampling technique were adopted in this study. In the first stage, the study area was stratified into three developmental zones which are the core, transition and suburban. This stratification allows for comparative analysis across different levels of urban development. The second stage is the identification and selection of residential areas across the different developmental zones of Ile-Ife. According to information obtained from the reconnaissance survey, there are eight (8) areas in the core, ten (10) in the transition and four (4) in the suburban areas respectively, making total of 22 residential areas. Due to homogeneity of the areas in each zone, one area was randomly selected from each zone. Also, systematic random sampling technique were used in selecting 131 sampled residents. The target persons for questionnaire administration were the operator of home-based enterprise in the selected residential buildings.

forming the largest age group at 45% reflecting high participation of the active workforce in informal activities. The majority are married (60.3%), and educational attainment differs by residential zone, with the suburban area with the highest rate of tertiary education (82.4%). Income levels also vary: 45.8% earn ₦50,000–₦99,000, while only 5.3% earn less than ₦20,000, indicating income disparities by residential zone. Ethnically, Yoruba dominate (74.8%), and business registration is more common in suburban areas (88.2%). These findings align with recent literature that highlights how informal workers in African urban settings are especially vulnerable to climate-related risks such as heat, flooding, and limited infrastructure due to their socioeconomic attributes (Adeniran & Okafor, 2021; Adebayo & Oladipo, 2023; Mobolaji et al., 2025; Oyelere, 2025).

Table 1. Socioeconomic characteristics of the respondents

Variables	Residential Zones			
	Core Frequency (%)	Transition Frequency (%)	Suburban Frequency (%)	Total Frequency (%)
Gender				
Male	18(4.9)	45(64.9)	2(11.8)	65(49.6)
Female	26(59.1)	25(35.7)	15(88.2)	66(50.4)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Age (years)				
Less than 20 Years	0(0.0)	3(4.3)	0(0.0)	3(2.3)
20-29	8(18.2)	27(38.6)	3(17.6)	38(29.0)
30-39	19(43.2)	34(48.6)	6(35.3)	59(45.0)
40-49	13(29.5)	6(8.6)	7(41.2)	26(19.8)
50 and above	4(9.1)	0(0.0)	1(5.9)	5(3.8)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Marital Status				
Single	10(22.7)	30(42.9)	5(29.4)	45(34.4)
Married	30(68.2)	40(57.1)	9(52.9)	79(60.3)
Divorced/Widowed	4(9.1)	0(0.0)	3(17.6)	7(5.3)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Religion				
Christianity	16(36.4)	53(75.7)	11(64.7)	80(61.1)
Islam	15(34.1)	17(24.3)	6(35.3)	38(29.0)
Traditional	13(29.5)	0(0.0)	0(0.0)	13(9.9)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Educational Level				
No Formal Education	3(6.8)	0(0.0)	0(0.0)	3(2.3)
Primary	6(13.6)	4(5.7)	0(0.0)	10(7.6)
Secondary	23(52.3)	42(60.0)	3(17.6)	68(51.9)
Tertiary	12(27.3)	24(34.3)	14(82.4)	50(38.2)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Average Monthly Income (₦)				
< ₦20,000	0(0.0)	7(10.0)	0(0.0)	7(5.3)
₦20,000–₦49,000	9(20.5)	23(32.9)	3(17.6)	35(26.7)
₦50,000–₦99,000	23(52.3)	28(40.0)	9(52.9)	60(45.8)
₦100,000 & Above	12(27.3)	12(17.1)	5(29.4)	29(22.1)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Ethnicity				

Variables	Residential Zones			
	Core Frequency (%)	Transition Frequency (%)	Suburban Frequency (%)	Total Frequency (%)
Yoruba	34(77.3)	47(67.1)	17(100.0)	98(74.8)
Hausa	5(11.4)	15(21.4)	0(0.0)	20(15.3)
Igbo	5(11.4)	4(5.7)	0(0.0)	9(6.9)
Others	0(0.0)	4(5.7)	0(0.0)	4(3.1)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)

The socioeconomic profile of respondents reveals important dimensions of climate vulnerability among informal sector operators in Ile-Ife. The respondents were distributed across both male and female categories, showing that climate-related risks affect a wide section of the informal workforce. A large proportion of respondents fell within the economically active age groups, indicating that climate-related disruptions directly affect the productive population and, by extension, household welfare (table 1). This means that interruptions to informal sector activity have consequences not only for individual operators but also for dependent household members. Educational attainment and income distribution also suggest uneven adaptive capacity. Operators with higher educational attainment may be better positioned to interpret climate information and respond more effectively to risk, while lower-income operators are less able to absorb repeated losses or invest in protective measures. In this sense, vulnerability in the informal sector is shaped not only by exposure to weather events, but also by the socioeconomic resources available for coping and adjustment.

3.2 Impacts of Climate Change on Informal Sector Operators

This section highlights the perceived and experienced impacts of climate change on informal sector operators across the study area. Respondents identified key challenges such as irregular rainfall, flooding, heatwaves, and wind, all of which significantly affect their daily operations, productivity, and income. The effects vary across residential zones. The results indicated in Table 2 that 61.8% of the respondents in all residential areas reported having been affected by climatic conditions in their work with the highest being reported in the transition (64.3%) and suburban (64.7%) areas. Approximately 36.6 % of the respondents reported they had lost money due to such disruptions and 24.4 % had weather related health problems. The most important weather occurrence that has an impact on informal workers was rainfall (90.1%), then there is wind and heat. The fact that the majority of the respondents (59.5%) evaluated the overall effects of climate change on their activities as low to middle level, nevertheless, represents an indication of the growing vulnerability in the informal sector. These findings can be compared to the findings provided by Adelekan and Asiyambi (2021) and Ajaero and Nzeadibe (2020), who have stated that workers of the informal sector in Nigerian cities are becoming more vulnerable to flooding and heat stress, which is caused by rainfall and lacks adaptive infrastructure and planning.

Table 2. Impacts of Climate Change on Informal Sector Operators

Variables	Residential Areas			Total
	Core Frequency (%)	Transition Frequency (%)	Suburb Frequency (%)	Frequency (%)
Climate-Related Disruptions to Work Experienced by Respondents				
Yes	25(56.8)	45(64.3)	11(64.7)	81(61.8)
No	19(43.2)	25(35.7)	6(35.3)	50(38.2)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Financial Losses Resulting from Climate-Related Disruptions				

Variables	Residential Areas			Total
	Core Frequency (%)	Transition Frequency (%)	Suburb Frequency (%)	
Yes	17(38.6)	24(34.3)	7(41.2)	48(36.6)
No	22(50.0)	43(61.4)	10(58.8)	75(57.3)
Not sure	5(11.4)	3(4.3)	0(0.0)	8(6.1)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Health Issues of Respondents Linked to Weather Conditions				
Yes	10(22.7)	15(21.4)	7(41.2)	32(24.4)
No	34(77.3)	55(78.6)	10(58.8)	99(75.6)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Weather Events that Most Affect Respondents' Work				
Heat	2(4.5)	0(0.0)	0(0.0)	2(1.5)
Rain	32(72.7)	70(100.0)	16(94.1)	118(90.1)
Flooding	4(9.1)	0(0.0)	0(0.0)	4(3.1)
Wind	6(13.6)	0(0.0)	1(5.9)	7(5.3)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)
Extent of Climate Change Impact on Informal Sector Activities				
None	2(4.5)	0(0.0)	2(11.8)	4(3.1)
Low	21(47.7)	51(72.9)	6(35.3)	78(59.5)
Moderate	15(34.1)	15(21.4)	9(52.9)	39(29.8)
High	4(9.1)	4(5.7)	0(0.0)	8(6.1)
Severe	2(4.5)	0(0.0)	0(0.0)	2(1.5)
Total	44(100.0)	70(100.0)	17(100.0)	131(100.0)

A notable proportion of respondents also reported financial loss and weather-related health problems. These findings are important because informal operators often depend on daily income to sustain both business operations and household needs. Financial loss therefore has immediate implications for food, transport, rent, inventory replacement, and general survival. Likewise, health problems can reduce work capacity and increase the cost of living. Although many respondents described the extent of impact as low or moderate, such responses should be interpreted carefully. Repeated low- to moderate-level disruptions can accumulate over time and gradually weaken business stability and livelihood resilience.

3.3 Source and Level of Awareness of Climate Change in the Study

This section explores the awareness and perception of climate change among informal sector operators across different residential zones in Ile-Ife. It provides insights into their understanding of human activities and the associated climate-related events they have experienced. As presented in Table 3, the majority of the respondents in all residential zones know about climate change, though, the levels of awareness are higher in the transition and suburban areas with (84.3%) and (88.2%). Nevertheless, the knowledge level is at the medium, which means that awareness does not produce deep knowledge at all times. The primary sources of information are social media and radio, whereas the most frequent climate-related occurrences are heat and irregular rain. These developments have adversely affected home-based businesses especially in terms of decreased daily sales. This trend confirms the conclusions of Olanrewaju et al. (2023) and Ayanlade and Jegede (2021), Daramola et al. (2023), Mobolaji et al. (2024), Mobolaji et al. (2025) who reported that urban dwellers are becoming more aware of the issue of climate change, although their ability to adapt to it and their knowledge of the socioeconomic consequences of this phenomenon is low.

Table 3. Sources and Level of Awareness of Climate Change in the Study

Variables	Residential Areas			Total Frequency (%)
	Core Frequency (%)	Transition Frequency (%)	Suburb Frequency (%)	
Respondents' Awareness of Climate Change				
Yes	30 (68.2)	59 (84.3)	15 (88.2)	104 (79.4)
No	14 (31.8)	11 (15.7)	2 (11.8)	27 (20.6)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Sources of Information on Climate Change				
Television	1 (2.3)	13 (18.6)	0 (0.0)	14 (10.7)
Radio	10 (22.7)	8 (11.4)	3 (17.6)	21 (16.0)
Social media	7 (15.9)	24 (34.3)	8 (47.1)	39 (29.8)
Friends	7 (15.9)	14 (20.0)	1 (5.9)	22 (16.8)
NGOs	3 (6.8)	4 (5.7)	2 (11.8)	9 (6.9)
Religious Institutions	2 (4.5)	0 (0.0)	0 (0.0)	2 (1.5)
Others	14 (31.8)	7 (10.0)	3 (17.6)	24 (18.3)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Level of Understanding of Climate Change				
Good	6 (13.6)	24 (34.3)	5 (29.4)	35 (26.7)
Fair	14 (31.8)	14 (20.0)	7 (41.2)	35 (26.7)
Poor	14 (31.8)	25 (35.7)	5 (29.4)	44 (33.6)
None	10 (22.7)	7 (10.0)	0 (0.0)	17 (13.0)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Perception of Human Influence on Climate Change				
Yes	14 (31.8)	56 (80.0)	12 (70.6)	82 (62.6)
No	2 (4.5)	3 (4.3)	3 (17.6)	8 (6.1)
Maybe	28 (63.6)	11 (15.7)	2 (11.8)	41 (31.3)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Climate-Related Events Experienced by Respondents				
Flooding	10 (22.7)	16 (22.9)	1 (5.9)	27 (20.6)
Heat	13 (29.5)	33 (47.1)	11 (64.7)	57 (43.5)
Drought	2 (4.5)	0 (0.0)	1 (5.9)	3 (2.3)
Irregular Rainfall	19 (43.2)	21 (30.0)	4 (23.5)	44 (33.6)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Effect of Climate Change on Home-Based Enterprises				
Affected Daily Sales	29 (65.9)	53 (75.7)	14 (82.4)	96 (73.3)
Loss of Goods	8 (18.2)	8 (11.4)	1 (5.9)	17 (13.0)
Others	7 (15.9)	9 (12.9)	2 (11.8)	18 (13.7)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)

The dominance of social media and radio as sources of information indicates that accessible communication channels play a major role in shaping climate awareness (table 3). At the same time, the uneven level of understanding suggests that information exposure is often fragmented and not always translated into actionable knowledge. Many respondents appear to understand climate change mainly through lived experience, especially through heat, rainfall irregularity, and disruptions to sales or work timing. This means that awareness in the study area is often experiential rather than deeply analytical. As such, awareness should be seen as a starting point for resilience, not as evidence of adequate response capacity.

3.4 Climate Change Adaptation and Mitigation Strategies in the Study Area

The table shows that there are spatial variations in the operations of the informal sector in the residential areas react to the conditions of climate. A higher percentage of the respondents in transition zones (50.0%), suburban regions (41.2%) held the view that their work practices changed because of weather than those in the core zone (31.8%), which suggests more adaptive flexibility in the peripheral regions. The level of awareness regarding climate adoption also differed between suburban (47.1%), transition (35.7%), and core zone (11.4%) as the respondents indicated that the information and education accessibility can potentially change climate responsiveness. The most prevalent adaptation technique was shelter modification (57.3%), which are the use of speedy and inexpensive coping mechanisms instead of migration or modification of products.

Institutional involvement in climate education is low with only (22.1%) of the respondents having attended climate-related training. The majority of trained individuals who identified facilitators other than the government agencies referred to NGOs (20.6%), community organizations (20.6%), and it is consistent with the findings of Adedeji et al. (2023) and Adenle (2022) that non-state actors are increasingly involved in climate awareness efforts of the vulnerable population. In addition, even though the intention to participate in further training was rather high (34.4%), a significant proportion of the respondents (61.1%) remained uncertain, which could be explained by a low sense of perceived benefits or opportunity costs. Lastly, most of them cited that they need financial resources, including loans with (55.0%), and equipment (29.8%) to expand the capacity of climate adaptation, which backs previous findings that financial empowerment is the key component of resilience in informal economies (Akinbami & Bello, 2021).

Table 4. Adaptation and Mitigation Strategies

Variables	Residential Zones			Total Frequency (%)
	Core Frequency (%)	Transition Frequency (%)	Suburban Frequency (%)	
Changes in Work Practices due to Weather Conditions				
Yes	14(31.8)	35 (50.0)	7 (41.2)	56 (42.7)
No	30 (68.2)	35 (50.0)	10 (58.8)	75 (57.3)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Awareness of Climate Adaptation Strategies among Respondents				
Yes	5 (11.4)	25 (35.7)	8 (47.1)	38 (29.0)
No	39 (88.6)	45 (64.3)	9 (52.9)	93 (71.0)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Adaptation Methods Adopted by Respondents				
Shelter	25 (56.8)	41 (58.6)	9 (52.9)	75 (57.3)
Relocation	1 (2.3)	20 (28.6)	2 (11.8)	23 (17.6)
Product Change	2 (4.5)	0 (0.0)	1 (5.9)	3 (2.3)
Early Closure	12 (27.3)	0 (0.0)	5 (29.4)	17 (13.0)
None	4 (9.1)	9 (12.9)	0 (0.0)	13 (9.9)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Climate-Related Training Attended by Respondents				
Yes	5 (11.4)	19 (27.1)	5 (29.4)	29 (22.1)
No	39 (88.6)	51 (72.9)	12 (70.6)	102 (77.9)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Organizations Providing Climate-Related Training				
NGOs	7 (15.9)	15 (21.4)	5 (29.4)	27 (20.6)
Government	3 (6.8)	8 (11.4)	1 (5.9)	12 (9.2)
Others	34 (77.3)	47 (67.1)	11 (64.7)	92 (70.2)

Variables	Residential Zones			Total
	Core Frequency (%)	Transition Frequency (%)	Suburban Frequency (%)	
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Respondents' Willingness to Attend Climate-Related Training				
Yes	10 (22.7)	27 (38.6)	8 (47.1)	45 (34.4)
No	3 (6.8)	3 (4.3)	0 (0.0)	6 (4.6)
Maybe	31 (70.5)	40 (57.1)	9 (52.9)	80 (61.1)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)
Types of Support Needed by Informal Sector Operators				
Loan	27 (61.4)	38 (54.3)	7 (41.2)	72 (55.0)
Equipment	7 (15.9)	24 (34.3)	8 (47.1)	39 (29.8)
Cooperative	8 (18.2)	3 (4.3)	2 (11.8)	13 (9.9)
Weather Alert	2 (4.5)	5 (7.1)	0 (0.0)	7 (5.3)
Total	44 (100.0)	70 (100.0)	17 (100.0)	131 (100.0)

The findings indicate that adaptation among informal sector operators is mostly reactive, short-term, and low-cost. Only a small proportion of respondents were formally aware of adaptation strategies or had participated in climate-related training, suggesting that most responses are coping mechanisms rather than planned adaptation (table 4). Measures such as shelter modification and temporary work adjustments are more common than structural or long-term solutions institutional support remains limited. The low participation in climate training indicates that formal climate governance has not effectively reached home-based enterprise operators. Awareness alone is insufficient without practical guidance and support. Respondents also highlighted the need for loans, equipment, cooperative support, and weather alert systems, showing that the challenge involves not only awareness but also limited financial and material capacity. Conceptually, the questionnaire captures adaptation practices more clearly than direct mitigation behaviour. Therefore, mitigation in this study is interpreted as part of broader climate responsiveness and preparedness rather than direct measurement of greenhouse gas reduction actions. Overall, the main challenge faced by informal sector operators in Ile-Ife is limited adaptive capacity under weak institutional and material support, rather than climate exposure alone

4. Conclusion

The study revealed out that rainfall variability is the most significant climate-related factor affecting informal sector activities in Ile-Ife. This suggests that many informal sector operators rely on outdoor or semi-open business environments that are highly vulnerable to weather conditions. The result aligns with Aina and Olatunde (2022), who observed that informal workers in Lagos experience productivity losses during periods of heavy rainfall and extreme heat. Similarly, Adelekan and Asiyebi (2021) reported that inadequate urban infrastructure increases the vulnerability of informal sector workers to climate risks in Nigerian cities. The predominance of shelter modification as an adaptation strategy further reflects the limited financial capacity of informal workers to implement more advanced adaptive measures. This highlights the need for institutional interventions aimed at strengthening climate resilience within the informal economy. The study concluded that climate change significantly affects informal sector operators in Ile-Ife, mainly through rainfall and flooding, which disrupt daily sales, damage goods, and pose health risks. While awareness of climate change is fairly high, practical understanding and adaptation remain limited, with minimal government support compared to NGOs. To strengthen resilience, the study recommends integrating informal sector needs into local climate plans, increasing government participation in training, establishing localized weather alerts, promoting business diversification and relocation, improving access

to credit and equipment, supporting cooperatives, enhancing communication through radio and social media, and using community and religious events to promote climate awareness.

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