

INDIGENOUS ADAPTATION MEASURES ADOPTED BY RURAL FARMERS IN FCT-ABUJA TO MITIGATE CLIMATE CHANGE IMPACTS

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Abstract

The neglect of indigenous knowledge by policymakers and development partners, such as Non-Governmental Organisations (NGOs), excludes rural farmers from climate change discourse. This poses challenges to effective climate change adaptation measures among rural farmers. This study was conducted to provide an understanding of the Indigenous Adaptation Measures Adopted by Rural Farmers in Bwari and Gwagwalada Area Councils of FCT-Abuja, Nigeria. A sample size of 348 rural farmers was randomly selected from the six selected farming communities in FCT, including Kawu, Zuma, Igu, Dobi, Kaida, and Dota communities. Data were collected from both primary and secondary sources through Focused Group Discussions and questionnaires. Data collected were analysed using both descriptive and inferential statistics. The study found that rural farmers in FCT-Abuja adopted crop rotation, planting of drought-resistant crops, change of planting dates, and soil conservation as indigenous adaptation measures to mitigate climate change impacts. It established that rural farmers in the FCT consider indigenous adaptation measures very effective. The study recommended that policymakers and development partners design climate change interventions targeting rural farmers in line with indigenous knowledge and practices that are culturally sensitive to make the interventions effective and sustainable.

Keywords: Indigenous, Climate Change, Adaptation, Rural Farmers

Introduction

Climate change poses a significant threat to agricultural practices and livelihoods, especially in Africa and other developing countries where rural farmers rely heavily on rain to carry out their farming activities (IPCC, 2022). In Nigeria, rural farmers in Abuja, the Nigerian capital city, are confronted with the challenges of increasingly unpredictable rainfall patterns, rising temperatures, soil degradation, and recurring extreme weather events (Akinbobola and Olaniyan, 2020; Nwafor et al., 2021). These challenges, resulting from climate change, are resulting in food insecurity, posing a huge threat to

rural farmers' income, and undermining sustainable development efforts (Dauda, 2021).

However, rural communities are resorting to indigenous adaptation measures as long-standing practices rooted in indigenous knowledge, to cope with and mitigate these climate change impacts. Berkes (2018) sees Indigenous knowledge Systems (IKS) as the cumulative body of knowledge, practices, and beliefs evolved by local communities over generations through direct interaction with their environment. Nyong et al. (2007) and Agrawal (2008) point out that IKS are location-specific and are not universal; at the same time, they are embedded in the

people's culture that guides them in the way they live and interact with their environment.

In the Federal Capital Territory, Abuja, rural farmers rely on crop rotation, use of drought-resistant crops, and traditional weather forecasting as indigenous measures to mitigate climate change impacts (Ajayi et al., 2020; Egbule et al., 2015). Although climate-smart agriculture is been promoted by government and private sector interventions, indigenous adaptation measures continue to gain prominence among rural communities due to their acceptability and sustainability (Mertz et al., 2009; Opere, 2018). These practices, which are climate change resilience rooted in community indigenous knowledge systems, are often overlooked in mainstream climate discourse (Adger et al., 2011; Tambo and Abdoulaye, 2013).

Past studies have investigated indigenous responses to climate variability in many communities in sub-Saharan Africa, yet there are insufficient studies in the region focusing on the FCT-Abuja communities (Odjugo, 2010; Ifejika Speranza, 2010).

It is within this context that this study seeks to bridge this knowledge gap by examining the indigenous adaptation measures adopted by rural farmers in FCT-Abuja to mitigate climate change. It will identify and document the effectiveness of these practices.

Identifying and documenting these indigenous measures is not only crucial for enhancing local resilience, but it also contributes to the global conversation on sustainable and inclusive climate adaptation. In recognizing the value of local knowledge, this research aligns with global frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, which advocate for the integration of indigenous perspectives in climate action.

Indigenous Adaptation to Climate Change

Every indigenous community has its own collective body of knowledge, often referred to as Traditional Ecological Knowledge, derived from centuries that regulates its practices and beliefs on how the people live and interact with the environment. The indigenous adaptation practice has developed over a long period of time through the observation of the natural environment and patterns. It is a community

practices that regulate its resource management and farming activities, such as crop rotation, mixed cropping, and weather forecast as indigenous measures to mitigate climate change impacts (Berkes et al, 2000).

Communities have cultural resilience, which is their ability to uphold and adapt to their cultural identity and social systems in the face of environmental stressors. Communities have Indigenous institutions such as indigenous association networks, age-grade systems, and community rituals that they rely on to facilitate and sustain responses to climate variability. The cultural resilience is sustained through community collective decision-making and shared practices that enhance adaptive capacity. It is also sustained through social memory and oral histories that teach and guide community members on future responses to climatic variability (Nelson et al, 2007).

Rural Farmers

Rural farmers are individuals who cultivate and manage agricultural land in rural areas, often relying on traditional practices and techniques passed down through generations. They play a significant role in agricultural production, relying on it for their livelihood and income generation (Zhang and Feng, 2019). George (2015) notes that rural farmers depend predominantly on family labour as their means of production and participation in the agricultural chain. Similarly, Ugonna (2020) explains that rural farmers contribute a huge portion of food production in any developing economy. However, their participation and efficiency in agricultural activities are dependent on their knowledge and skills in the entire agricultural chain.

Empirical Review

Chidiebere et al (2018) reported in their study "Assessment of Food Crop Farmers Indigenous Strategies to Climate Change Mitigation and Adaptation in Imo State Rural farmers in Imo state, Southeast Nigeria that rural farmers rely on Indigenous practices of planting disease-resistant crops, crop rotation, and agroforestry practices for climate change mitigation and adaptation.

Indigenous adaptation practices among rural farmers in Imo are hugely effective and require research institutions to investigate further and work with extension workers to ensure they are properly integrated into sustainable agricultural practices.

Ihenacho, et al (2019) reported in their study “Rural Farmers Use of Indigenous Knowledge Systems in Agriculture for Climate Change Adaptation and Mitigation in Southeast Nigeria” that majority of rural farmers in Southeast Nigeria, do not have formal education and rely on the use of crop diversification, crop rotation, multiple cropping, agroforestry, ashes for pest control, and cannabis to control new castle diseases as Indigenous practices for climate change mitigation and adaptation. The study established that Indigenous knowledge and its applicability are effective and valuable in sustainable agricultural practices among rural farmers.

Abdul (2023) reported in his study “Analysis of Indigenous Knowledge for Climate Change Mitigation and Adaption among Rural Farmers in Ibaji, Kogi State, Nigeria” that rural farmers in the Ibaji community of Kogi State, North-Central Nigeria have over the years relied on the Indigenous practices of crop rotation and soil conversation as the most effective means of climate change mitigation and adaptation measures. The study established that these Indigenous practices are part of the community culture that they have relied on to successfully carry out sustainable farming activities among themselves. The study recommended that governments at all levels should work with Non-Governmental Organisations and agricultural extension workers to support rural farmers and strengthen their capacity in the use of Indigenous practices for mitigation and adaptation measures.

Oladele and Amara (2024) in their study “Farmers’ use of Indigenous knowledge On Climate Change Adaptation across Farming Systems and Agroecological Zones of Sierra Leone” reported that rural farmers in Sierra Leone have over the decades relied on rotational grazing, migration, crop-livestock integration, and manure application as their most effective indigenous practices for climate change adaptation. The study recommended that interventions targeting climate change among rural

farmers in Sierra Leone should take Indigenous knowledge systems into serious consideration because they have proven to be hugely effective in farming activities among the rural farmers.

Theoretical Framework

This study adopts Indigenous Knowledge Systems (IKS) and Participatory Communication as theoretical frameworks of analysis. IKS is not known to have been propounded by a single scholar; it emerged from a collective work of indigenous scholars, researchers, and communities globally. George (2012), in his works, *Indigenous Knowledge and Anti-colonial Thought*, and *Indigenous Anti-Colonial Knowledge as ‘Heritage Knowledge’ for Promoting Black/African Education in Diasporic Context*, challenges dominant Western knowledge systems and advocates for the recognition and validation of Indigenous knowledge and perspectives. His contribution led to a wider understanding of the role indigenous knowledge plays in community development and societal preservation.

The Indigenous Knowledge Systems argues that every society has, over a long period, developed its unique philosophies and knowledge that govern its interaction and dealings with its natural environment. The philosophies and knowledge are so significant that they inform the basis on which society decides the fundamental aspects of their day- to-day life. It cannot be separated from society, it is integral to their culture, that encompasses language, social classification, resource use practices, social interactions, ritual, and spirituality. Every society believes that its Indigenous Knowledge System is supreme and cannot be replaced with any other knowledge and that it is a critical connection in which they build sustainable social and economic development.

Historically, rural farmers in FCT possess rich traditional knowledge and cultural practices that have enabled them to adapt to their environment for generations (Dauda, 2021). The FCT rural farmers have over the years developed indigenous communication methods of storytelling, proverbs, and community gatherings to share knowledge and

wisdom on climate-related issues among themselves (Dauda, 2021). This study sees indigenous knowledge as established traditionally accepted knowledge and practices of indigenous peoples, in their interaction and relation among themselves and their environment. Also, indigenous knowledge and indigenous communication implemented within the cultural sensitivity of the locals, play a significant role in climate change understanding and mobilize them for adaptation and mitigation practices. This study strongly believes that communication strategy targeting the rural population must consider their cultural sensitivity and ensure messages are crafted and conveyed in line with their culture. It is within this context that this study adopts Indigenous Knowledge Systems (IKS) as a theoretical framework of analysis.

Research Methodology

This research employed an explanatory sequential mixed-methods model, where quantitative data were collected and analyzed, followed by the collection of qualitative data to augment and interpret the findings. Quantitative methods,

including surveys and statistical analyses, were employed to measure and analyse Indigenous Adaptation Measures Adopted by Rural Farmers in communities covered in the study. This was supported by the qualitative method of Focused Group Discussions (FGDs), which provided in-depth insights and diverse perspectives from the rural farmers on the Indigenous Adaptation Measures Adopted to Mitigate Climate Change

The population of this study is farmers who are actively engaged in farming activities in the communities studied. The study focused on the registered number of farmers in the Bwari and Gwagwalada Area Councils, respectively, and narrowed it down to the communities covered in the study. According to records obtained from the Special Agro Processing Zones (SAPZ), a federal government initiative established to promote increased productivity and the agricultural value chain, as of 2023. The table below shows the distribution of registered Farmers in study locations within Gwagwalada and Bwari Area Councils, FCT-Abuja. However, Yamane's (1967) formula was used to determine a sample size of 351 rural farmers.

Table 1: Distribution of Registered Farmers in Study Locations within Gwagwalada and Bwari Area Councils, FCT-Abuja

Area Council	Ward	Study Communities Located in Ward	Number of Registered Farmers in Ward	Total Registered Farmers in Area Council
Gwagwalada Area Council	Dobi Ward	Yes	1,856	15,100
Bwari Area Council	Kawu Ward	Yes	1,892	14,317
	Total (Study Population)		3,748	

This study employed a purposive and a stratified random sampling technique to guarantee an all-inclusive and proportional representation of the diverse rural communities involved in farming activities in the Dobi and Kawu wards in Gwagwalada and Bwari Area Councils of FCT. From each community, participants were randomly selected to form the sample of 348 rural farmers,

established using Yamane's formula. This method guaranteed that each of the communities was represented in the sample that is proportion to its size within the total 3,748 study population. The sample population was divided into primary and secondary groups. The primary group consists of 306 rural farmers randomly selected, 51 each from the six communities to whom questionnaires were

administered. The secondary group consists of seven farmers purposively selected from each of the communities studied who participated in Focused Group Discussions (FGDs).

The study employed primary data collection as the main source of information. Questionnaires were physically distributed to respondents. The questionnaires consist of closed and open-ended questions that enabled respondents to select appropriate answers applicable to them in the options provided. The questionnaires were designed to elicit data that addressed the research objectives. In addition to the questionnaire,

Focused Group Discussions (FGDs) of 42 participants, seven from each of the six communities, were carried out to gather in-depth insight information from participants who were employed to analyse Indigenous Adaptation Measures Adopted by Rural Farmers in FCT-Abuja to Mitigate Climate Change Impacts. Like the questionnaire, FGDs were carried out using questions that addressed the research objective as instruments to gather in-depth information from participants.

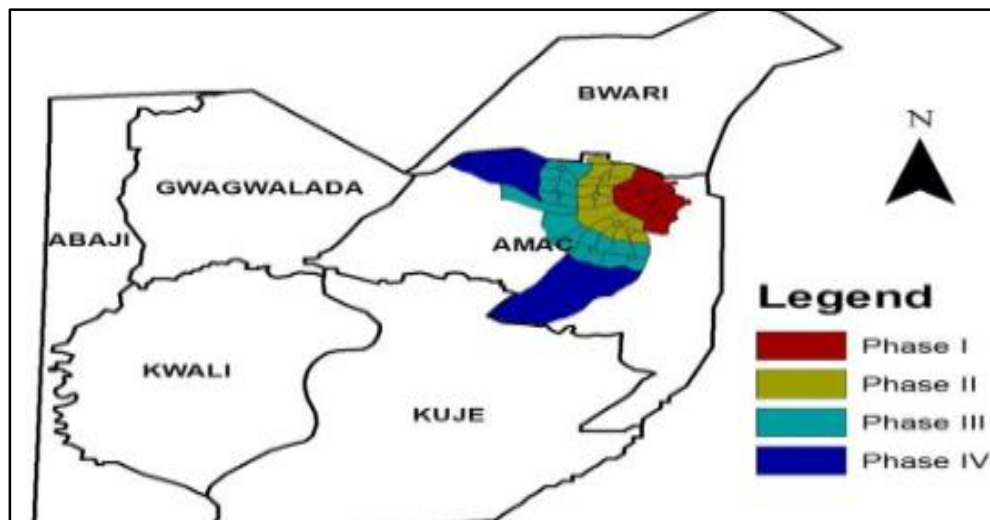


Figure 1: Study Area

Kawu, Igu and Zuman communities are located in the Bwari Area Council of the Federal Capital Territory, Abuja. Also, Dota, Kaida and Dobi communities are located in the Gwagwalada Area Council of FCT-Abuja. The six communities are predominantly rural, with farming as a major occupation. They rely on rain for their agriculture and are experiencing climate impacts.

Data Presentation and Analysis

Table 1 shows the level of Indigenous climate change adaptation measures by the respondents in the communities studied. The result showed that majority (88.95%) of the respondents adopted crop rotation as an Indigenous climate change adaptation measure. This showed that most farmers in the communities studied adopted crop rotation as an Indigenous climate change adaptation measure.

Table 2: Level of Adoption of Indigenous Climate Change Adaptation Measures by the Respondents

Indigenous Climate change adaptation measures adopted	Frequency	Percentage %	Ranking
Crop Rotation	272	88.95	1 st
Changes in planting dates	30	9.80	2 nd
Soil conservation techniques	3	0.98	3 rd
Use of drought-tolerant crops	1	0.33	4 th

Source: Survey Data, 2025

On the other hand, an insignificant proportion (9.80%) and (0.98%) of the respondents relied on changes in planting dates and soil conservation techniques, respectively, as Indigenous climate change adaptation measures. This indicated that a small number of farmers in the communities studied relied on changes in planting dates and soil conservation techniques for Indigenous climate change adaptation measures; at the same time, it showed that farmers in the communities studied adopted different Indigenous climate change adaptation measures. This result is in line with the finding by Abdul (2023) who reported in his study “Analysis of Indigenous Knowledge for Climate Change Mitigation and Adaption among Rural Farmers in Ibaji, Kogi State, Nigeria” that farmers have over the years relied on the Indigenous practices of crop rotation and soil conversation as the most effective climate change mitigation and adaptation measures.

Focused Group Discussions (FDGs)

The findings from the Focus Group Discussions (FDGs) conducted across the selected rural communities in the Federal Capital Territory (FCT), Abuja, reveal critical insights into farmers’ indigenous adaptation strategies in response to climate change. Through thematic analysis, the data unearthed recurrent patterns and community-specific practices rooted in traditional knowledge systems. These practices reflect the collective experiential understanding of environmental changes and the pragmatic strategies adopted to sustain agricultural productivity amid climatic uncertainties. Two dominant themes

emerged from the analysis: (i) reliance on crop rotation as an indigenous adaptation strategy, and (ii) selective adoption of drought-resistant crops for climate resilience.

Theme 1: Reliance on Crop Rotation as an Indigenous Adaptation Strategy

Across all FGDs conducted in the studied communities, crop rotation was unanimously identified as a predominant indigenous practice employed by farmers to cope with the adverse impacts of climate change. Participants emphasized that this method has been passed down through generations and continues to serve as an effective soil management and yield optimization technique. The prevalence of crop rotation among farmers illustrates a deep-rooted reliance on local knowledge systems for sustaining agricultural productivity despite increasing climate variability. This theme reflects both the cultural continuity of traditional practices and their perceived efficacy in mitigating the risks posed by erratic weather patterns, declining soil fertility, and prolonged dry seasons.

Theme 2: Selective Adoption of Drought-Resistant Crops

In contrast to the widespread adoption of crop rotation, the planting of drought-resistant crops was reported to be less common among farmers. Participants across all FGDs acknowledged that only a small number of farmers in each community had adopted this strategy. The limited uptake was attributed to factors such as lack of awareness,

limited access to improved seed varieties, and entrenched preferences for traditional crops. Nonetheless, participants affirmed that those who practiced drought-resistant crop farming viewed it as a promising response to prolonged dry spells and reduced rainfall. This theme highlights the gradual but emerging integration of newer adaptation strategies within the broader context of indigenous climate resilience practices.

The thematic analysis of the FGDs reveals that indigenous knowledge remains central to climate change adaptation among rural farmers in the studied communities. The widespread adoption of crop rotation reflects a deeply embedded traditional practice that has proven effective in sustaining soil fertility and ensuring continued crop productivity despite climatic stressors. In contrast, the selective and limited adoption of drought-resistant crops indicates an emerging, yet less entrenched, adaptation strategy influenced by factors such as access, awareness, and local preferences. Together, these themes underscore the dual reliance on time-tested indigenous practices and the cautious integration of newer methods in farmers' efforts to mitigate the impacts of climate change.

Discussion of Findings

Rural farmers in the communities studied adopted crop rotation, soil conservation, change in planting date, and planting of drought-resistant crops as indigenous adaptation measures to mitigate climate change impacts. Crop rotation is the most common indigenous adaptation measure adopted by the majority of farmers in the communities studied to mitigate climate change impacts. The practice is that farmers do not repeat planting of the same type of crop on the same piece of land, for example, if maize was planted on a particular piece of land this year, yam will be planted on it next year. The adoption of crop rotation as the indigenous adaptation measure to mitigate climate change impacts in the communities studied, is in line with the finding by Chidiebere, et al, (2018) who reported in their study "Assessment of Food Crop Farmers Indigenous Strategies to Climate Change Mitigation and Adaptation in Imo State, Nigeria" that rural farmers in Imo state, Southeast

Nigeria rely on Indigenous practices of planting disease-resistant crops, crop rotation, and agroforestry practices for climate change mitigation and adaptation measures.

A small population of farmers who do not own large farms adopted soil conservation as an Indigenous measure to mitigate climate change impacts. At the same time, farmers use the application of manure for soil nutrient replenishment to improve its condition for better crop yields. Through this approach, rural farmers in the communities studied have been able to record good harvests without relying on fertilizers. Additionally, changes in planting dates and planting of drought-resistant crops were other indigenous measures adopted to mitigate climate change among rural farmers in the communities studied. The adoption of soil conservation and planting of drought-resistant crops as measures to mitigate climate change impacts by a smaller number of farmers in the community studied is in line with the finding by Abdul (2023) who reported in his study "Analysis of Indigenous Knowledge for Climate Change Mitigation and Adaption among Rural Farmers in Ibaji, Kogi State, Nigeria" that rural farmers in the Ibaji community of Kogi State, North-Central Nigeria have over the years relied on the Indigenous practices of crop rotation and soil conservation as the most effective measure of mitigating climate change impacts.

"Our forefathers used crop rotation, soil conservation, and planting of drought-resistant crops as indigenous knowledge to mitigate the impact of weather change on their farming activities, it worked well for them which is why they transferred it to generations, today we use the same approach and it is working better for us making it possible for all farmers to manage the impact of this unbearable weather change in on our crops",
a participant in Lgu community FGD said.

Rural farmers in the communities studied believe in the indigenous adaptation measures of crop rotation, soil conservation, change in planting dates, and use of drought-resistant crops as the most effective measures to mitigate climate change impacts. They

see the measures as indigenous knowledge among farmers that have been practiced for years and have shown results in their effectiveness in mitigating climate change impacts.

“We learned the use of crop rotation and soil conservation as the best practices for climate change mitigation from our father, the practices have proven to be hugely effective and all farmers in this community adopt them to mitigate the bad effects this hot weather conditions are having on our crops,”
a participant in Dobi community FGD said.

Rural farmers in the communities studied perceived indigenous adaptation measures of crop rotation and soil conservation as not only about mitigating climate change impacts but also a preservation of the people’s culture that has been in practice for centuries and has enabled them to survive many challenges thrown at them as a result of the change in weather. The communities do not see climate change as a new phenomenon, but as weather events that have existed for centuries, while their forefathers had developed indigenous measures of crop rotation and soil conservation as mitigation measures. The farmers see indigenous measures of crop rotation and soil conservation as the most effective practices transferred to them by their fathers as cultural norms, which are solutions to addressing environmental impacts on farming activities. The adoption of indigenous adaptation measures to mitigate climate change impacts by the rural farmers is in line with the finding by Oladele and Amara (2024) who reported in their study “Farmers’ use of Indigenous knowledge On Climate Change Adaptation across Farming Systems and Agroecological Zones of Sierra Leone” that rural farmers in Sierra Leone have over the decades relied on indigenous adaptation measures of crop rotation and manure application to mitigate climate change impacts.

The adoption of indigenous adaptation measures to mitigate climate change impacts by rural farmers in the communities studied validates the Indigenous Knowledge System (IKS) adopted as a theoretical framework of analysis in this study. The fundamental

tenets of the theory are that every society has its IKS that it has developed over a long period, which it relies on to live and interact with its environment. Therefore, this fundamental on which IKS rests its argument conforms to the practices among rural farmers in the communities studied, which validates its adoption as a theoretical framework of analysis in this study.

Conclusion

This study was carried out with the objectives of identifying the Indigenous Adaptation Measures Adopted by Rural Farmers in FCT-Abuja to Mitigate Climate Change Impacts. The study found that rural farmers in FCT adopted crop rotation methods, changes in planting dates, and planting drought-resistant crops as indigenous adaptation measures to mitigate climate change impacts. The indigenous adaptation measures are effective. They are ingrained in the community culture and passed on through generations. They are seen as the best form of sustainable agricultural practices among the people.

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