Journal of Agriculture and Environment for International Development - JAEID 2025, 119 (1): 183 - 208
DOI:10.36253/jaeid-16639

# Environmental Resource Conflicts and Food Insecurity in Rural Southeast Nigeria: Implications for Humanitarian and Sustainable Development Policies

SAMUEL OKAFOR[1], ANDREW OGBOCHIE[2], CHUKWUKA UGWU[2*], CHIZOBA ORANU[3], GLORIA AMADI[4], CHIGOZIE UGWUANYI[2], OKOLO MODESTA[2]

[1] *Department of Sociology/Anthropology, University of Nigeria, Nsukka*

[2] *Department of public administration and local government, University of Nigeria, Nsukka*

[3] *Department of Agricultural and Applied Economics, Lilongwe University of Agriculture and Natural Resources, Malawi*

[4] *Institute of Climate Change Studies, Energy and Environment, University of Nigeria, Nsukka*

**Correspondence details: chukka.ugwu@un.edu.ng*

Submitted on: 2024, 22 September; accepted on 2025, 13 March. Section: Research Papers

**Abstract:** Environmental resource crises involving farmers and herdsmen in developing nations can affect the realisation of the United Nations 2030 Sustainable Development Goals'(SDGs) targets, such as elimination of poverty, elimination of hunger and food insecurity, peace and safety of the human settlements, as well as sustainable production and consumption. This study examined this situation among indigenous farmers and migrating herdsmen in southeast Nigeria. The study aimed to examine the relationship between environmental resource access crises and food insecurity indicators in southeast Nigeria, as well as investigate the social indicators of climate change and environmental resource access crises and the predictors of resource access crises among the farmers and herders. This study involved 1658 respondents and was guided by the Resource Access Theory (RAT) (Ribot & Peluso, 2003). The study applied a survey research design with multistage and probability sampling techniques. Data were collected with a questionnaire instrument developed using FAO, IFAD, UNICEF, WFP and WHO's (2019) mild, moderate and severe food insecurity scale, and Coleman et al.'s (2013) Household Food Security Survey Module [HFSSM]. Percentage analysis, Spearman's rho Correlation and multiple linear regression statistics were utilised in analysing the collected data. The analysis revealed a strong positive correlation between environmental resource-access crises and food utilization rho (1658) = .329 P =.01, a decrease in food stability rho (1658) = .308 P =.01, a decrease in food access rho (1658) = .234 P =.01, a decrease in food availability rho (1658) = .526 P =.01, and a decrease in food production rho (1658) = .307 P =.01. There is also a positive correlation between climate change and environmental resource-access crises in the region rho (1658) = .388 P =.01, while environmental resource-access crises are predicted by education, religion, climate change, etc (** p<.01, *** p<.000, R2= 72.9).One implication of these findings is that the control of environmental resource-access crises and climate change will eventually reduce the affected dimensions of food insecurity in the region and beyond. Based on these findings, it is recommended that agricultural policies and emerging food security crises be harmonized to create a synergy for proactive intervention. There should be a synergy between agricultural and security policies to address the issue of migration, which is affecting different regions and has enormous implications for food security.

*Keywords: Food insecurity, Resource-access, Herdsmen/Farmers, Environment, Climate change, Sustainable development*

## Introduction

The environment as one of the naturally occurring resources for human survival is harbouring virtually every aspect of human existence (Food and Agriculture Organization of the United Nations [FAO], 2022). The natural environment (i.e., the lithosphere, hydrosphere and atmosphere) over the years, has been technically colonized and explored by man with technology and other socially designed strategies such as laws and cultures in different parts of the globe (Hasenöhrl, 2021). More importantly, the lithosphere and the hydrosphere as aspects of the environment attract much involvement in the daily engagement with the natural environment by humans. The involvement occurs in terms of the use of physical land space for farming, forest resources, grazing, building, and other human socioeconomic activities (Guo et al, 2022; Shantiko et al, 2013; Nwokeoma et al, 2024). Similarly, water resources such as oceans and rivers, streams and lakes are basically connected to human daily survival.

The lithosphere, hydrosphere and the atmosphere are all necessary in their existence for the survival of man and other living organisms. However, the lithosphere and the hydrosphere have been more captivating in the overall need and use of environmental resources. As such, the battles for environmental resources are mostly centred on the land space and water resources within which human groups battle for dominance (Food and Agricultural Organization, 2011; Guppy & Anderson, 2017; Emile et al, 2022; Okafor et al, 2023a; Okafor et al, 2023b). This captures the various dimensions of the resource-access crisis in the resource-access theoretical legacies, which include the dimensions of entitlement (Sen, 1981), sustainable livelihood (Chambers & Conway 1992), powers of exclusion (Hall, Hirsch& Li, 2011), materiality (Appadurai 1986; Ribot & Peluso, 2009; Milgroom, 2012; Myers, 2015; Besta, 2013), as well as property and authority (MacPherson, 1978; Bromley, 1989; Ribot & Peluso, 2009). Over the centuries, the battles for environmental resources have resulted inother crises such as endemic wars, religious conflicts, food insecurity and other unpleasant socioeconomic outcomes (Zolnikov, 2013; Zhou et al, 2020).

Across the globe, especially, among developing nations, the crises of environmental resources have devastated the economy through wars and instabilities (Schellens, 2020; Nillesen&Bulte, 2014; Bayramov, 2018; Chellens& Diemer, 2020). In recent times, environmental resource access crises have affected food insecurity in different parts of the globe such as some Asian countries (Global Network Against Food Crises, 2021; Global Agricultural Monitoring, 2022), Mali and Central African Republic (Tor &Boubacar, 2009), Kenya (Atela, Tonui & Glover, 2018), Ethiopia (Berihu et al, 2015), Niger (Kwaja & Smith, 2020), etc.

In sub-Saharan African countries such as Nigeria, environmental access crises have centred on the available land spaces and water ways controlled by different ethnic groups occupying the spaces in different geographical locations. This follows the obtainable land tenure system among the population, which demarcates people into geopolitical zones with evidence of ethnic and cultural dominance (Babalola & Hull, 2019; Adeyemo, Kirk & Olusegun, 2019; Ogah et al, 2019). For instance, in Northern Nigeria, dominance in land ownership is by the domineering ethnic groups such as the Hausas and Kanuri; the Western part is dominated by the Yorubas; the Eastern part by the Igbos while in the Southern part, the Ijaws, Ibibio, Isoko and other ethnic groups dominate land tenure (Nwankwo & Okafor, 2022; Igbafe, 2021; Ani, Ojakorotu&Asuelime, 2019; Ajayi &Owumi, 2013).

In each of the Nigerian six geopolitical zones, there are overbearing ethnic and even religious antics affecting the settlement of people and access to land resources. These in the long run create tensions among the human population occupying the territories. For instance, no matter the length of time anyone lives in any part of Nigeria outside their place of origin, they are seen as migrants who will certainly go back to their place of origin. This is reinforced by the political

and religious divisions at the top administrative level in Nigeria. The political and religious divisions in Nigeria characterise even leaders along religious and ethnic cleavages. The tenets of resource access theory captured materiality which shows how the land and other biophysical resources are encapsulated in the socio-cultural and ethnic cleavages of society with power and authority dimensions (Ribot & Peluso, 2003; 2009; Appadurai 1986; Milgroom, 2012; Dyke, 2006; Ellis, 2016; Ginger et al., 2012). However, the ethnic and religious cleavages as unseen licenses of domination and control of resources beyond the extant rules, laws and precedents, have become some powerful tools to generate resource-access crises in the current history of Nigeria (Ogele, 2021; Folami & Chamberlain, 2017; Okafor et al, 2022; Okafor et al, 2023c). These, by implication, depict the resource access theoretical assumption on property and authority (Sikor & Lund 2009; Ribot & Peluso, 2009; Rasmussen & Lund, 2018). Environmental-resource-access crisis indicators include environmentally based conflicts anchoring either on the lithosphere, atmosphere, or hydrosphere. In the case of farmers and herdsmen in southeast Nigeria, the crisis has been connected to grazing lands, which often intersect with farmland and water resources. The intersection of the crisis also includes farming lands as well as the so-called "cattle routes" affecting farm settlements. The frequent confrontations between these groups in connection with these resources serve as empirical indicators of resource-access crises in the region.

The present study addresses the following key questions:

- What is the relationship between environmental resource access crises and food insecurity indicators in southeast Nigeria?
- What is the relationship between social indicators of climate change and environmental resource access crises in southeast Nigeria?
- What are the predictors of resource access crises among the farmers and herders in southeast Nigeria?

According to the United Nations Food and Agricultural Organization (2022), food security indicators include four dimensions of food security, namely food production, food availability, food accessibility and food stability. These can be verified with such empirical indicators as the elements of sustainability of agricultural production in a region, elements of sustainable food storage and circulation, elements of affordability and timely access to food products as well as elements of food price stability overtime.

Across the five administrative states of southeast Nigeria namely, Abia, Anambra, Ebonyi, Enugu and Imo, more than 35 local councils with a population of over two million people have been affected by resource-access crises. These crises have resulted in the desertion of as much as over 120 farm settlements with significant production capacities in the region. No fewer than 340 farmers have lost their lives, while more than 3000 others have abandoned their occupation for safety from resource-access conflicts between farmers and herders in the region, which specifically target the farm settlements and farming communities.

Resource-access crisis has activated food insecurity and other unpleasant situations in the southeast region of Nigeria negating the United Nations' sustainable development goals 1, 2,11 and 12 (United Nations, 2015). For instance, goal1 of the SDG focuses on the elimination of poverty, which is indirectly dependent on the regular income of a population. In the present situation in southeast Nigeria, many farmers have lost their means of income and by implication, driven into poverty. Goal2 of the SDG is designed to tackle hunger and food insecurity across the globe. However, the current situation in southeast Nigeria has drastically affected food security and thereby generating a situation of hunger. According to the outline of the indicators of goal2 of the SDG, hunger and food insecurity are clustered within the poverty cycle and access to food. Goal11 of the SDG is formulated to achieve peace and safety in human settlements and cities; however, in southeast Nigeria, the issue of farmers-herders crisis has

resulted in the destabilization of farm settlements and the creation of an atmosphere of insecurity among rural and urban communities in the region. As a challenge to the UN-SDGs, the issue of environmentally related crisis is one of the factors of underdevelopment in the third world countries where incessant conflicts have paralyzed developmental activities (Adeleke & Olaniyi, 2021). More importantly, goals 1and 2 of the SDG focus on sustainable production and consumption, which in the obtainable situation in southeast Nigeria today have been limited by the resource-access crisis in the region. The global food chain according to extant studies has been observed to be vulnerable to conflicts and crises rooted in socioeconomic and ethnic factors (Eshetu & Adem Guye, 2021). The current crises are throwing most farmers into poverty with an emerging hunger crisis in the region. Equally, the peace and overall wellbeing of the population of the region are under threat in all ramifications. In policy consideration, the ongoing crises are parts of the underlying factors affecting effective agricultural policies, migration and allied economic matters in the region. These cannot be easily addressed without the deployment of empirical data, which the present study aspires to provide. This is in view of the fact that the interconnectivity of security policies, migration policies, measurement of GDP and agricultural policies in Nigeria is not in proper synergy following the gap in mandate and terms of references in the institutional dynamics of these areas. Although there are other studies on resource-access crises in other parts of the globe, there is yet to be a study focusing on the substantive issues of environmental resource-access crises and food insecurity among the developing nations which considers the factors of ethnic and historical differences overlapping with environmental crisis and food security. More so, while many of the studies on conflicts and food security have depended on secondary data, there is a scarcity of studies using primary data to demonstrate the causes and impacts of the problems. Owing to the need for empirical substantiation of the cause-effect relationship between resource-access crises and food insecurity for timely and sustainable policy intervention as well as the ongoing global discuss on food security, the present study has been designed to dig deep into the indicators of reoccurring resource-access crises and emerging food insecurity in southeast Nigeria. Having introduced the study, other sections in the paper include: the literature review, theoretical framework, method adopted in the study, presentation of results, discussion of the findings, and implications of the study, conclusion and limitations.

## Literature review

The environmental resource crisis is a global phenomenon, but it has much presence and impact on the developing countries across the globe (Schellens, 2020; Nillesen&Bulte, 2014; Bayramov, 2018; Chellens& Diemer, 2020). It has in recent times generated food security crisis in such places as Asia (Global Network Against Food Crises, 2021; Global Agricultural Monitoring, 2022), Mali and Central African Republic (Tor & Boubacar, 2009), Kenya (Atela, Tonui & Glover, 2018), Ethiopia (Berihu et al, 2015), Niger (Kwaja & Smith, 2020), etc. The problem of environmental resource crisis has even contributed much to the issues of poverty, food insecurity, safety and inclusive society in sub-Saharan Africa especially in Nigeria. As other studies have confirmed, poverty and living below the poverty line among farmers is connected to loss of source of income and livelihood (Roantree & Doorley, 2023; Ridwan, Falola & Akanbi, 2021). Studies like Beyene (2023), FAO, IFAD, UNICEF, WFP and WHO (2023) have documented the connectivity between access to food and hunger as well as the social developmental implications of obstructed access to food among the global population. According to Mensah and Casadevall (2019) and FAO (2024), peace and safety among the human population create an atmosphere for development and progress.

In different parts of Nigeria, domination and quest for domination over environmental resources have led to numerous crises such as ethno-religious conflicts, communal conflicts, food security crises and more (Nwagwu, 2016; Ambe-Uva, 2010; Igwe & Amadi, 2021). In the current historical epoch, Southeast Nigeria has been overrun by the ongoing global food security

crises due to recent environmental resources-access crises (Tanyi et al, 2021; Ajala, 2020). The battle has been centred on transhumance-related conflicts between indigenous farmers and the migrant herdsmen who began to move southwards recently following other environmental challenges encountered in the Northern part of the country (Ele, 2020; Uzodinma, 2019; Nwangwu et al, 2020).

While the Easterners are struggling for dominance over the land resources in the region based on the history and origin of their ancestral heritage, the herdsmen from the Northern part of Nigeria have centred their struggle for access to the environmental resources on the controversial cattle route touted by the corrupt Nigerian government, characterised by religious and ethnic interests (Krätli& Toulmin, 2020; Ademola, 2020; Ofuoku&Isife, 2019). This situation, in line with the Ribot and Peluso's (2003) assumption of Resource Access Theory, is based on location, schema of the dimensions, and the web of benefits of the resources to the interested individuals/groups. This is further ascertained by the identification of the system of gain, control and maintenance of the flow and distribution of benefits by the involved actors, and understanding of the power relations thereof.

In the present situation, the herdsmen have discovered the availability of land resources in the southeast region and observed a nexus between their cattle business and distant patronisers, as well as power relations in manipulating land resources through corrupt systems in the region. As such, they have intruded into the region despite the extant land tenure system in the region and the emerging grazing bills (Amusan, Abegunde & Akinyemi, 2017; Ezemenaka&Ekumaoko, 2018). In the quest for domination via land grabbing by the herdsmen and the resistance by the indigenous farmers, herdsmen and the indigenous farmers have been in a head-on collision resulting in unpleasant situations. Among other things in recent times, Southeast Nigeria has begun to experience food security crises. Although the food insecurity situation in the region has been blamed on climate change and other globally designated challenges, the timing of environmental resource-access crises in the region prior to food security crises is yet to be empirically verified using substantive variables in the context.

Scholars have explored the problem of resource-access crises and the four dimensions of food security in different places and at different scales of studies. According to the study by Obi et al. (2021) on resource-access crises and food production, there is an inalienable impact of resource-access crises on food production in Uzo-Uwani in Enugu state located in the southeast region of Nigeria. A similar study has been carried out in Zamfara state in north-western Nigeria by Bello and Abdullahi (2021).The findings showed that over the years, most of the regions in northern Nigeria mostly occupied by herdsmen have been hit by drought, the bye-product of climate change. According to the study, drought and desert encroachment have all forced the herdsmen in most of these areas to relocate to the nearby areas or towards southern Nigeria. The study by Onwunyi and Anekwe (2020) in Benue state relying on the Environmental/Resources Scarcity theoretical framework by Homer-Dixon, found that population explosion and land disputes between the farmers and herders due to scarcity of resources such as grazing and farming lands, is responsible for incessant violent conflicts. This has led to farmers being afraid of going to farm as well as some farmers abandoning their farms. Onah et al. (2020) carried out their study in Kogi, Kwara, Nassarawa, Niger, Plateau and the Federal Capital Territory all in north-central Nigeria with a focus on climate change and resource access. The study revealed that there were eight impacts of climate change and three measures adopted by the pastoralists to mitigate the effects. Also, that there was no significant relationship between the socioeconomic characteristics of climate change and the measures adopted by pastoralists to mitigate climate change.

Further, some other studies have explored the impact of resource-access crises on food availability such as the studies by Global Agricultural Monitoring (2022); Udosen (2021) and Mbih (2020). Other studies have empirically examined environmental conflict and food

accessibility; these include Ogbe and Nyiayaana (2022); Ogbomah (2023); Olagbemiro et al. (2022) and so on. On the other hand, some scholars (e.g., Obasanmi&Enoma, 2022; Oche et al., 2021) have examined the relationship between environmentally-related crises and food stability. The role of climate change on the issue of environmental crises and food security has been examined by a number of scholars from different parts of the globe. These studies include the studies by Teka et al. (2012), Issifu et al. (2021), Olaniyan et al. (2015) and Adigun (2019). Spectacularly missing among these studies so far, is the specific examination of the correlation between the indicators of food security and the indicators of environmentally-related crises on the one hand and the social indicators of climate change and environmentally-related conflicts on the other hand. This gap by implication, calls for a deeper cross-examination as the present study was designed to do.

## Theoretical Framework: Environmental Resource Access Crises

Central to human existence and survival is the question of resources and access to available resources depending on population densities and geographical locations. As the nature and nomenclature of resources change with context and time, access to them becomes dynamic in line with the obtainable situations within a population. Ribot and Peluso (2003) propounded the theory of access, which points to the inalienable circumstances surrounding access to resources in society within a given population. Basically, according to Ribot and Peluso (2003), the composition of access to resources included location, schema of the dimensions and web of benefits of the resources to the interested individual/group. It also includes identification of the system of gain, control and maintenance of the flow and distribution of benefits by the involved actors and, understanding of the power relations obtainable in the system regarding the available resources.

The mechanism of access according to Ribot and Peluso (2003) includes right-based access and illegal access, which are captured in the knowledge, capital, market, authority, labour, technology, identities and social relations in the system. While the right-based access is the right sanctioned by the state and society through laws, norms, conventions and tradition, illegal access on the contrary, is the enjoyment of access not socially sanctioned by the society and the state. In any case, illegal access is operated through coercion and other compelling means other than socially verifiable and acceptable means within the population. In support of the above assumptions, some studies especially from the developing nations have revealed the structural disposition of ownership and control of resources. These are interwoven with the population and historical dynamics in the existence of socio-cultural groups' fluidly connected to each other in different geographical settings (Udoekanem, Adoga& Onwumere, 2014; Byamugisha, 2016; Gandhi, 2016). According to the ResourceAccess Theory, access to available resources can be facilitated by right-based or illegal access, which is both anchored on knowledge, authority, technology, labour, market, capital, identity and social relations. Among developing nations such as Nigeria, environmental resources are accessed through legally sanctioned means as well as illegal processes, which are controlled from behind the scenes. For instance, in most sub-Saharan African nations, solid and other mineral resources are exploited through different channels such that foreign nations from Europe, Asia, Australia and the Americas prefer going through the local boys and the traditional leaders rather than striking a deal with the government at the state or federal level (Oruonye& Ahmed, 2018; Adamu, Jazbhay&Benyera, 2022). As resource access theory captures it, this is dependent on classified knowledge about these resources, exploitation of the channels of local authorities and other social capital networks.

When individuals or groups have knowledge of the available resources and the benefits thereof, they tend to utilize this knowledge as an advantage over other groups. This also applies to having technology and capital that exploits opportunities and resources, as the possessors of the technology have an advantage over the technologically handicapped. In identity and social relationships, the available resources are accessed through the networks of social capital and

identifications available to the individuals and groups. However, illegal access is operated contrary to the socially recognized means, and this can trigger conflicts due to the existence of right-based access. This situation is encapsulated in the concepts and realities of the dimensions of the resource access theory such as entitlement, which is the basis for claim and domination when it comes to landed properties (Leach, Mearns & Scoones 1999; Sen, 1981), sustainable livelihood (Chambers & Conway 1992; Ribot, 2014; Scoones, 2015), powers of exclusion, which in the ethnic and tribal dimension of access to resources creates a fluid separation among a heterogeneous group in accessing the available resources (Harvey, 2003; Hall et al., 2011; Ribot & Peluso, 2009). Other dimensions include materiality (Milgroom, 2012; Besta, 2013), property and authority, as well as power (Sikor & Lund 2009; Ribot & Peluso, 2009).

The environmental resource access crises affecting the dimensions of food security in southeast Nigeria are predicated on the basic problem of access to natural resources (in particular, land), which the farmers and the herdsmen are struggling to control. The materiality of the land resources and the power of exclusion being exercised by the indigenous farmers invariably raise the consciousness of deep contention over the land space and vigilance against intruders (Leach, Mearns & Scoones, 1999; Hall et al., 2011). While the farmers in the region see themselves as possessing right-based access to the land in the region, in view of resource access theory, the entitlement, sustainable livelihood and powers of exclusion issues, in any case, create the atmosphere of domination and manipulation by the indigenous farmers. Meanwhile, the herdsmen are viewed as operating illegal access to the lands by invading communities with their cows. Specifically, the farmers in southeast Nigeria are basically indigenous people of the area farming on their ancestral lands, while the Fulani herdsmen are basically from northern Nigeria, migrating to the southeast region in search of grazing lands. While the farmers operating in the region appear to be exercising right-based access to the land resources in the region, the Fulani herdsmen empowered by the corrupt Nigerian government, are operating with illegal access to the land resources in the region (Leach, Mearns & Scoones 1999; Sen, 1981). This is reflected in the manner and approach they adopt in colonizing grazing lands, which include using threats and even killing farmers in isolated farmsteads to have access to their farm settlement.

The benefits of the land resources to the farmers as well as to the herders are seen to be accessed through either right-based access or illegal access (Milgroom, 2012; Besta, 2013). However, the problem of herders/farmers' clashes emanates from the illegal access by the herdsmen moving to the South from northern Nigeria, supported by the Fulani identity and federal government's covert control over land resources across the nation (Sikor & Lund 2009; Ribot & Peluso, 2009). The crises thereof result in the interruption of farming activities which leads to food insecurity captured as interrupted food production, availability, accessibility and stability currently affecting the region. In recent times, the production capacities of the farmers in the region as well as food availability, food accessibility and food stability have drastically reduced as a result of the incessant attacks on the farmers by the herdsmen due to environmental resource access crises in the region.

## Methodology

### *Study area*

Nigeria currently, is engulfed in a food security crisis resulting in what has been classified as a hunger protest in the country. Although globally, there is the prevailing problem of food insecurity (Food and Agricultural Organization, 2022), the case of Nigeria in sub-Saharan Africa is a peculiar one as the country has been self-reliant on food production over the years. The problem of food insecurity as an emerging issue in Nigeria is connected to the recent

security crisis across the nation in which the farmers are heavily affected. This has triggered multiple crisis dimensions such as increased unemployment problem in the rural and urban communities. For instance, the unemployment rate before 2015 in Nigeria was3.88% with an annual change rate of 0.17%, however, the current unemployment rate is 7.5% with an annual change rate of -4.01% (Nigerian Bureau of Statistics, 2024). Between 2015 and 2023, Nigerian gross domestic product (GDP) crashed from 6.31% growth rate to 2.74% growth rate. Within the same period under review, Nigeria faced both internal and external migration crises mostly from the northern region where the federal government opened the border for unregistered migrants. When the migrants from other parts of sub-Saharan Africa enter Nigeria through the North, most of them end up in southern Nigeria including southeast Nigeria. The southeast Nigeria, where the current study was carried out is located within the latitude N904.9199 and Longitude E8040.5166 with a land mass of 41,440km2; the region is made up of five administrative states with a population of about 22million. The region is home to the Igbo ethnic group estimated to be 24% of the total population of Nigerian. In connection to the migration crisis and food security crisis in Nigeria, southeast Nigeria is a gateway for northern Nigeria and greater parts of southern Nigeria, as the region is one of the most self-reliant regions in food production. Among the five administrative states in southeast Nigeria, there is a delineation of each state into senatorial districts, local councils and local communities/wards.

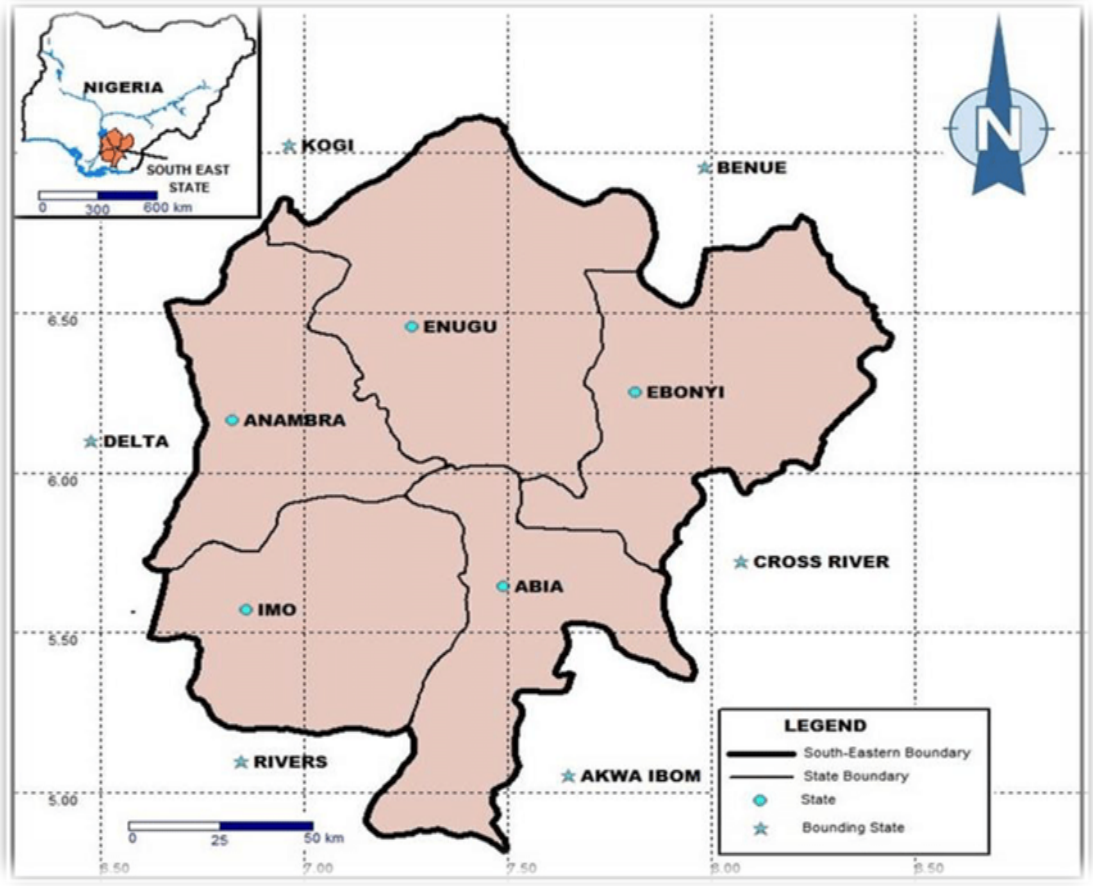


*Figure 1: The Map of the Southeast Nigerian Region showing the five administrative States*

## *Study design/sampling*

The study adopted multistage sampling techniques; three administrative states, namely Enugu, Anambra and Ebonyi were randomly selected from southeast Nigeria for the collection of data. Six senatorial districts were selected from the three states with a specific focus on the

areas mostly affected by resource-access conflicts in the selected states. The multistage sampling technique has been affirmed as suitable for the study of a relatively homogeneous population, which is located in seemingly heterogeneous geographical outlets (Hankin, Mohr & Newman, 2019; Kamalu, Niyomwungere&Etikan, 2024). It has been applied by other researchers in studying more complex and heterogeneous populations and regions (Ramanujan, Bhattacharjea & Alcott, 2022). The purpose of selecting Anambra, Enugu and Ebonyi in the study was because of their strategic position in the analysis of food production in the southeast region. The selected states are also strategic in the crisis in the region because of having some fluid boundaries with northern Nigeria from where the herders mainly occupying the northern Nigeria have access to the southeast and southern Nigeria. As such, the study focused on border communities and communities with a history of transhumance conflicts. This was to maintain a procedure that ensures the inclusion of the socio-human relation indicators making up the variables of the study such as the constant confrontation between the herders and the farmers in the region. From six (6) selected senatorial districts, eighteen (18) local councils and fifty-four (54) local communities were selected for the study from which we selected 1658 respondents for the study.

Due to the spread of the environmental resource-access crises across the communities and states selected for the study, the study adopted a simple random sampling in selecting the 18 local councils and 54 communities from the region. Simple random sampling developed from probability mathematics, is one of the reliable ways of maintaining proper representation within a given population in a survey research design (Maravelakis, 2019; Rudas, 2008). Also, a simple random sampling technique in social research avails some level of generalization of the result owing to the predicting capability of the method in research design. The logic of simple random sampling lies in the assumption that random selection offers a better chance of representation among a given population. Also, this assumption assists in the analysis of research data with more advanced statistics requiring harmonised data (Ali & Bhaskar, 2016; Hirschauer et al, 2020; Binu, Mayya& Dhar, 2014). Meanwhile, the study was keen to consider the mostly affected senatorial districts, local councils and communities directly affected by the environmental resource-access crises between the farmers and the herdsmen in the management of the sampling frame.

The study applied a survey design with a questionnaire instrument, which was designed to elicit information from the respondents on environmental resource-access crises and food insecurity. Survey research design compared to other designs, is more efficient in capturing an ongoing socioeconomic behavioural phenomenon. This is because of the logical effectiveness of the method in allowing the representation of heterogeneous populations and complex data. The design over the years has been relied on, in the execution of sensitive and complex studies in different contexts and different research issues (Zimba & Gasparyan, 2023; Phillips, 2017). Equally in the present study, the design enabled the study to properly maintain a synergy between the theoretical framework chosen for the study, and the instrument for elicitation of the required information in the study. The resources-access theory is a population resource dynamic theory with the elements of human population and availability of resources. In any case, survey research design offers an apt and dynamic approach to understanding the indices of the human population and their implication for the access and possession of natural resources.

### *Instrument of data collection and data collection procedure*

The indices of the questionnaire instrument included the socio-demographic information of the respondents, factors triggering environmental resources-access crises as well as the components of food insecurity such as food production, availability, access and stability. The empirical indicators for the study variables captured in the questionnaire instrument include the indicators of sustainability of agricultural production in southeast Nigeria, indicators of

sustainable food storage and circulation, indicators of affordability and timely access to food products as well as indicators of food price stability overtime in southeast Nigeria. The study adopted the FAO, IFAD, UNICEF, WFP and WHO (2019) mild, moderate and severe food insecurity scale and Coleman et al. (2013) Household Food Security Survey Module [HFSSM]. These scales were modified to accommodate the four dimensions of food security and the sub-Saharan African socioeconomic peculiarities in the overall food security crisis. This is in view of the socioeconomic realities among the population, which sharply contrast with the situation in the developed and emerging economies. Adoption and modification of data collection instrument in social research is key to capturing dynamic social phenomenon such as human behaviour and emerging social issues in different environments and populations (Vallejo-Medina et al, 2017; Pérez-Fuentes et al, 2020). While the adoption of the instrument helped the study to maintain a conventional standard, modification of the instrument specifically enabled the study to capture the population and environmental dynamics obtainable in the area of study. Meanwhile, environmental access crises as the dependent variable were developed using questionnaire items capturing the dimensions and frequency of conflicts between the indigenous farmers and the migrating herdsmen in the southeast region; these are shown in table 1 below.

*Table 1. Variables in the Study, Measuring Scale, Social Indicators, Cross Variable Analysis and Testing Statistics*

| VARIABLES | MEASURING SCALE | SOCIAL INDICATORS/INDICES INCLUDED IN THE INSTRUMENT | CROSS VARIABLE ANALYSIS | TEST STATISTICS |
|---|---|---|---|---|
| Resource-access crisis | Ordinal scale [strongly agree, agree, disagree, strongly disagree | Frequency of clashes between farmers and the herdsmen, encroachment into farmland, contention over land and water space between the farmers and the herdsmen, etc. | Resource-access crisis, climate change and food security indicators | Spearman's rho Correlations and Linear regression |
| Climate change social indicators | Ordinal scale [strongly agree, agree, disagree, strongly disagree | Observed frequency and changes in rainfall, drought, scarcity of grass for herding, desert encroachment, water scarcity, etc. | Climate change social indicators and Resource-access crisis | Spearman's rho Correlations and Linear regression |
| Food utilization | Ordinal scale [strongly agree, agree, disagree, strongly disagree | The quality of household food consumption in your locality, frequency and timing of food consumption, etc. | Food utilization and Resource-access crisis | Spearman's rho Correlations and Linear regression |
| Foodstability | Ordinal scale [strongly agree, agree, disagree, strongly disagree | Stability of food commodity prices in the locality, food supply to and from the locality, etc. | Food stability and Resource-access crisis | Spearman's rho Correlations and Linear regression |
| Foodaccess | Ordinal scale [strongly agree, agree, disagree, strongly disagree | The price of food items in your locality, access to meat and other dairy products in your locality, access to food crops from other localities to your locality, access to water resources in your locality | Food access and Resource-access crisis | Spearman's rho Correlations and Linear regression |
| Food availability | Ordinal scale [strongly agree, agree, disagree, strongly disagree | The extent of food crops exported from your community, the extent of food in circulation in your locality | Food availability and Resource-access crisis | Spearman's rho Correlations and Linear regression |
| Food production | Ordinal scale [strongly agree, agree, disagree, strongly disagree | Number of food crops regularly produced in the locality, the scale of food crops harvested in the locality seasonally, etc. | Food production and Resource-access crisis | Spearman's rho Correlations and Linear regression |

*NOTES: Developed fromFAO, IFAD, UNICEF, WFP and WHO (2019) mild, moderate and severe food insecurity scale, and Coleman et al. (2013) Household Food Security Survey Module [HFSSM]*

For validation, the questionnaire instrument was tested through a pilot study, which involved 120 respondents, and aimed at testing the consistency of the scale, familiarity and acceptability

of the instrument among the targeted population. The outcome of the pilot study showed that 113 (94.2%) of the questionnaires were properly filled showing a high level of familiarity and acceptability among the target population. Following the consistency analysis of the outcome of the pilot study, the overall Cronbach Alpha value is 0.88, after removing non-relevant items. According to variable-by-variable analysis, each of the included variables of interest showed commendable values. These are as follows: Resource-access crises (0.79), food utilization (0.68), food stability (0.71), food access (0.81), food availability (0.65) food production (0.73) and social indicators of climate change (0.78). Sections of the questionnaire instrument with some complexities following our observation via pilot study were reviewed and adjusted, resulting in the removal of non-relevant questionnaire items. The pilot testing and review of the questionnaire instrument for the study followed Thurstone (1929) and Likert (1932) underlying factors to the rating scale, which is more or less connected to the nature and dynamics of the population understudy (Menold & Bogner, 2016; Oosterveld, Vorst & Smits, 2019).

The questionnaire instrument was shared among the study population following their locations and convenient time of visitation especially, with regard to the socioeconomic activities of the farmers in the rural setting within the region. Following a randomization and random number specifically designed for the study, the researchers maintained the 5th term random technique in the arrangement and reaching out to the respondents. Due to the irregular building arrangement in the rural setting where the study took place, the researchers decided to visit every 5th residence starting from the entry point to each community involved in the study. Although this was very challenging, the aid of local research assistants eventually helped the researchers in reaching the set goals of the study.

### *Method of data analysis*

The collected data were analyzed using descriptive and inferential statistics, giving attention to the major thrust of the study. The study adopted two specific models in testing the relationship of the variables of interest. The models included Spearman's rho Correlation and Linear model. At the first stage of the analysis, the collected data were presented in percentages (%) to show the relative occurrences of incidences of resource-access crises and their related food insecurity indicators. The application of these statistics was to enable the potential readers to easily capture the patterns of the data. This was followed by the correlation analyses of the relationship of substantive variables to answer the research questions on resource-access crises, climate change and food insecurity. This was executed with Spearman's rho Correlations with a P. value of 0.01 and 1-tail, focusing on the effect size.

To address the first research question for this study, the indicators of food insecurity were cross-tabulated with the environmental-resource-access crises indicators using Spearman's rho Correlations. The data was coded in reversed order with 1 showing non-existent negative impacts of herdsmen/farmers clashes on food security in the scale, while 4 represented disturbing negative impacts of farmers-herders clashes on food security in the region. The same method and statistics were applied in answering the second research question; the data was coded in reversed order with 1 showing non-existent negative impacts of climate change in the scale, while 4 represented disturbing negative impacts of climate change. The third stage of the analysis which is to answer the question of the predicting factors to resource-access crises in southeast Nigeria was carried out with the aid of linear regression. The model explored the relationship of the key variables in this, with more focus on the direction of the relationship between the selected variables. The explanatory variables in the equation include age, gender, religion, education, farming types, open grazing, frequency of encroachment into the farmland, effects of farmers-herders clashes on the scale of farming and effects of herdsmen-farmers clashes on potential farmers, while the dependent variable is environmental resource-access

crises. The relationship between the dependent variable and the explanatory variables is represented thus:

$$Y= b1X1=b2X2+b3X3+b4X4+b5X5+b6X6+b7X7+b8X8+b9X9+b10X10+a$$

*X1= gender*
*X2= age*
*X3= education*
*X4= religion*
*X5= farming types*
*X6= rate of open grazing*
*X7= frequency of encroachment into the farmland*
*X8= climate change*
*X9= effects of farmers-herders clashes on the scale of farming*
*X10= effects of herdsmen/farmers clashes on potential farmers*
*b1= regression coefficient for X1*
*b2= regression coefficient for X2*
*b3= regression coefficient for X3*
*b4= regression coefficient for X4*
*b5= regression coefficient for X5*
*b6= regression coefficient for X6*
*b7= regression coefficient for X7*
*b8= regression coefficient for X8*
*b9= regression coefficient for X9*
*b10= regression coefficient for X10*
*a = intercept*

The model followed the theoretical assumption of the multiple linear regressions, which assumes that y is directly related to a linear combination of the explanatory variables. Also, the data outcome assumptions of multiple linear regression such as there are no outliers, the residuals are normally distributed, the residuals are not related to the explanatory variables and the residuals are not correlated with one another (Tranmer et al, 2020), were all observed in examining the data before analysis.

## Results

Following the major thrust of the study, the socioeconomic information of the respondents was important and formed the basis for other sections of the data analysis. In sequential order, the analysis was presented thus: socioeconomic information of the respondents, answering the first research question on the relationship between environmental resource access crises and food insecurity indicators; answering the second research question on the relationship between social indicators of climate change and environmental resource access crises, and answering the third research question on the predictors of resource access crises among the farmers and herders.

### *The socioeconomic information*

The socioeconomic information about the respondents showed that the majority of the respondents were females (58.9%), while 41.1% of the respondents were males. The majority of the respondents (45.2%) are in the age category of 40-50years, 26.7% are in the age category of 29-39 years, 13.4% are in the age category of 18-28years, 14.4% are in the age category of 51-61years, while less than one percent of the respondents is in the age category of 62 years and

above. The majority of the respondents (70.1%) had primary/secondary school education, 14.1% had National Certification in Education-NCE and Diploma, while 15% of the respondents were educated up to a master degree and more. The majority of the respondents (77.9%) were Christians, 13.3% were African Traditional Religion adherents, while only 8.7% were Muslims.

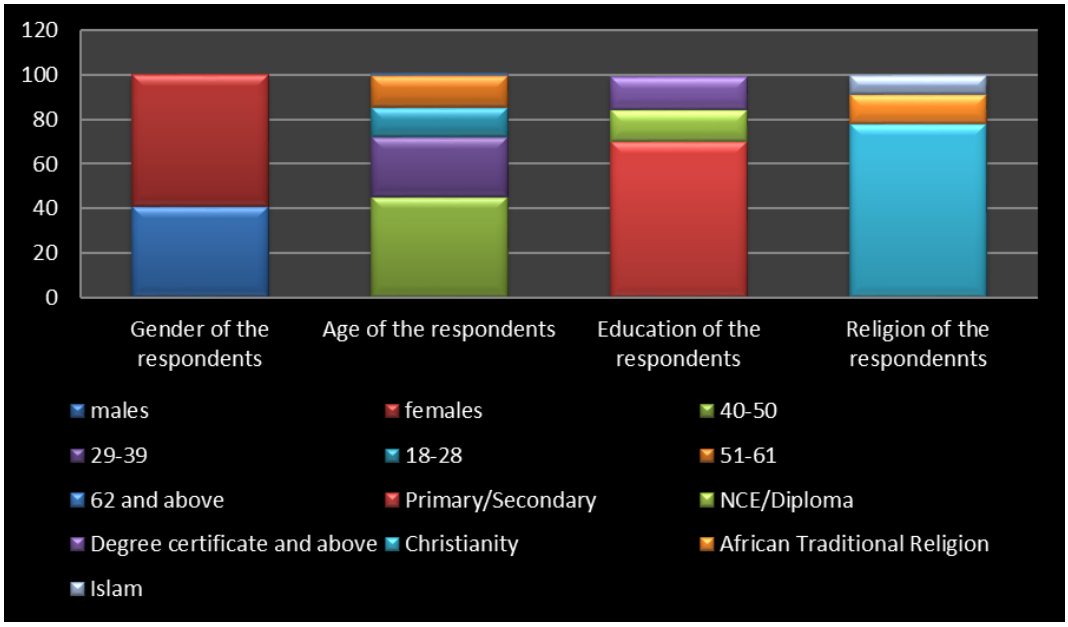


*Figure 2: Sociodemographic Information of the Respondents*

*Answering the first research question for this study*

To address the first research question for this study, the indicators of food insecurity were cross-tabulated with the environmental-resource-access crises indicator using Spearman's rho Correlations. Table 2 below shows the correlation test on resource-access crises and the indicators of food insecurity such as food production, food availability, food access, food stability and food utilization. The data was coded in reversed order with 1 showing non-existence of negative impacts of herdsmen-farmers clashes on food security in the scale, while 4 represented disturbing negative impacts of farmers-herders clashes on food security in the region. From Spearman's rho Correlation computation, there is a strong positive correlation between resource-access crises and decreased food utilization in southeast Nigeria rho (1658) = .329 P = 01. Furthermore, the finding here points to the fact that among other factors affecting food utilization, the resource-access crisis has a stronger impact. Similarly, there is a strong positive correlation between resource-access crises and a decrease in food stability in the region rho (1658) = .308 P = 01.

The correlation showed a strong positive relationship between resource-access crises and food access in southeast Nigeria rho (1658) = .234 P = 01. The test showed a positive correlation between resource-access crises and a decrease in food availability in the region rho (1658) = .526 P = 01. Further, the test showed a strong positive correlation between resource-access crises and a decrease in food production rho (1658) = .307 P = 01. Although other studies have addressed the issue of food insecurity at the national and international levels, there is yet to be a specific study on the relationship between the dimensions of food security and resource-access crisis as well as climate change. Hence, the present study innovatively approached the issue by creating a new insight into the dimensions of food security and resource-access crisis. However, other studies focusing on the aggregate impacts of other natural resources on food security have

demonstrated the sensitive relationship between food security and natural resources control (Garzón & Paloma, 2018; Payán et al, 2021; Pawlak & Kołodziejczak, 2020).

*Table 2. Correlation Test on Resource-Access Crisis and Indicators of Food Insecurity*

| | | ENVIRONMENTAL RESOURCE-ACCESS CRISES |
|---|---|---|
| Food insecurity (decrease in food utilization in these localities) | Spearman's rho | .329** |
| | Sig. (2-tailed) | .000 |
| Food insecurity (decrease in food stability in these localities | Spearman's rho | .308** |
| | Sig. (2-tailed) | .000 |
| Food insecurity (decrease in food access in these localities) | Spearman's rho | .234** |
| | Sig. (2-tailed) | .000 |
| Food insecurity (decrease in food availability in these localities | Spearman's rho | .526** |
| | Sig. (2-tailed) | .000 |
| Food insecurity (decrease in food production in these localities) | Spearman's rho | .307** |
| | Sig. (2-tailed) | .000 |

*** Correlation is significant at the 0.01 level (1-tailed).*

### *Answering the second research question for this study*

To address the second research question for this study, the social indicators of climate change were cross-tabulated with the environmental-resource-access crises indicator using Spearman's rho Correlations. The data was coded in reversed order with 1 showing nonexistence of negative impacts of climate change on the scale, while 4 represented disturbing negative impacts of climate change. Table3 below shows a Spearman's rho Correlation computation on resource-access crises and climate change in southeast Nigeria. According to the computation, there is a strong positive correlation between observed climate change and resource-access crises in the region rho (1658) = .388 P = 01. Other studies focusing on the impacts of climate change and the collective human relationship have shown similar results (SIDA, 2018; Ayanlade et al, 2022; Abbass et al, 2022).

*Table 3. Correlation Test on Social Indicators of Climate Change and Resource-Access Crisis*

| | | ENVIRONMENTAL RESOURCE-ACCESS CRISES | CLIMATE CHANGE |
|---|---|---|---|
| Resource-access crises | Spearman's rho | 1 | .388** |
| | Sig. (1-tailed) | | .000 |
| | N | 1658 | 1658 |
| Climate change | Pearson Correlation | .388** | 1 |
| | Sig. (1-tailed) | .000 | |
| | N | 1658 | 1658 |

*NOTES: ** Correlation is significant at the 0.01 level (1-tailed).*

### *Answering the third research question for this study*

Table 4 below shows a linear model demonstrating the predictors of resource-access crises in southeast Nigeria. From the table, all the included variables are significant. However, some

of the variables according to their b values appeared with an indication of a negative relationship with the dependent variable; these include the gender, age, frequency of encroachment, effects on the scale of farming, and effects on the potential farmers in the region. These variables according to their position in the model appeared as counter measures to the frequency of resource access crises in the region. This finding demonstrated that the higher the age of the farmers, the less the likelihood of resource-access crises between the farmers and the herdsmen in the region. This can be further understood from the point of view that as the farmers advance in age, they begin to withdraw from farming activities, resulting in fewer encounters of conflicts with the herdsmen. Frequency of encroachment, effects on scale of farming and potential farmers are indicators of diminishing return in the quest for resistance against the migrant herdsmen in the region. Meanwhile, religious differences, multiple farming designations, frequency of open grazing as well as climate change appeared to be resilient in the occurrence of resource-access crises in the region.

*Table4. Coefficients of Environmental Resource-Access Crises*

| Model | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | T | Sig. |
| (Constant) | 2.297 | .173 | | 13.314 | .000 |
| Gender | -.157*** | .032 | -.179 | -4.899 | .000 |
| Age | -.296*** | .042 | -.252 | -7.118 | .000 |
| Education | .077* | .039 | .056 | 1.975 | .048 |
| Religion | .109*** | .025 | .166 | 4.334 | .000 |
| Farming types | .392*** | .034 | .358 | 11.455 | .000 |
| Rate of open grazing | .525*** | .056 | .536 | 9.396 | .000 |
| Frequency of encroachment into farm land | -.263*** | .045 | -.235 | -5.893 | .000 |
| Climate change observation | .241*** | .029 | .252 | 8.302 | .000 |
| Effects of farmers/herders clashes on the scale of farming | -.236*** | .052 | -.238 | -4.579 | .000 |
| Effects of herdsmen/farmers clashes on potential farmers | -.135** | .054 | -.136 | -2.520 | .012 |

*a. Dependent Variable: Environmental Resource-Access Crises*
**p<.05, ** p<.01, *** p<.000, R2= (72.9), F (92.390).*

## Discussions

Resource-access crises have been one of the enduring challenges of all times; but it is currently having emerging disastrous dimensions in developing nations. Currently in southeast Nigeria, resource-access crises mostly between indigenous farmers and migrating herdsmen from northern Nigeria have taken another dimension with negative impacts on the four dimensions of food security, namely food production, food availability, food accessibility and food utilization among the population. The activities of the migrating herdsmen, which informed the reaction of resistance by the indigenous farmers, have triggered a cycle of crises with specific impacts on the overall food security issues in the southeast Nigeria beginning with the destabilisation of the farming communities in region. From the findings of the study, there is a disturbing pointer that the activities of the migrating herdsmen have drastically reduced the scale of farming activities in the region. These activities include trespassing open grazing and

deliberate encroachment into farmlands. This unpleasant interaction has equally interrupted the basic elements of food security such as food production, availability, accessibility, stability and utilization within the local communities.

From the findings of the study, the above interruptions are directly affecting the farming communities as well as the entire region. The food circulation and sustainability within the region are squarely within the farming capacities and resources of the indigenous farmers in the region. The study by Shafieisabet and Mirvahedi (2021) revealed the delicate nature of the food chain among developing nations in relationship with conflicts and crisis relating to environmental management. The present study discovered a strong positive correlation between resource-access crises and a decrease in food production rho (1658) = .307 P =.01.; this is translated to be resource-access crises causing about 9.4% chances of decrease in food production among the farmers in local communities in southeast Nigeria. The finding showed an enormous contribution to food crises in the dimension of food production by resource-access crises squarely found between the indigenous farmers and the migrating herdsmen in southeast Nigeria. Food production, which is mainly extractive agricultural activities in the developing nations lacking full-scale mechanized agriculture, is much dependent on frequent activities in the remote parts of the region that are volatile and vulnerable to security crises caused by marauding herdsmen. In any case, the increasing threat to the security of the farmers operating mainly in remote areas has translated to reduced frequency in agricultural activities such as planting, supervision and harvesting. In the long run, this is a sure way of reducing food production and the amount of food entering the food chain within the southeastern Nigeria and other parts of the globe connected to it. A similar situation has been observed and affirmed by other researchers in Ethiopia (Gebreselassie et al, 2016), Kenya (Mwikalia& Wafula, 2019) and Niger (Kwaja & Smith, 2020), that the activities of migrating herdsmen, which lead to their clashing with indigenous farmers are drastically affecting food production among the population. The current study found a positive correlation between resource-access crises and a decrease in food availability in southeast Nigeria rho (1658) = .526 P =.01, showing that resource-access crises is indirectly responsible for about 27.7% chances of a decrease in food availability in the region. Food availability, which is the function of food production and circulation within the system, is strategic to other dimensions of food security, which by implication are threatened by the interrupted food availability issue. The fluid connections of the states and communities in southeast Nigeria in food chain and socio-cultural networks is invariably susceptible to the intrusion of the herders from northern Nigeria who by their constant invasion of farmland have created an atmosphere of terror such that going to the farm and moving food produce within and across the region is now gradually becoming a difficult task. For instance, the herders and their volatile crime networks from other parts of sub-Saharan Africa have increased the case of kidnapping for ransom in the region and this takes place on the connecting routes of the states in the region and between the states in the region and other regions. In essence, the increasing escalation of the crisis to other security issues has eventually limited the chances of movement of food produce within the region and beyond. The finding here extended other findings by Global Network Against Food Crises (2021) and Global Agricultural Monitoring (2022) showing that resource-access crises are drastically affecting food stability in the dimension of food availability. The peculiarity of the finding of this study in this aspect stems from the empirical approach to food insecurity in southeast Nigeria adopted in the study using the food security indicators as well as accessing the magnitude of the effect.

From the study, there is a strong positive correlation between resource-access crises and food access in southeast Nigeria rho (1658) = .234 P =.01, showing that about 5.5% of crises of food access among the population in southeast Nigeria is explained by resource-access crises between the farmers and herdsmen in the region. The findings of Czuba, O'Neill and Ayala (2017), showed that resource-access crises originating from the relationship between indigenous farmers and the migrating herdsmen are responsible for the reduced access to food products in Kenya. This has also been confirmed by the study of Berihu et al (2015) in Ethiopia, as well as

in Nigeria by the study of Akerjiir (2018) and Tanyi et al. (2021), which demonstrated that herdsmen/farmers crises have eaten deep into the system of food production and the food chain. Food stability in southeast Nigeria at least, since 2015, has been observed as interrupted following the increased activities of migrating herdsmen in the form of open grazing and encroachment into farmlands (Ele, 2020; Uzodinma, 2019; Nwangwu et al, 2020). In the present study, a step was taken further to assess the extraneous factors of this situation, which the current study has pointed out as squarely within the framework of the crises between migrating herdsmen and indigenous farmers in the region. For instance, the study found that about 9.4% of chances of decreased food stability in the region are associated with resource-access crises between the herdsmen and farmers in the region. Also, decreased food utilization, one of the direct food security impacts on the households across the developing nations has been connected to resource-access crises in the developing nations (Brüntrup, 2020). The finding of this study affirmed this in southeast Nigeria where such information is lacking before now. According to the findings, about 10.8% of decreased food utilization among the population is explained by resource-access crises between the migrating herdsmen and indigenous farmers in southeast Nigeria.

The impact of climate change on food security as a whole has been researched by different scholars in different parts of the globe. However, the nexus of climate change and food insecurity with the context of resource-access crisis was the interest of this study among other things. In southeast Nigeria and perhaps other regions, a resource-access crisis is the nexus between climate change and food insecurity crisis. According to the finding of this study, there is a strong positive correlation between observed climate change and resource-access crises in the southeast region of Nigeriarho (1658) = .388 P =.01,which is translated as, “observed climate change is responsible for about 15.1% of the increase in resource-access crises in southeast Nigeria” and by implication, the trigger for the whole gamut of food security crisis in the region.The finding here put into perspective, the increasing manifestation of climate change crises that are gradually pushing the herdsmen from majorly the northern region down to the southern parts of Nigeria. Recently in the sub-Saharan Africa, herdsmen relocate from the north towards the south due to the increasing droughts and other harsh weather conditions mostly experienced in the north, such as the northern Nigeria. Although the present study is a connecting dot to the understanding of the whole synergy of climate change and food security crisis in sub-Saharan Africa, it affirms the findings of other studies that have tracked the migration of herdsmen from different parts of sub-Saharan Africa down to the southern axis of the region including southeast Nigeria (Benjaminsen & Ba, 2009; Brüntrup, 2020; FAO, 2024).

From the model predicting the factors to resource-access crises in the local communities in southeast Nigeria among the herdsmen and farmers, a number of factors explained resource-access crises among the study population. These included religion, education, open grazing, observed climate change indices as well as designated farming types. Religion as a factor in the scenario reaffirmed the findings of other studies around Africa on transhumance-related conflicts (McGuirk & Nunn, 2021). While majority of the herdsmen in sub-Saharan Africa are Muslims, religious interest seems to interfere with their cattle rearing business as they migrate from one region to another attracting attention and religious cum ethnic differences crises in their new destinations. In southeast Nigeria, majority of the population are Christians, with a significant proportion adhering to African Traditional Religion. This is reflected in the findings of this study; majority of the respondents (77.9%) are Christians followed by 13.3% who are African traditionalists, while only seven percent are Muslims. In essence, this is a situation of tension in view of the common religious crises that have bedevilled Nigeria over the years. Concerning access to resources, the migrant herdsmen who are mainly Muslims are already viewed as potentially unwanted, coupled with their aggressive approach to animal grazing, which brings them to a head-on coalition with the indigenous farmers. As such, religion and

open grazing basically create the background for resource-access crises. As Ribot and Peluso (2003; 2009) captured it, the resource-access crisis is anchored on materiality, knowledge, social capital and more, on which the citizens pull the string of domination and influence. In southeast Nigeria, while ethnicity in connection with religion empowers the indigenous farmers to resist the herdsmen perceived as intruders from the north, the herders who are invariably dependent on the corrupt authority of the Nigerian government maintain a string of invasion of farmland, which is projected in Ribot and Peluso's model as illegal access to resources. This in the long process creates the atmosphere of conflicts and counter-conflicts in the cycle of invasion and resistance among the groups, which is now extended to food security since both groups are strategically in the synergy of food security (Basedau, 2017; Oghuvbu&Oghuvbu, 2020).

The frequency of encroachment into farmlands did not positively correlate with resource-access crisis as was expected in the study. Contrary to popular believe about the causes of herdsmen/farmers clashes, the frequency of encroachment into the farmland by the herders has been misplaced by some analysts as a strong variable in the ongoing farmer-herder conflicts in the region due to perhaps lack of empirical information and some level of bias. For instance, on some occasions in the process of settling the issue of the herdsmen invasion of farmlands, evidence emerged showing false accusations emanating from other grudges and the dominant view that wherever herdsmen appeared they were to cause some harm. Also, from various indicators among the farming communities in the region, there has been a harmonious relationship between the farmers and herders in the past during which the farmers allowed the herders to graze their cows in their farms after harvest. Further, the effects of conflicts on the scale of farming did not positively correlate with the resource-access crisis as was expected in the study. In the current climate change realities in southeast Nigeria, the farmers have started diversifying their specialization in farming, making room for more farming methods and specialization less vulnerable to herdsmen grazing interference. For instance, farming in the riverside areas and food crops adaptable to these areas are some of the ways of avoiding much interference from herdsmen grazing their cows, since most times the cows are protected from getting near the rivers to avoid loss. Also, more advanced and diversified farming in the ikpa, agu and ozara as forest and distant farmlands are represented in various dialects in the region, with a more clustered security method that at the surface scares the herders away. Nonetheless, the effects of herdsmen/farmers clashes on potential farmers did not positively correlate with the resource-access crisis as was expected owing to the gradual falling of interest in farming among the youth in the region. Farming in southeast Nigeria and perhaps other regions of the country has remained mainly the occupation of the old and unschooled in the rural areas, even after years of government's encouragement for the youths to go into agriculture. As such, there is yet to be consciousness among the youth to be involved in farming, which may result in little or no concern about the resource-access crisis in the region among the youths as potential farmers in the region.

## Implications of the Findings

The findings in the study have raised policy, practice and further research issues in view of the global and local food security issues. Agricultural policies in Nigeria in which the region of our study is located, have been on an ad hoc basis with surface information either from secondary data, outdated colonial research information, or, imported scientific findings that are incompatible with the environment. In the present study, the primary data, which technically involved the origin of the food chain in the region, has pointed out the underlying issues of ignoring the opinions and experiences of the farmers in making policy decisions about them. In any case, the policy intervention should target the factors connected to the origin of the food chain and food circulation in the region and beyond. To sustain food security in southeast Nigeria and other cross-border regions depending on the food supply and circulatory chain in the southeast, there is a need for a policy model incorporating the human relationship in

environmental resource-access issues beyond the land tenure model that has been dominant in the area of agriculture and environmental resources. In support of this policy approach option, other studies have revealed how indigenous policy approach revolutionized agriculture in places like China, South Korea, Asian region and more (Zhang & Lu, 2022; Ling, 2013; OECD, 2018; Sundram, 2023)

In managing the environmental and food security issues in sub-Saharan Africa and perhaps other developing nations, the study points to the need for creating a synergy within the ethnic, religious and land policy structures involving farmers and herders. This is in view of the peculiarity of the region in the management of land and environmental resources, which has much attachment to the socio-historical, ethnic and extant land tenure system in the region. By implication, the non-governmental organizations and government agencies interested in tackling and arresting the ongoing food security and sustainability issues are invited to give cognizance to the above-raised issues in their dealings with different groups involved in food security crisis at this level. Land and other natural resources have been observed as major sources of crisis in places such as Europe, the United States of America and elsewhere in the early stage of their development before policy interventions addressing the issue by considering inter and intra-group relationships towards land and natural resources were made (Bowers, 1997; Carlos et al, 2021).

Based on the findings of this study, which are more on the food insecurity indicators and resource-access crises, there is a need for further investigation into government agricultural policies and the emerging food security crises in southeast Nigeria.

As research is an ongoing venture, the present findings point to the need for further studies to establish a synergy between global food insecurity and the ongoing food security crisis in different regions of sub-Saharan Africa such as southeast Nigeria. In as much as the problem appears to be a local one due to the scale of violence and the envisaged scale of the food chain in the region, there is yet to be an established link between the local food insecurity crisis and the ongoing global food security crisis. For instance, a significant percentage of Africans especially Nigerians living in Europe, America and Asia still maintain a tie of food supply from the region. Also, different food products used in America, Europe and Asia originate from sub-Saharan Africa especially Nigeria and southeast Nigeria. The study also calls for further studies on migration-related crises beyond the Nigerian border to investigate the volatile boundaries in sub-Saharan Africa and their implications for unregulated migration and security crises across different regions using primary and human behavioral data.

## Conclusion

Resource-access crisis has been a constant problem among many nations except those that have taken policy measures to checkmate the problem. In such nations, open grazing has been restricted and replaced with ranching, which has helped in the sustainability of agricultural activities as well as the dairy industry. In the case of some sub-Saharan Africa countries, the resource-access crisis is yet to be given attention and it has continued to frustrate the developmental agenda of the region. As the present study has discovered, different dimensions of food security such as food production, utilization, access, availability and stability have all been affected by the resources-access crisis and climate change issues in the southeastern Nigerian. In addition, the resource-access crisis is predicted by age, gender, encroachment into the farmland by herdsmen, etc., showing the multidimensional impact of the problem. Conclusively, according to the evidence from the study, resource-access crises in southeast Nigeria have affected the indigenous population as well as the interest of the global community. This is in view of the fact that southeast Nigeria is located within the United Nations' sustainable development goals, which include food security and population safety. For instance, SDGs 1, 2, and 3 focusing on poverty, hunger and food security are already interrupted in the region as

many farmers have become jobless and cannot feed their families depending on their production capacity. For instance, goal1 of the SDG focuses on the elimination of poverty, which is indirectly dependent on the regular income of the population. In the present situation in southeast Nigeria, many farmers have lost their means of income and by implication, driven into poverty, which is counterproductive to the overall aim of SDG goal 1. Goal 2 of the SDG is designed to tackle hunger and food insecurity across the globe, however, the current situation in southeast Nigeria has generated a situation of hunger contradicting the social indicators of goal 2 of the SDG. Goal 11 of the SDG is formulated to achieve peace and safety inthe human settlements and cities, however, in southeast Nigeria, the issue of resource-access crises has resulted in the destabilization of farm settlements and the atmosphere of insecurity among communities and urban centres in the region. Nonetheless, goal 12 of the SDG focuses on sustainable production and consumption, which in the obtainable situation in southeast Nigeria has been obstructed following the resource-access crisis in the region. In policy consideration, the ongoing crisis is one of the underlying factors affecting agricultural policies, migration and allied economic matters in the region, which cannot be easily resolved without empirical data. This is in view of the fact that the interconnectivity of security policies, migration policies, measurement of GDP and agricultural policies are not in proper synergy following the gap in the mandate and terms of references of these areas in the institutional dynamics.

## Limitations of the study

Although the researchers meticulously executed the research as it was designed from the drawing board, the method and design of the study lacked maximum comprehensiveness. For instance, methodological triangulation would have given the present study more reliable data, but due to logistics issues, the study was limited to a quantitative survey data collection procedure, which is relatively sufficient in the present context. The sample size of the study was indeed relatively sufficient for the population understudy, but not sufficient enough to generalize for larger populations such as the sub-Saharan region and the entire developing nations. Also, the study was confronted with some challenges in the process of data collection among the population understudy, which was capable of bringing some level of bias. However, this was effectively managed to meet the target set for the study.

## References

Adamu, A., Jazbhay, A. H. &Benyera, E. (2022). The Political Economy of Illegal Mining in Nigeria: The Case of Bukkuyum Local Government Area of Zamfara State. *University of Nigeria Journal of Political Economy*, 12(1), 226-245.

Adeleke, A. & Olaniyi, A. J. (2021). Violent Conflict and National Development in Nigeria. Hatfield Graduate Journal of Public Affairs, 5(1), 1-23.

Ademola, E. O. (2020). Herder-Farmer Conflicts and RUGA Policy: Why Nigerian Stakeholders are at Loggerheads over Rural Grazing Settlements. *Ethnic Studies Review*, 43(3),103-121.

Adeyemo, R., Kirk, M. & Olusegun, O. (2019). Women and Land Tenure Security: The Nigerian Experience. *International Journal of Agricultural Economics*, 4 (2), 41-47.

Ajala, O. (2020). New drivers of conflict in Nigeria: an analysis of the clashes between farmers and pastoralists. *Third world quarterly*, 41(12), 2048-2066.

Ajayi, J.O. &Owumi, B. (2013). Ethnic pluralism and internal cohesion in Nigeria. *International Journal of Development and Sustainability*, 2 (2), 926-940.

Ali, Z., & Bhaskar, S. B. (2016). Basic statistical tools in research and data analysis. *Indian journal of anaesthesia*, 60(9), 662–669.

Ambe-Uva, T. N. (2010). Identity politics and the Jos crisis: Evidence, lessons and challenges of good governance. *African Journal of History and Culture (AJHC)* 2(3), 42-52.

Amusan, L., Abegunde, O. & Akinyemi, T. E. (2017). Climate change, pastoral migration, resource governance and security: the Grazing Bill solution to farmer-herder conflict in Nigeria. *Environmental Economics*, 8(3), 35-45.

Ani, K. J., Ojakorotu, V., & Asuelime, T. L. (2019). Ezza and Kwahu-Ewe Land Dispute in Nigeria and Ghana: Unfolding the Road to Peace and Development. *Journal of African Foreign Affairs*, 6(1), 45–64.

Appadurai, A. (1986). *Introduction: Commodities and the politics of value. In The social life of things*. Cambridge University Press.

Atela, J., Tonui, C. & Glover, D. (2018). Farmers' agency and experiences of agricultural change in rural Kenya: Insights from exploratory fieldwork.*STEPS Africa*.

Babalola, K. H., & Hull, S. A. (2019). Examining the Land Use Act of 1978 and its effects on tenure security in Nigeria: A case study of Ekiti State, Nigeria. *Potchefstroom Electronic Law Journal/PotchefstroomseElektronieseRegsblad*, 22(1), 1-34.

Basedau, M. (2017). The Rise of Religious Armed Conflicts in Sub-Saharan Africa: No Simple Answers. *German Institute of Global and Area Studies*.

Bayramov, A. (2018). Review: Dubious nexus between natural resources and conflict. *Journal of Eurasian Studies*, 9(1), 72–81.

Bello, B., & Abdullahi, M. M. (2021). Farmers–Herdsmen Conflict, Cattle Rustling, and Banditry: The Dialectics of Insecurity in Anka and Maradun Local Government Area of Zamfara State, Nigeria. *SAGE Open*, 11(4), 1-12.

Benjaminsen, T. A., & Ba, B. (2009). Farmer-Herder Conflicts, Pastoral Marginalisation and Corruption: A Case Study from the Inland Niger Delta of Mali. *The Geographical Journal*, 175(1), 71–81.

Berihu, A. S., Bihon, K., Betelhem, S.&MewchaA. G. (2015). Farm Land Conflict and its Socio-Economic Consequences in TahtayQoraro, Tigray, Ethiopia. *International Journal of African and Asian Studies*, 9,44-54.

Besta, N. A. (2013). Seaweed farming and intra-household gender relations on Songo Songo Island, Tanzania *[PhD thesis, University of East Anglia]*.

Beyene, S. D. (2023). The impact of food insecurity on health outcomes: empirical evidence from sub-Saharan African countries. *BMC Public Health*, 23(1), 338.

Binu, V. S., Mayya, S. S., & Dhar, M. (2014). Some basic aspects of statistical methods and sample size determination in health science research. *Ayu*, 35(2), 119–123.

Bowers, S. R., (1997). Ethnic Politics in Eastern Europe [*Faculty Publications and Presentations, Liberty University*].

Bromley, D. W. (1989). *Economic interests and institutions: The conceptual foundations of public policy*. Basil Blackwell.

Brüntrup, M., (2020). Food security in times of crisis: Poor developing countries are different. *ECONSTOR*.

Carlos, A. M., Feir, D. L., & Redish, A. (2022). Indigenous nations and the development of the US economy: Land, resources, and dispossession. *The Journal of Economic History*, 82(2), 516-555.

Chambers, R., & Conway, G., (1992). *Sustainable rural livelihoods: Practical concepts for the 21st Century*. Institute of Development Studies.

Chellens, M. K., Diemer, A. (2020). Natural Resource Conflicts: Definition and Three Frameworks to Aid Analysis. In: Leal Filho, W., Azul, A., Brandli, L., Lange Salvia, A., Wall, T. (Eds) *Partnerships for the Goals*. Springer, Cham.

Coleman-Jensen, A., Nord, M. & Singh, A. (2013). September. Household Food Security in the United States in 2012. *ERR-155, U.S. Department of Agriculture, Economic Research Service.*

Czuba, K., O'Neill, T. J. & Ayala, A. P. (2017). *The impact of food assistance on pastoralist livelihoods in humanitarian crises: An evidence synthesis*. Oxfam GB.

Dyke, A. J. (2006). The Practice, politics and ecology of non timber forest products in Scotland*[Doctoral dissertation, University of Glasgow]*.

Ele, M. (2020). Transhumance, Climate Change and Conflicts: Reflections on the Legal Implications of Grazing Reserves and Ruga Settlements in Nigeria. *Journal of African Law*, 64(2), 199-213.

Ellis, A. M. (2016). Wabanki Access to Sweetgrass (Hierochloe Odorata) within Coastal Maine's Diminishing Open Land Tradition *[PhD Thesis, University of Maine]*.

Emil Clammer, J.R., Jayaswal, P. & Sharma, P. (2022). Addressing water scarcity in developing country contexts: a socio-cultural approach. *Humanities and Social Science Communications* 9(144), 1-10.

Eshetu, F. & Guye, A. (2021). Determinants of Households Vulnerability to Food Insecurity: Evidence from Southern Ethiopia. *Journal of Land and Rural Studies* 9(1) 35–61.

Ezemenaka, K. E. &Ekumaoko, C. E. (2018). Contextualising Fulani-Herdsmen Conflict in Nigeria. *Central European Journal of International and Security Studies* 12 (2), 30–55

FAO, IFAD, UNICEF, WFP &WHO. (2019). The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns.*FAO*.

FAO, IFAD, UNICEF, WFP &WHO. (2023). In Brief to The State of Food Security and Nutrition in the World 2023. Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum.*FAO*.

Food and Agriculture Organization of the United Nations (2011). The state of the world's land and water resources for food and agriculture. FAO.

Food and Agriculture Organization of the United Nations, (2022). The state of the world's land and water resources for food and agriculture. *FAO*.

Food and Agriculture Organization of the United Nations (2024). Social protection as a pathway to sustaining peace. *FAO*.

Folami, O. M. & Chamberlain, J. M., (2017). Ethnic-conflict and its manifestations in the politics of recognition in a multi-ethnic Niger delta region. *Cogent Social Sciences*, 3(1), 1-17.

Garzón Delvaux, P. A., & Gomez y Paloma, S. (2018). Access to common resources and food security: Evidence from National Surveys in Nigeria. *Food security*, 10(1), 121-140.

Gebreselassie, S., Juhar, N., Almaw, A., Engidawork, A., Abdisa, K. &Mekona, N. (2016). Economic Linkages between Pastoralists and Farmers in Ethiopia: Case Study Evidence from Districts in Afar/Amhara and Oromia. *USAID Agriculture Knowledge, Learning, Documentation and Policy (AKLDP)*.

Ginger, C., Emery, M. R., Baumflek, M. J., & Putnam, D. E. (2012). Access to natural resources on private property: Factors beyond right of entry. *Society & natural resources*, 25(7), 700-715.

Global Agricultural Monitoring, (2022). Northern Ethiopia: Conflict and Food Insecurity. *Conflict Report*.

Global Network Against Food Crises (2021). Global Report on Food Crises Joint Analysis for Better Decisions. Conflict Report.

Guo, Q., He, Z., Li, D. & Spyra, M. (2022). Analysis of Spatial Patterns and Socioeconomic Activities of Urbanized Rural Areas in Fujian Province, China. *Land*, 11(7), 969. https://doi.org/10.3390/ land11070969

Guppy, L., Anderson, K. (2017). *Water Crisis Report*. United Nations University Institute for Water, Environment and Health.

Hall, D., Hirsch, P. & Li, T. (2011). *Powers of exclusion*. NUS Press.

Hankin, D. G., Michael S. M. & Ken B. N. (2019). *Multi-stage sampling', Sampling Theory: For the Ecological and Natural Resource Sciences*. Oxford Academic.

Hasenöhrl, U. (2021). Histories of Technology and the Environment in Post/Colonial Africa:Reflections on the Field. Histories. 1(3):122-144.

Hirschauer, N., Grüner, S., Mußhoff, O., Becker, C. & Jantsch, A. (2020). Can p-values be meaningfully interpreted without random sampling? *Statistics Surveys*, 14, 71-91.

Igwe, P. I. & Amadi, L. (2021). Democracy and Political Violence in Nigeria Since Multi -Party Politics in 1999: A Critical Appraisal. *Open Political Science*, 4, 101–119.

Issifu. A. K., Darko, F. D. & Paalo, S. A. (2022). Climate change, migration and farmer–herder conflict in Ghana. *Conflict Resolution Quarterly* 39,421–439

Kamalu I, Niyomwungere F &EtikanİIker. A. (2024). Comprehensive Analysis of Cluster Sampling versus Multi-Stage Sampling Techniques: Methodologies, Applications, and Comparative Insights. *PJBMR*, 2(1), 21-30.

Krätli, S & Toulmin, C. (2020). Farmer-herder conflict in sub-Saharan Africa? *IIED*.

Kwaja, S.M.A. & Smiths, K. (2020). Transnational dimensions of conflict between Farmers and Herders in the Western Sahel and Lake Chad Basin. *Search for Common Ground*.

Leach, M., Mearns, R. & Scoones, I. (1999). Environmental entitlements: Dynamics and institutions in community-based natural resource management. *World Development* 27 (2), 225–247.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 140, 1-55.

Macpherson, C.B. (1978). *Property, mainstream and critical positions*. University of Toronto Press.

Maravelakis, P. (2019). The use of statistics in social sciences. *Journal of Humanities and Applied Social Sciences*, 1(2), 87-97.

Mbih, R. A. (2020). The politics of farmer–herder conflicts and alternative conflict management in Northwest Cameroon, *African Geographical Review*, 39(4), 324-344.

McGuirk, E.F. & Nunn, N. (2021). Transhumant pastoralism, climate change and conflict in Africa. *ERSA Working Paper* 860.

Menold, N., & Bogner, K. (2016). Design of Rating Scales in Questionnaires. *GESIS*.

Mensah, J., & Ricart Casadevall, S. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent Social Sciences*, 5(1), 1-21.

Milgroom, J., (2012). Elephants of democracy *[PhD thesis, Wageningen University]*.

Mwikalia&Wafula (2019). Effects of Farmer-Herder Conflicts on Socio-Economic Development of the Local Communities in Mutitu Sub County of Kitui County, Kenya 1963-2013.International Journal of Sciences: *Basic and Applied Research* 48(6), 66-81.

Myers, R. (2015). Access in a global rattan production network: A case study of rattan originating from central Sulawesi, Indonesia and upgraded for sale in international markets *[PhD thesis, University of East Anglia]*.

Nillesen, &Bulte, E. (2014). Natural Resources and Violent Conflict. Annu. *Rev. Resour. Econ*, 6,69–83.

Nwagwu, E. J. (2016). Indigenes and Settlers Conflict in Nigeria: A Negation to National Integration and Nation Building. *Mediterranean Journal of Social Sciences*,7 (4)218-227.

Nwangwu, C., Mbah, P. O., Ike, C. C., Otu, O. A., & Ezugworie, C. (2020). Transhumant Pastoral Economy and Human Security in Nigeria: Whither Civil Society Organisations? *Journal of Asian and African Studies*, 55(7), 1033–1053.

Nwankwo, C. F. & Okafor, U. P. (2022). Ethnic faultline in the farmer–pastoralist conflict (FPC) – when does ethnicity matter to the FPCs? A case study of Adani-Nimbo area in South-Eastern Nigeria. *Journal of Global Faultlines* 9(1):44-56.

Nwokeoma, B., Okafor, S., Onah, S., Nwokeoma, S., & Amadi, G. (2024). Illegal logging in rural Southeast Nigeria: Implication for environmental crime and ecological sustainability. *Forestist*, 74(1), 102-111.

Obasanmi, J. O. & Enoma A. (2022). The Effects of Farmer/Herder Conflict on Socioeconomic Development of Nigeria. *Saudi J Econ Fin*, 6(4), 118-125.

Oche, O. G., Omodunbi, O. O. & Isaac, J., (2021). Herdsmen invasion: a threat to food and state security in Nigeria herdsmen invasion: a threat to food and state security in Nigeria. *Annals of Spiru Haret University Economic Series*,1,153-165.

Organisation for Economic Co-operation and Development, (2018). Innovation, Agricultural Productivity and Sustainability in Korea. *OECD Food and Agricultural Reviews*. https://doi.org/10.1787/9789264307773-en

Ofuoku, A. U. & Isife, B. I. (2019). Causes, effects and resolution of farmers nomadic cattle herders conflict in Delta state, Nigeria. *International Journal of Agricultural Extension and Rural Development* 7 (1), 001-008.

Ogah, W. O., Omiya, A. M., Ibrahim, I. S., &Dankasa, A. A. (2018). Ethnicity and Religion in Nigerian Politics: A Historical Analysis. *International Journal of Social Sciences*, 12(4), 171-184.

Ogbe, J. E. & Nyiayaana, K. (2022). Farmers-herders' conflict and goal two (2) of the sustainable development goals in Benue State. *World Journal of Advanced Research and Reviews*, 15(02), 058–068

Ogbomah, O. F. (2023). Herdsmen and farmers conflict in selected states from north central, south west and south east geo- political zones and its impact on food security in Nigeria, 2015 – 2021. *African Journal of Sustainable Agricultural Development*, 4(1), 39-62

Ogele E. P., (2021). Identity Conflict and Development Challenge in Nigeria's Fourth Republic, 2011-2020. *Saudi J. Humanities Soc Sci*, 6(3): 96-108.

Oghuvbu E.A., Oghuvbu O.B., 2020. Farmers-Herdsmen Conflict in Africa: The Case of Nigeria. *International Relations*, 20(4), 698-706.

Okafor, S. O., Onah, S. o., Abah, G. O. N. & Oranu, C. O. (2023a). Climate change-induced conflicts in Southeast Nigeria and urban food security. *Tema. Journal of Land Use, Mobility and Environment*, 16(2), 353-366.

Okafor, S. O., Izueke, E. M. C., Onah, S. O., Ugwu, C. E., Chuke, N. U., Nkwede, J. O., Udenze, C. & Okoye, O. E. (2023b). Social ecology, climate change and environmental sustainability among urban/semi-urban settlements in Southeast Nigeria: probing environmentally responsible behaviour and community – sustainable development. *Applied Ecology And Environmental Research* 21(3):1869-1889.

Okafor, S. O., Izueke, E. M. C., Onah, S. O., Ugwu, C. E.,Chuke, N. U., Nkwede, J. O., Udenze, C. & Okoye, O. E. (2023c). Social ecology, climate change and environmental sustainability among urban/semi-urban settlements in southeast Nigeria: probing environmentally responsible behaviour and community–sustainable development. Applied ecology and environmental research 21(3):1869-1889.

Okafor, S. O., Igwe, J. N., Izueke, E. M., Okoye, O. E., Okechukwu, A. B. & Obiozor, E. E. (2022). Environmental Knowledge and Policy Sustainability: A Study of Pro Environmental Policy Support among the Southeast Nigerian Rural Communities. *International Journal of Sustainable Development and Planning*, 17(1)341-350

Olagbemiro, M. F., Ojediran, J. T. & Oladipupo, E. (2022). Impacts of transhumance-related conflicts on the food security in the region. *World Journal of Advanced Research and Reviews*,13(03), 073–085.

Olaniyan, A., Francis, M., & Okeke-Uzodike, U. (2015). The Cattle are "Ghanaians" but the Herders are Strangers: Farmer-Herder Conflicts, Expulsion Policy, and Pastoralist Question in Agogo, Ghana. *African Studies Quarterly*, 15(2), 53.

Onah, B. N., Okafor, I. F., Oyigbo, D. N. & Nnate, K. N. (2020). Deployment of energy technologies for sustainable rural agricultural development in Nigeria. *IOP Conference Series: Earth and Environmental Science* 730(1), 1-11.

Onwunyi, U, M. & Anekwe, N. J. (2020). Interrogating clashes in benue state and their implications on food security in Nigeria. *Social scientia Journal of the Social Sciences and Humanities*, 5(3), 69-85.

Oosterveld, P., Vorst, H. C. M., & Smits, N. (2019). Methods for questionnaire design: a taxonomy linking procedures to test goals. *Quality of Life Research*, 28(9), 2501-2512.

Oruonye, E. D. & Ahmed, Y. M., (2018). Challenges and prospects of mining of solid mineral resources in Taraba State, Nigeria. *International Research Journal of Public and Environmental Health*, 5 (1), 1-7.

Pawlak, K., & Kołodziejczak, M. (2020). The Role of Agriculture in Ensuring Food Security in Developing Countries: Considerations in the Context of the Problem of Sustainable Food Production. *Sustainability*, 12(13), 1-20.

Payán, D. D., Díaz Rios, L. K., Ramírez, A. S., & De Trinidad Young, M. E. (2021). Structural Barriers Influencing Food Insecurity, Malnutrition, and Health Among Latinas During and After COVID-19: Considerations and Recommendations. *Journal of the Academy of Nutrition and Dietetics*, 121(5), 837–843.

Pérez-Fuentes, M. D. C., Molero Jurado, M. D. M., Martos Martínez, Á., Fernández-Martínez, E., Franco Valenzuela, R., Herrera-Peco, I., ... & Gázquez Linares, J. J. (2020). Design and validation of the Adaptation to Change Questionnaire: New realities in times of COVID-19. *International journal of environmental research and public health*, 17(15), 5612.

Phillips A. W. (2017). Proper Applications for Surveys as a Study Methodology. *The western journal of emergency medicine*, 18(1), 8–11.

Ramanujan, P., Bhattacharjea, S. & Alcott, B. (2022). A Multi-Stage Approach to Qualitative Sampling within a Mixed Methods Evaluation: Some Reflections on Purpose and Process. *Canadian Journal of Program Evaluation / La Revue canadienne d'évaluation de programme* 36(3), 355–364.

Rasmussen, M. B. & Lund, C. (2018). Reconfiguring frontier spaces: Territorialization and resource control. *World Development*, 101,388–399.

Ribot, J. C., & Peluso, N. L. (2003). A theory of access. *Rural sociology*, 68(2), 153-181.

Ribot, J. (2014). Cause and response: Vulnerability and climate in the anthropocene. *The Journal of Peasant Studies* 41 (5), 667–705.

Ribot, J., & Peluso, N. L. (2009). A theory of access. *Rural Sociology* 68 (2): 153–181.

Ridwan Mukaila, R., Falola, A., Akanbi, S.-U., O. (2021). Socioeconomic determinants of income among rural women in Enugu state, Nigeria: implication for achieving first sustainable development goal. *J. Agribus. Rural Dev*., 4(62), 363–370.

Rudas, T. (2008). *Handbook of probability: Theory and applications*. SAGE Publications.

Schellens, M. K. (2020). Violent natural resource conflicts *[PhD Thesis, Stockholm University, Sweden]*.

Scoones, I. (2015). *Sustainable livelihoods and rural development*. Practical Action Publishing.

Sen, A. (1981). *Poverty and famines: An essay on entitlement and deprivation*. Oxford University Press.

Shafieisabet, N., Mirvahedi, N. (2021). The role of rural–urban linkages in perceived environmental effects of farmers for participation in sustainable food security plans. *Agric & Food Secur* 10, 46 (2021).

Shantiko B, Fripp E, Taufiqoh T, Heri V & Laumonier Y. (2013). Socio-economic considerations for land-use planning: The case of Kapuas Hulu, West Kalimantan.*CIFOR*.

Sikor, T., & Lund, C. (2009). Access and property: A question of power and authority. *Development and Change* 40 (1),1–22.

Sundram, P. (2023). Food security in ASEAN: progress, challenges and future. *Frontiers in Sustainable Food Systems*, 7, 1-14.,

Tanyi, P. L., Nwatu, U. L., Ugwu, P. B., Amadi, A. &Idongesit, J. E. (2021). They have taken our farmlands! Examining the impact of herdsmen and farmers conflict on farming communities in Nkanu East Local Government Area of Enugu State. *Journal of Social Work in Developing Societies* 3(2): 58-70.

Teka, A. M. & Lee, S. (2019). The impact of agricultural package programs on farm productivity in Tigray-Ethiopia: Panel data estimation. *Cogent Economics & Finance*, 7(1), 1-28.

Thurstone, L. L. (1929). Theory of attitude measurement. *Psychological Review*, 36(3), 222-241.

Tranmer, M., Murphy, J., Elliot, M., & Pampaka, M. (2020). Multiple Linear Regression. *Cathie Marsh Institute Working Paper* 2020-01.

Udoekanem, N. B., Adoga, D. O. & Onwumere, V. O. (2014). Land Ownership in Nigeria: Historical Development, Current Issues and Future Expectations. *Journal of Environment and Earth Science*, 4(21), 182-188.

Udosen, N. M. (2021). Farmers-herders crisis and food security in Nigeria: Causes and implications. *European Journal of Political Science Studies*, 5(1), 24-44.

United Nations, (2015). Sustainable Development Goals. New York: UN.

Uzodinma, A. P. Q. (2019). Early Warning System and Transhumance Conflicts in Southeast Nigeria: A Study in Conflict Prevention. *Social scientia: Journal of Social Sciences and Humanities*, 3(4), 103-115.

Vallejo-Medina, P., Gómez-Lugo, M., Marchal-Bertrand, L., Saavedra-Roa, A., Soler, F. & Morales, A. (2017). Developing Guidelines for Adapting Questionnaires into the Same Language in Another Culture. *TerapiaPsicológica*, 35(2), 181-194.

Zhang, Y., & Lu, X. (2022). A Comprehensive Evaluation of Food Security in China and Its Obstacle Factors. *International journal of environmental research and public health*, 20(1), 1-17.

Zhou, J., Dellmuth, L. M., Adams, K. M., Neset, T. &Uexkull, N. V. (2020). The Geopolitics of Food Security: Barriers to the Sustainable Development Goal of Zero Hunger. *Stockholm International Peace Research Institute*.

Zimba, O., &Gasparyan, A. Y. (2023). Designing, conducting, and reporting survey studies: a primer for researchers. *Journal of Korean Medical Science*, 38(48), 1-11.

Zolnikov, T. R. (2013). The maladies of water and war: addressing poor water quality in Iraq. *American journal of public health*, 103(6), 980-987.