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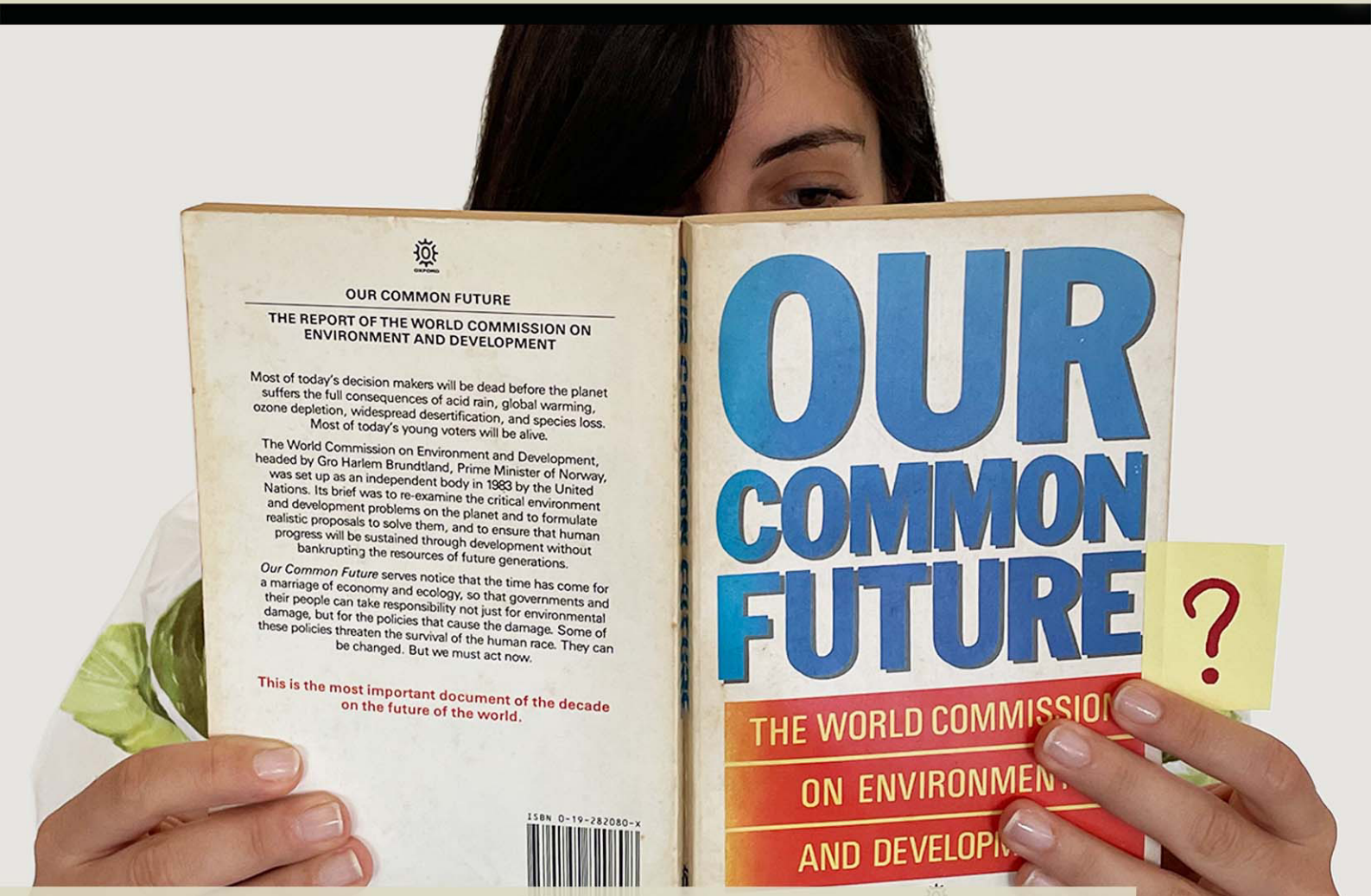
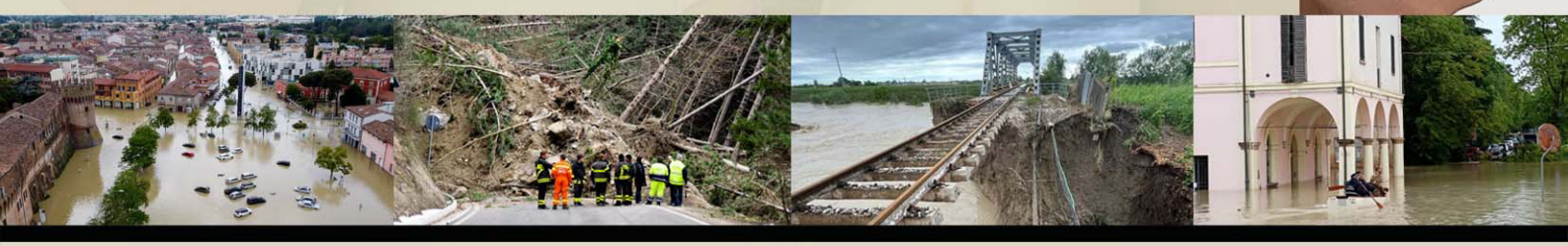


THE CITY CHALLENGES AND EXTERNAL AGENTS. METHODS, TOOLS AND BEST PRACTICES



Vol.16 n.2 August 2023

print ISSN 1970-9889 e-ISSN 1970-9870
University of Naples Federico II

TeMA Journal of
Land Use, Mobility and Environment

THE CITY CHALLENGES AND EXTERNAL AGENTS. METHODS, TOOLS AND BEST PRACTICES

2 (2023)

Published by
Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"

TeMA is realized by CAB - Center for Libraries at “Federico II” University of Naples using Open Journal System

Editor-in-chief: Rocco Papa
print ISSN 1970-9889 | on line ISSN 1970-9870
Licence: Cancelleria del Tribunale di Napoli, n° 6 of 29/01/2008

Editorial correspondence
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The cover image shows a copy of the 1987 UN report “Our Common Future – The report of the world Commission on Environment and Developments”. The picture has been taken in TeMA Lab in July 2023. On the bottom, there is a collage made up of four pictures of recent climate disasters (Source: Google images)

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TeMA Journal of Land Use, Mobility and Environment

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2 (2023)

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TeMA Journal of Land Use, Mobility and Environment

TeMA 2 (2023) 353-366
print ISSN 1970-9889, e-ISSN 1970-9870
DOI: 10.6093/1970-9870/9556
Received 7th December 2022, Accepted 18th February 2023, Available online 31st August 2023

www.tema.unina.it

Climate change-induced conflicts in Southeast Nigeria and urban food security

Implication to urban sustainability and sustainable development

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Abstract
Climate change is multifaceted and complex in its impacts on the human population across the globe. The areas of impacts include food insecurity and urban sustainability issues, which are currently ravaging the developing nations where sustainability policy frameworks are lacking or in passivity. The complex impacts of climate change on the urban population have been explored by some researchers in other regions of the world however, the nexus between climate change-induced conflicts and urban food insecurity and sustainability crises is yet to be empirically explored especially in the developing nations such as in sub-Saharan Africa. The aforementioned research and policy problem was the drive to the present study. The study which was guided by sustainability and climate change models, involved 1,658 respondents among the farming communities in southeast Nigeria using survey design and questionnaire as data gathering instrument. The study concludes that there is a cycle of anthropogenic activities among the urban population contributing to climate change, and climate change crises returning to urban population in form of food security and urban sustainability crises due to weak and passive environmental sustainability policy framework in Nigeria.

Keywords
Climate change; Food security; Environmental conflict.

How to cite item in APA format
Okafor, S. O., Onah, S. o., Abah, G. O. N. & Oranu, C. O. (2023). Climate change-induced conflicts in Southeast Nigeria and urban food security. *Tema. Journal of Land Use, Mobility and Environment*, *16* (2), 353-366. http://dx.doi.org/10.6092/1970-9870/9556

1. Introduction

In Nigeria in recent times, there has been an increase in transhumance from northern to the southern axis by the pastoralists who are majorly located in northern Nigeria; this has brought about some crises with some socioeconomic impacts on both the rural and urban populations alike (Ikezue & Ezeah, 2017; Ezemenaka & Ekumaoko, 2018; Oghuvbu & Oghuvbu, 2020). Although there has been evidence of the presence of the herders in southern Nigeria and southeast Nigeria in particular, the recent changes in the number of herders moving to the south from northern Nigeria has been raising a concern and speculations about their origin and implication to the receiving region. The influx of cattle, their herders and families has at least, unsettled the peace of the receiving communities due to herders trespasses and attendant struggle for land space with the indigenous farmers (Oli et al., 2018; Akabuiro, 2022). Following the traditional land tenure system in different parts of Nigeria, each region popularly marked by ethnic identity, do see landed properties as inheritance from lineage and communal history, which in any case, does not allow the non indigenes access to land ownership and occupation (Udoekanem et al., 2014; Ajala, 2017; Pierce, 2013; Ghebru & Okumo, 2016). As such, the presence of herders who are mainly Fulani ethnic group from the north undoubtedly triggers concern among the southern population who see the herders as intruders. There is a mutual suspicion between the herders coming mostly from northern Nigeria and the indigenous farmers in the southern axis. The herders are aggressive over land space to occupy for settlement while the sedentary farmers in the local communities are aggressive over land space for farming and as lineage/ancestral inheritance. The trespasses and conflict of interest engenders clashes, which has eventually led to the emerging trends of sudden onslaught against the host communities with monumental loss of lives, properties and farm products damage.

Owing to the glaring impacts of transhumance-related conflicts centred on the farmers and herders in sub-Saharan Africa and other parts of the globe, researchers have focused to understand the originator of the transhumance-related conflicts and the complex impacts on the urban and rural communities world over owing to its drastic effects on the United Nations Sustainable Goals 2, 11 and 12 (United Nations General Assembly, 2015). Among other factors, climate change over the years has been suspected as a culprit in the ever-growing movement of the pastoralists across Africa and sub-Saharan Africa in particular, causing some unsettlement on the side of the indigenous farmers who become vulnerable to the accompanying crises. Although the emergence of climate change crises have compelled both developed and developing nations to work out strategic land use policies to adapt into the emerging climate change issues (Zucaro & Morosini, 2018), most developing nations such as Nigeria are yet to priorities this problem. Many researchers have focused on the relationship between climate change incidents and the movement of the herders from one region to another with some findings suggesting the cause and effects relationship between climate change and transhumance activities (Serdeczny et al., 2016; Hoste & Vlassenroot, 2009; Turner & Schlecht, 2019; Musau, 2021; Connolly-Boutin & Smit, 2016; Leal et al., 2020).

According to the study by Teka et al. (2012), among the pastoralists in Eastern Tigray Ethiopia, weather activities has been found significant in their decision for seasonal movement from one region of the country to another as their local weather calendar indicates when and where drought is about to strike. Similarly, the study by (McGuirk & Nunn, 2021) equally confirmed that within the Ethiopian territory, much of the clashes between the farmers and the pastoralists have hovered around the decision of the herders to relocate because of weather challenges. According to the study by Issifu et al. (2021) among the Agogo population in Ghana who are known for pastoralist activities, the growing harsh and unpredictable weather, which is the evidence of climate change in the recent times, have forced them to move south ward in other to find pasture for their herds; this usually exposes them to conflicts and crises with the indigenous people of the south with unpleasant consequences. The study by Olaniyan, Francis and Okeke-Uzodike (2015) among the herders in Agogo Ghana who are involved in cross border transhumance activities showed that, among the herders originating from the region, the weather activities over the years have drastically affected their chances of sustainable livestock

management in their original settlements, forcing them to relocate for better pasture for their livestock. This situation according to the study has resulted into countless crises with the farmers whose farms are mostly affected by these movements across border.

According to the study by Krätli and Toulmin (2020) in sub-Saharan Africa involving Mali, Ghana and Nigeria, most of the recorded and investigated transhumance-related conflicts are pointing towards the emerging issue of climate change. From the study, about 60% of the crises documented with proper investigation among some sub-Saharan African nations indicated the effects of climate change on the decision and movement of the herders towards new areas with its accompanying crises with the farming communities. From the study by Adigun (2019), evidences suggested the climate change as a culprit in the increased movement of the pastoralists from northern Nigeria towards southern Nigeria. The study concluded that with timeframe and historical changes, the increased movement of the herders towards the south from the north are undeniably connected to the recent global climate change issues. Similarly, the study by Adeniran (2020), which was carried out in northern Nigeria revealed that in the recent times, climate change impacts on the grazing areas across northern Nigeria has been affecting many herders forcing them to search for more conducive regions and areas where they can maintain their livestock.

The study by Odoh and Chilaka (2012) in the middle belt region of Nigeria [the region linking the north and southeast Nigeria] suggested that the climate change indices are biting hard on the activities of the herdsmen in northern Nigeria, forcing them to relocate southward. According to the study, the movement of the herdsmen has begun quite a long time due to the emergence of climate change crises affecting the global community. Equally, the study by Halliru (2015) among the Kano state farmers and herders showed the drastic effects on the activities of herdsmen especially, their grazing areas causing the herders to involve in a somewhat internal migration for greener pastures and grazing areas. According to the finding of the study carried out by Olagunju et al. (2021) in southern Nigeria, there are common indicators among the herdsmen activities in the region that majority of their movements have been forced by weather activities in northern Nigeria. Corroborating this study is the study by Bello and Abdullahi (2021), which showed that over the years, most of the regions in northern Nigeria mostly occupied by the 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.

While the pastoralists popularly known as nomadic or Fulani herdsmen in Nigeria are viewed as operating mostly in northern Nigeria where there has been numerous encounters between them and the farmers in the region, their appearance and encounters with the indigenous farmers in the southern axis has been relatively recent owing to the peculiar nature of the southern axis as a region with multi-ethnic outfit who mostly earn their living through subsistence and relatively commercial farming (Oke & Olawale, 2019). The emergence of the pastoralists in the southern region both with a shock and fundamentally with conflicting interests to the people of the region has eventually turned to another dimension of domestic socioeconomic crises with global magnitude. Specifically, the unsettling of the farmlands and farming activities by the movement of herdsmen in the South eastern Nigeria in particular has created the crises of food insecurity and urban food sustainability issues (Okeke, 2022; Obi et al., 2021). According to the allied body of the United Nations (Food and Agricultural Organisation), food insecurity is captured in four major dimensions such as issues affecting food production, food accessibility, food stability and food utilization (FAO, 2020). The movement and activities of the herdsmen down to southeast Nigeria sparked by climate change in the recent times have drastically affected the four dimensions of food security with enduring impacts across the region and beyond (Egodike et al., 2020; Oti et al., 2017; FAO, 2022).

From farm inputs to farm output and to the market and urban access to different foods originally produced in southeast Nigeria, there are evidences of hardships among the population of the region (Tanyi et al., 2021). Most of the farm products produced in the southeast Nigeria is either in short supplies to the host and urban

communities in the region or totally supplied from other regions due to climate change triggered conflicts between the farmers and herders in the region (Obi et al., 2020; Akerjiir, 2018). Although the change in pastoralists movement towards the southeast Nigeria has been attributed to the climate change crises, which have drastically affected the nomadic activities in the northern region (Odoh & Chilaka, 2012; Oyaba & Nein, 2019), some scholars have attributed the problem to the challenges of poor governance and a smokescreen of land grabbing agenda (Christiana, 2021; Bello & Abdullahi, 2021). As a matter of fact, the southern Nigeria leadership structure under the aegis of southern governors forum have formed alliance to enact anti open grazing bill in their respective states targeting the activities and encroachment of the herdsmen and the eventual conflicts with the farmers (Aligba et al., 2020; Alonge, 2019; Jooji, 2020).

The impact of herdsmen clashes with the indigenous farmers in southeast Nigeria, which is triggered by climate change, has some wide range and long lasting magnitude and impacts. These included the urban food security and sustainability in the region; for instance, all the urban communities in southeast Nigeria receive their food supplies from the rural communities where the herdsmen-farmers clashes are taking place (Enete & Achike, 2008; Akukwe, 2020; Olumba et al., 2021). In the recent times, there has been an increase in the prices of foodstuffs in the urban communities in southeast Nigeria, especially with the recent farmers' herders clashes in the region (Ifejirika et al., 2013; Adekunle et al., 2020). The farmers and other indigenous people being destabilised due to the climate change-induced farmers-herders clashes are forced into the nearby urban communities for safety and new venture of seeking for greener pastures. For instance, in the recent conflicts between the migrant herdsmen and the indigenous farmers has eventually pushed more people into the nearby urban communities such as Enugu in Enugu state, Umuahia and Aba in Abia state, Owerri in Imo state, Abakiliki in Ebonyi state, Onitsha, Nnewi and Awka in Anambra state all within southeast Nigeria. The nexus of the urban food security and climate change-induced farmers-herders crises in southeast Nigeria points to a critical and strategic gap in the ongoing United Nations Sustainable development goals domestically in the region and internationally to the overall global agenda in ending hunger, achieving inclusiveness and sustainable food consumption in the urban communities as well as in the rural communities. The aforementioned gap in knowledge and policy option is yet to be explored by any researcher in southeast Nigeria prompting this study, which is focused on answering the following questions such as:

i. What is the relationship between observed climate change indicators and herdsmen movement from northern Nigeria towards southeast Nigeria?
ii. What is the relationship between climate change-induced conflicts and urban food insecurity in southeast Nigeria?
iii. What are the predictors of urban food insecurity originating from the rural communities in southeast Nigeria?
iv. What is the implication of climate change-induced conflicts to urban sustainability in southeast Nigeria?

2. Climate change and urban sustainability

The interrelationship between the anthropogenic activities and climate change produces the environmentally related crises, which eventually return to the same human population responsible for environmental degradations especially in the urban communities. This usually comes in a way that may not easily be fathomed except through scientific cross-examination of cause and effects analysis of factors (Heidi & Somaya, 2017; Archer & Satterthwaite, 2019). Urban sustainability, which goes beyond economic, political, social and religious perspectives and paradigms (Khalili, 2011; Jenkins, 2008) to involve behavioral disposition of the urban population, awakes in our consciousness the implication of the unseen individual and collective attitudinal disposition of the urban population towards the natural environment. Beginning from the government urbanization policies to the obtainable urbanism in the urbanized areas, there are issues of environmental negligence, which ultimately resulted to emerging environmental related crises in the developing nations. And

this is connected to poor urban planning in the developing nations, where the emergence of urban areas follows no definite pattern due to population crises and poor governance.

Following the sustainability models such as the political, economic, ecological and theological models, which are invariably interwoven in the explanation of the concept of sustainability, urban sustainability is multidimensional with a bearing on the human behavioral ethics (Jenkins, 2008; Khalili, 2011). For instance, the political model, which focuses on environment and human dignity with the instances of environmental justice and civic environmentalism (Jenkins, 2008; Khalili, 2011; Childers et al., 2014), cannot be achievable in the absence of checkmated human attitudinal disposition towards the natural environment. This is also obtainable in the case of ecological, economic and theological models, which are primarily on using the returns from the natural environment for further investment opportunities, sustainability of biological diversities and ecological dignity as well as cultural transformation. All these point to the inalienable position of anthropogenic activities in the game of sustainability, especially in the urban communities where much of the present and future global populations are concentrated.

In southeast Nigeria, the urban communities are forming in rather irregular patterns without a proper and definite planning by the federal, state and local governments making it difficult for economic, political and ecological sustainability within the urban communities. For instance, the activities of the urban population in the region, which are inimical to environmental sustainability, lacked any form of supervision and documentations. This is visible in the types and forms of industrial activities as well as the crude technologies in use across the urban communities in the region (Echendu, 2020; Pona et al., 2021). These have contributed to the burden of greenhouse gasses such as carbon dioxide, chlorofluorocarbons, methane, nitrous oxide, ozone, and water vapor produced in Nigerian cities that contribute to climate change.

Climate change, which is the change in statistical distribution of the weather in at least 35 years duration, has been observed across the globe as one of the pressing challenges of the global community with daring consequences (Khalili, 2011). Climate change, which is majorly triggered by the anthropogenic activities, is roughly distributed across different human populations across the globe of which the developing nations such as Nigeria is specifically located within the nations contributing to global climate change through greenhouse gas emissions.

According to the Food and Agricultural Organisation (FAO, 2022), Nigeria contributed to about two percent of the entire global greenhouse gas emissions, which is hampering the global climate stability. Within the southeast Nigerian urban and semi urban communities, there is a cumulative of 86,694,435t, 0.48t per capita and 95.3 t/km² co2 intensity, which invariably points to the heavy anthropogenic activities affecting climate change from the region.

The current climate change crises rocking the entire globe have gradually began to tell on the rural and urban communities across Nigeria. One of the evidence of the emerging climate change crises impacting the urban sustainability is the emerging crises of food insecurity mostly affecting the urban communities in southeast Nigeria. Due to the absence of failed political, economic and ecological sustainability in the urban communities resulting to the heavy anthropogenic activities in the region affecting climate stability, the urban communities have invariably contributed to the unsettling of the herdsmen mainly located in northern Nigeria from their original location to new locations causing the farmers-herders crises responsible for emerging food instability in the urban communities.

In northern Nigeria, the impact of climate change has forced the herdsmen and even farmers to relocate and change strategies from their areas of occupation and the spillover of the crises has surfaced in the southeast Nigeria with some crises indicators such as food insecurity in both urban and rural communities as well as urban instabilities in southeast Nigeria.

3. Methodology

Southeast Nigeria is located at latitude N904.9199 and Longitude E8040.5166 with the landmass of approximately 41,440 km2; the region is predominantly Igbo ethnic group with about 22 million population. The population in the region is mainly Christians with some proportion of traditionalists and Muslims, while the mainstay for the population is subsistence and commercial agriculture for the rural population the urban population is mainly preoccupied with service, industrial, commercial and artisan occupations. As such, the urban population is dependent on the rural population for food sustainability.

The region is politically arranged under three-tier government of federal, state and local government levels. There are five administrative states in southeast Nigeria and approximately 97 local government areas. Among the local government areas across the five administrative states in the region, there are rural communities classified in the categories of communities, villages, wards and kindred. Within these communities there farming communities organized under cooperative societies with different farming specialties. The sample size for this study was developed from the five administrative states in the region; three states were randomly selected for the sample size through multistage sampling technique. Six senatorial districts were selected followed by 18 local councils and 54 local communities. Within the local communities, the study focused on the cooperative societies located within these communities.

A community without any form of cooperative society was replaced with another community with a presence of cooperative society. From each of the communities, one cooperative society was selected however, where there are more than one cooperative society, two or three cooperative societies were selected and on the whole, 116 cooperative societies were selected from among the 54 communities. Among the cooperative societies, there are at least 36 members for every cooperative society as the World Bank guideline for recognition and sponsorship grants for the groups has restricted for scams and irregularities through the farmers' cooperative society. For instance, the cooperative societies in the region are conditioned to have a minimum of 36 members and maximum of 45 members per cooperative society. As a matter of fact, from the documentation of the selected cooperative societies for the study, there were 4,518 registered members among the 116 cooperative societies; this made up the sample frame for the study.

The study selected 1,658 respondents for the study putting into consideration, local communities mostly affected by herdsmen-farmers conflicts in the region as well as farming communities with direct supply links to the nearby urban communities.

The study applied survey research design, using questionnaire instrument, which was designed in nominal and ordinal scales with focus on the socio-demographic information from the respondents as well as the substantive issues to the study. While the first section of the questionnaire contained the socio-demographic characteristics of the respondents, the second section contained information on the formation of farming and farming activities among the respondents such as types of farming, farming scales, farming location, climate change indices as well as encounter with the herdsmen in the area and farm settlements. The third section of the questionnaire contained information on the indices and indicators of food security and integrated rural and urban food security chain. The questionnaire instrument was validated by four experts from the faculties of the Social sciences, Education, Environmental studies and Agricultural sciences in the University of Nigeria, Nsukka. The questionnaires were shared among the study respondents for data collection with the help of research assistants recruited from the involved communities.

The collected data was analyzed using descriptive and inferential statistics such as percentages, correlation analysis and statistical models to understand the relationship of the substantive variables to the study.

According to the socio-demographic information of the respondents, 58.9% are females and 41.1% of the respondents were males showing the farming business are more of women engagement than that of men in this region of the country. By age distributions, 45.2% of the respondents are within the age range of 40-50 years, 26.7% are in the age range of 29-39 years, 13.4% are in the age range of 18-28years, 14.4% are in

the age range of 51-61 years and less than one percent are in the age range of 62 years and above; this showed that the farmers in this region are relatively youths.

Spearman's rho		Herdsmen movement towards southeast Nigeria	Frequency of climate change indicators
Herdsmen movement towards southeast Nigeria	Correlation Coefficient	1.000	0.395**
	Sig. (2-tailed)	.	0.000
	N	1,658	1,658
Frequency of climate change indicators	Correlation Coefficient	0.395**	1.000
	Sig. (2-tailed)	0.000	.
	N	1,658	1,658

***. Correlation is significant at the 0.01 level (2-tailed).*

Tab.1 Frequency of climate change indicators and Herdsmen movement towards southeast Nigeria: Correlations

The above Tab.1 showed the correlation between the observed frequencies of climate change and herdsmen movement down to southeast Nigeria. The climate change indicators and there intensities were used as scale to check the frequency of change in weather activities observed by the study population; these included No observation, Rare change in sun, rain, humidity and other seasonal weather activities, Intermittent change in sun, rain, humidity and other seasonal weather activities and Extreme change in sun, rain, humidity and other seasonal weather activities. The above finding showed a positive correlation between the frequency of climate change indicators and herdsmen movement towards southeast Nigeria (rho = 0.395). Furthermore, the findings showed that about 15.6% of the herdsmen movement from northern Nigeria towards southeast Nigeria is explained by the frequency of climate change indicators as observed by the farmers in southeast region of Nigeria. As one of the goals of this study, the study sought to understand the observed relationship between climate change indicators and the movement of herdsmen from northern Nigeria towards southeast Nigeria, which has been shown from the above table that there is a positive correlation between the climate change indicators and the movement of the herdsmen from northern Nigeria towards southeast Nigeria.

Spearman's rho		Climate change-induced conflicts	Urban food insecurity
Climate change-induced conflicts	Correlation Coefficient	1.000	0.234**
	Sig. (2-tailed)	.	0.000
	N	1,658	1,658
Urban food insecurity	Correlation Coefficient	0.234**	1.000
	Sig. (2-tailed)	0.000	.
	N	1,658	1,658

***. Correlation is significant at the 0.01 level (2-tailed).*

Tab.2 Urban food insecurity and Climate change-induced conflicts Correlations

The above Tab.2 showed the correlation between climate change-induced conflicts and urban food insecurity. While climate change-induced conflicts were measured with the frequency of farmers/herders conflicts related to the movement of the herders due to climate change, urban food insecurity was measured with the frequency in decrease of the amount of food products from the rural farmers exported to the urban communities. From the finding, there is a positive correlation between climate change-induced conflicts and urban food insecurity in the region (rho = 0.234). Furthermore, the finding showed that about 54.7% of urban food insecurity in the region is explained by climate change-induced conflicts between farmers and herdsmen in the rural communities. As one of the major thrust of the study, urban food security is dependent on the rural farming activities owing to the fact that urban communities in southeast Nigeria struggle for space and do not allow for elaborate agricultural activities.

Urban food security is therefore connected to the farming activities in the region and this is facilitated through the exportation of food products from the rural communities to the nearby or even a distant urban communities. From the findings of this study, the interruption of farming activities and food transportation activities by the herdsmen/farmers clashes has invariably interrupted sustainable food security in the urban communities in the region. This can also be observed through the sudden increase in food prices around the urban communities in the region in the recent times.

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
	B	Std. Error	Beta		
(Constant)	-0.038	0.033		-1.151	0.250
Farming types	-0.141***	0.014	-0.151	-10.345	0.000
Open grazing	0.057***	0.015	0.068	3.727	0.000
Herdsmen encroachment	0.042***	0.011	0.044	3.705	0.000
Climate-induced conflicts	0.155***	0.009	0.182	16.593	0.000
Climate change indicators	0.164***	0.012	0.200	13.366	0.000
Increased scale of farming	-0.281***	0.018	-0.332	-15.308	0.000
Diminishing farming population	0.423***	0.039	0.499	10.918	0.000
Rural food instability	-0.228***	0.022	-0.227	-10.312	0.000
Rural food affordability	0.473***	0.020	0.500	23.815	0.000
Rural food production	0.121**	0.043	0.137	2.778	0.006

a. Dependent Variable: Urban food insecurity

**p<0.05, ** p<0.01, *** p<0.000, R^2= (0.887), F (1288.038)*

Tab.3 Coefficients Urban food insecurity and other variables

The above Tab.3 presented a model explaining the predictors of urban food insecurity in southeast Nigeria in relationship with rural farming activities. From the model above, the explanatory power of the model is 0.887 (R2), which in translation is 78.7%. From the findings, the model explained about 78.7% of urban food insecurity in relationship with farming in the rural communities. In their order of contributions to the explanation of urban food insecurity, farming types, which was measured in the study as the ability to cultivate multiple crops, appeared to be negating urban food insecurity. This in essence indicates that the more diverse the farmers are in the rural communities, the more the reduction of urban food insecurity. Equally in the same direction, increased scale of farming appeared to be negating urban food insecurity. This is true in view of the enormous impacts of commercial agriculture in the rural communities on the urban communities. The finding showed that the larger the scale of farming by the rural farmers, the lower the incidence of urban food insecurity in southeast Nigeria.

Rural food instability is inversely a gain in urban food security; the food security crises in the rural communities such as food instability are indirectly the evidence of food exportation to the urban communities. Meanwhile, there are other variables in the model appearing as indicators of urban food insecurity originating from the rural communities. These variables included open grazing, which in this context appeared as counter weight to urban food security. In essence, the open grazing crises that have become a social problem in southeast Nigeria and other parts of the nation seems to have started telling on the overall food security in the rural communities as well as the nearby urban communities. The finding here pointed to the fact that the more the incidence of open grazing, which is responsible for other farmers-herders crises in the region, the more the likelihood of urban food insecurity. Similarly, the model showed that the more the incidence of herdsmen encroachment into the farmland, the more the likelihood of urban food insecurity.

While the problem of herdsmen encroachment into the farmland has been publicly denounced at the surface as inherently destructive, the problem has been further revealed as more complicated in this study with its positive correlation with urban food insecurity in southeast Nigeria. This also is understandable in the case of

climate change-induced conflicts, which in itself is the destabilization of the farming community in the region by the herdsmen dislodged from the northern abode by climate change indicators. Nonetheless, climate change indicators as observed by the farmers appeared to be reporting on the overall food security crises both in the rural and urban communities in the region. For instance, the appearance of climate change indicators in the model pointed to a positive correlation with urban food insecurity, which in translation means, the more the frequency of climate change indicators in the region, the more likelihood of urban food insecurity. This applies to the issue of diminishing farming population in the rural communities, which is the by-product of climate change via farmers-herders clashes in the region.

4. Discussion of the findings and conclusion

The ripple effects of climate change have began to surface across the globe and this is mainly being experience in the urban communities where anthropogenic activities are highly concentrated due to high population densities compared to the rural communities especially in the developed and emerging/developing economies (Balaban & Şenol, 2015; Galderisi & Ferrara, 2012) such as in southeast Nigeria as one of the developing nations yet to give appropriate attention to climate change adaptation and mitigation strategies (Okafor et al., 2023). In southeast Nigeria in particular the industrial activities as well as other engagement of the urban population are in themselves, anthropogenic activities fuelling climate change in the long run. This is obtainable in other cities across the nation where weak and obsolete environmental policies have not measured up against climate change.

Now, the impacts of climate change have begun to return to the urban communities in rather extraneous manner. The study showed positive correlation between frequent climate change indicators and influx of herdsmen who originally occupied the northern axis of the country. Although there are pockets of evidences that herdsmen do come around the southern axis such as the southeast Nigeria, the recent influx of the group towards the region appeared to be triggered by some factors of which one of them has been identified as climate change. Specifically, the encroachments of desert in northern Nigeria as well as other unfriendly weather activities in the region are not good for the business of the herdsmen and these have started forcing the population of herdsmen in northern Nigeria towards southern Nigeria.

In southeast Nigeria from this study, the indicators of climate change have been showed positive correlation with the influx of the herdsmen in the region. The finding corroborated with the findings of the studies by (Turner & Schlecht, 2019; Opitz-Stapleton et al., 2021; Eeswaran et al., 2022) who located the recent transhumance crises in the sub-Saharan Africa as squarely connected to climate change indicators within the region. While the herdsmen are dependent on the natural resources such as land space, water, weather and other natural resources in the sub-Saharan Africa, these resources are gradually phasing off in different parts of the region such as northern Nigeria.

Within the northern Nigeria, climate change crises have engulfed both the farmers and the herdsmen alike (Ugbem, 2019; Farauta et al., 2011; Abraham & Fonta, 2018), prompting their move to safer zones such as southeast Nigeria where the crises of climate change is at least manageable for the herdsmen due to the enormous presence of water and other natural resources supportive to herdsmen business. The farmers in southeast region of Nigeria acknowledged the frequencies of climate change indicators in the region, which is measured up with the influx of herdsmen who seem to be finding relative comfort in the region compared to northern Nigeria.

One of the consequences of climate change crises pushing the herdsmen from northern Nigeria towards southeast Nigeria is the incessant conflicts between the migrant herdsmen and the indigenous farmers. The encroachment of herdsmen in southeast Nigeria has gradually reduced the food production capacity of the farmers in the region owing to the crises of insecurity in the farmsteads across the region orchestrated by the herdsmen activities in the farm settlements in the region. More importantly as it affects the urban community

food sustainability, larger part of the foods consumed in the urban communities are produced in the rural communities in southeast Nigeria.

In fact, this is one of the major sustainable factors in the urban-rural interaction in the region. With the encroachment of the herdsmen in the rural communities in southeast Nigeria, the quantity of food transported to the urban communities has drastically reduced in recent times showing up in the skyrocketed food prices in the urban communities as well as the scantiness of certain food products in the urban centers in southeast Nigeria. Other studies have shown that the presence of herdsmen is usually accompanied by some level of conflicts with the indigenous farmers at least, in sub-Saharan Africa where open grazing is still the in-thing for the herdsmen (Ezemenaka & Ekumaoko, 2018; Ikezue & Ezeah, 2017; Osadebamwen, 2017; Apuke & Umar, 2020). While more than 15.6% of the movement of the herdsmen from northern Nigeria to southern Nigeria is explained by the presence of climate change indicators (rho = .395), about 54.7% of urban food insecurity in southeast Nigeria is explained by herdsmen-farmers climate change-induced conflicts (rho = .234). This confirming the earlier studies by (Sani et al., 2021; Nnaji et al., 2022; Kazzah, 2018) who confirmed the presence of herdsmen-farmers conflicts as a threat to food security in some regions.

Climate change-induced farmers-herdsmen conflicts are multifaceted and mostly bite hard to food insecurity such as food production, food availability, food accessibility and food utilization. Although this is mostly among the farmers in the rural communities, this also affects the urban population as the present study has revealed. For instance, some studies have shown that more than 60% of the foods consumed by the urban population are produced by the rural farmers especially in the developing nations such as Nigeria where the urban population are limited to commercial, industrial and service provision occupations.

In southeast Nigeria for example, the recent herdsmen-farmers conflicts have started reporting on the food prices in the urban and rural markets (SWAC/OECD, 2020; Cohen & Garrett, 2010; FAO, 2022; Owoo, 2021). This is the accumulation of the herdsmen activities in the region as they are being pushed out of northern Nigeria towards southeast Nigeria; this appears in form of unsettling the farming communities and forcing many farmers to abandon their occupation for other engagement in the nearby urban communities.

The impact of climate change-induced conflicts and crises on the urban sustainability in southeast Nigeria are multiple, anchoring on multiple factors. For instance, from the model applied to check the predicting factors to urban food insecurity in the region, some factors appeared as indicators of urban food insecurity originating from the rural communities. For instance, open grazing is one of the factors according to the findings, which is triggering urban food insecurity.

This finding affirmed other studies, which showed that open grazing is inimical to food security especially in the sub-Saharan African region (Bjornlund et al., 2022; Wudil et al., 2022; Giller, 2020). Open grazing in its manifestation is triggered by the unsettled exclusive environment of the herdsmen, which bring them to frequent confrontations with the farming communities since their cows will always feed on the available farm crops on their path of grazing. In southeast Nigeria for instance open grazing accounted for majority of the farmers-herdsmen clashes in the region due to the cows sometimes stray into the farms and in some cases the troublesome herdsmen decide to allow their cows to feed on the crops of the farmers. In any case, the open grazing crises triggers urban food crises through its destabilizing impacts on the four dimensions of food security such as food production, food availability, food accessibility and food utilization in the rural communities, which in extension affects the supply chain to the urban communities thereby triggering urban food security crises.

Climate change triggers the influx of the herdsmen into southeast geopolitical zone with its undesirable outcomes such as decreasing the farming population through climate change-induced crises, decreased farming scale as well as interrupted rural-urban food supply chain. More importantly, as implication of climate change-induced conflicts in southeast Nigeria to urban sustainability, the population being destabilized is forced into the nearby urban communities with poor infrastructures and facilities.

Since the beginning of herdsmen influx in their numbers to southeast Nigeria in 2016, most of the urban communities have swelled having more slums and over stretched settlements. This has brought about increase in crimes of all sorts, prostitution, and ballooned urban unemployment and under employment within the southeast Nigeria and beyond. Urban sustainability which is anchoring on political, environmental, economic and theological policy frameworks is altered by the influx of destabilized population in the rural communities as well as interrupted rural-urban resources flows blamed on climate change-induced conflicts in the rural communities. Evidently, climate change is being triggered by the loosed urban industrial and other anthropogenic activities and this is bringing to the table, some crises such as climate change-induced conflicts that eventually send back disturbing ripples to urban sustainability.

References

Abraham, T. W. & Fonta, W. M. (2018). Climate change and financing adaptation by farmers in northern Nigeria. *Financial Innovation*, 4:11 https://doi.org/10.1186/s40854-018-0094-0

Adekunle, C.P. Akinbode, S.O. Shittu, A.M. & Momoh, S. (2020). Food price changes and farm households' welfare in Nigeria: direct and indirect approach. *Journal of Applied Economics*, *23* (1), 409-425. https://doi.org/10.1080/15140326.2020.1743103

Adeniran, A. I. (2020). Climatic Factors in Nigeria's Farmer–Herder Conflict. Policy Briefing Climate Change and Migration: *Centre for International Governance and Innovation*. Retrieved from: https://www.africaportal.org/publications/climate-factors-nigerias-farmer-herder-conflict/

Adigun, O. W. (2019). A Critical Analysis of the Relationship between Climate Change, Land Disputes, and the Patterns of Farmers/Herdsmen's Conflicts in Nigeria. *Canadian Social Science*, *15*(3), 76-89. http://dx.doi.org/10.3968/10967

Ajala, T. (2017). Gender discrimination in land ownership and the alleviation of women's poverty in Nigeria: A call for new equities. *International Journal of Discrimination and the Law*, 17(1), 51–66. https://doi.org/10.1177/1358229117700028

Akabuiro, D. O. (2022). Herders and Farmers Competition over Natural Resources and Its Impacts on Human Rights in Nigeria. *Journal of Energy and Natural Resources, 11* (4), https://doi.org/107-119. 10.11648/j.jenr.20221104.11

Akukwe, T. I. (2020). Household Food Security and Its Determinants in Agrarian Communities of Southeastern Nigeria. *Agro-Science Journal of Tropical Agriculture, Food, Environment and Extension 19* (1), 54 – 60. https://doi.org/10.4314/as.v19i1.9

Apuke, O.D., & Omar, B. (2020). Nigeria: Conflict Victims' Assessment and Narratives on the Reportage of Herdsmen-Farmers Conflict. https://doi.org/10.24193/csq.31.2

Balaban, O. & Şenol B. M. (2015). Adaptation to Climate Change: Barriers in the Turkish Local Context. *TeMA - Journal of Land Use, Mobility and Environment*, 7-22. https://doi.org/10.6092/1970-9870/3650

Bjornlund, V., Bjornlund, H. & van Rooyen, A. (2022). Why food insecurity persists in sub- Saharan Africa: A review of existing evidence. *Food Sec.* 14, 845–864 (2022). https://doi.org/10.1007/s12571-022-01256-1

Childers, D. L., Pickett, S. T. A., Grove, J. M., Ogden, L. & Whitmer, A. (2014). Advancing urban sustainability theory and action: Challenges and opportunities. *Landscape and Urban Planning 125* (2014) 320–328. https://doi.org/10.1016/j.landurbplan.2014.01.022

Cohen, M. J., & Garrett, J. L. (2010). The food price crisis and urban food (in)security. *Environment and Urbanization, 22*(2), 467-482. https://doi.org/10.1177/0956247810380375

Connolly-Boutin, L. & Smit, B. (2016). Climate change, food security, and livelihoods in sub-Saharan Africa. *Reg Environ Change* 16, 385–399 (2016). https://doi.org/10.1007/s10113-015-0761-x

Dodman, D., Archer, D. & Satterthwaite, D. (2019). Editorial: Responding to climate change in contexts of urban poverty and informality. *Environment & Urbanization*, 31 (1), 3-12. https://doi.org/10.1177/0956247819830004

Echendu, A. J. (2020). The impact of flooding on Nigeria's sustainable development goals (SDGs). *Ecosystem Health and Sustainability*, 6:1. https://doi.org/10.1080/20964129.2020.1791735

Eeswaran, R.; Nejadhashemi, A.P.; Faye, A.; Min, D.; Prasad, P.V.V.; Ciampitti, I.A. (2022). Current and Future Challenges and Opportunities for Livestock Farming in West Africa: Perspectives from the Case of Senegal. *Agronomy 2022, 12*, 1818. https://doi.org/10.3390/ agronomy12081818

Enete, A. A., & Achike, A. I. (2008). Urban Agriculture and Urban Food Insecurity/Poverty in Nigeria. *Outlook on Agriculture*. https://doi.org/10.5367/000000008784648915

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. Retrieved from: https://www.cejiss.org/images/issue_articles/2018-volume-12-issue-2-0/ezemenaka-fulani-herdsmen-new.pdf

Farauta, B.K., Egbule, C.L., Idrisa, Y.L., & Agu, V.C. (2011). Climate Change and Adaptation Measures in Northern Nigeria: Empirical Situation and Policy Implications. Retrieved from: https://www.africaportal.org/publications/climate-change-and-adaptation-measures-in-northern-nigeria-empirical-situation-and-policy-implications/

Galderisi, A. & Ferrara, F. (2012). Enhancing urban resilience in face of climate change: a methodological approach. *TeMA - Journal of Land Use, Mobility and Environment*, *5*(2), 69-88. https://doi.org/10.6092/1970-9870/936

Ghebru, H. & Okumo, A. (2016). Land Administration Service Delivery and Its Challenges in Nigeria A case study of eight states. *International Food Policy Research Institute*. Working paper 39. Retrieved from: https://www.canr.msu.edu/fsp/publications/research-papers/Land_administration_service_delivery_and_its_challenges_in_Nigeria_A_case_study_of_eight_states.pdf

Giller, K. E. (2020). The Food Security Conundrum of sub-Saharan Africa. *Global Food Security*, 26. https://doi.org/10.1016/j.gfs.2020.100431

Halliru, S. L. (2015). Security Implication of Climate Change Between Farmers and Cattle Rearers in Northern Nigeria: A Case Study of Three Communities in Kura Local Government of Kano State. In: Leal Filho, W. (eds) *Handbook of Climate Change Adaptation*. Berlin: Springer. https://doi.org/10.1007/978-3-642-38670-1_6

Heidi, S. & Somaya, A. (2017). Climate Change Impacts on Urban Planning in the Cities. 1st *International Conference on Towards a Better Quality of Life, 2017*, Retrieved from SSRN: https://ssrn.com/abstract=3162375

Hoste, J. & Vlassenroot (2009). Climate Change and Conflict in Sub-Saharan Africa: the Mother of all Problems? *International Symposium Developing Countries facing Global Warming: a Post-Kyoto Assessment Royal Academy for Overseas Sciences United Nations Brussels, 12-13 June, 2009* pp. 139-149. Retrieved from: https://www.egmontinstitute.be/app/uploads/2013/10/110714-SubSahara-Afriac-Hoste-Vlassenroot.pdf?type=pdf

Ifejirika, C. A., Chukwuemeka, J. A. & Mkpado, M. (2013). Price Transmission and Integration of Rural and Urban Rice Markets in Nigeria. *Journal of Agriculture and Sustainability* 2 (1), 66-85. Retrieved from: https://infinitypress.info/index.php/jas/article/view/40

Ikezue, C. E. & Ezeah, P. (2017). Recurrent Conflicts among Migrant Fulani Herdsmen and Indigenous Communities of Southern Nigeria: A Review of Literature. *International Journal of Health and Social Inquiry*, *3*(1), 152-169. https://journals.aphriapub.com/index.php/IJHSI/article/view/331

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. https://doi.org/10.1002/crq.21346

Jenkins, Willis. (2008). Global ethics, Christian theology, and sustainability. *Worldviews: Global Religions, Culture, and Ecology*, *12*, 197–217. https://doi.org/10.1163/156853508X359985

Kazzah, S. (2018) Herdsmen-Farmer Conflicts: It's Implication on Food Insecurity and Economic Development in Southern Kaduna 1999-2017. *International Journal of Strategic Research in Education, Technology and Humanities*, 5,1,126-138. Retrieved from: http://internationalpolicybrief.org/images/2018/AUGUST/IJSRETH/ARTICLE13.pdf

Khalili, N.R. (2011). Theory and Concept of Sustainability and Sustainable Development. In: *Practical Sustainability*. Palgrave Macmillan, New York.

Leal Filho, W., Taddese, H., Balehegn, M., … & Wolf, F. (2020). Introducing experiences from African pastoralist communities to cope with climate change risks, hazards and extremes: Fostering poverty reduction. *International Journal of Disaster Risk Reduction*, *50*, 101738. https://doi.org/10.1016/j.ijdrr.2020.101738

McGuirk, E.F. & Nunn N. (2021). *Transhumant Pastoralism, Climate Change, and Conflict in Africa*. Working Paper, https://doi.org/10.3386/w28243

Musau, B. M. (2021). Effects of Climate Change on Pastoralist Women in the Horn of Africa *Journal of cmsd 6*(3) 60-76. http://journalofcmsd.net/effects-of-climate-change-on-pastoralist-women-in-the-horn-of-africa/

Nnaji, A., Ma, W., Ratna, N., & Renwick, A. (2022). Farmer-herder conflicts and food insecurity: Evidence from rural Nigeria. *Agricultural and Resource Economics Review, 51*(2), 391-421. https://doi.org/10.1017/age.2022.9

Odoh, S.I., & Chilaka, F. C. (2012). Climate Change and Conflict in Nigeria: A Theoretical and Empirical Examination of the Worsening Incidence of Conflict between Fulani Herdsmen and Farmers in Northern Nigeria. *Arabian Journal of Business and Management Review*, *2*(1), 110-124. Retrieved from: https://www.arabianjbmr.com/pdfs/OM_VOL_2_(1)/7.pdf

Ogbeide, O. A. (2017). Fulani Herdsmen and Communal Clashes in Nigeria: Issues and Solutions. *Mayfair Journal of Agribusiness Management* 1(2), 50-61. Retrieved from: https://mayfairjournals.com/wp-content/uploads/2017/11/Fulani-Herdsmen-and-Communal-Clashes-in-Nigeria_Issues-and-Solutions.pdf

Oghuvbu, E. A. & Oghuvbu, O. B. (2020). Farmers-Herdsmen Conflict in Africa: The Case of Nigeria. *Вестник Российского университета дружбы народов. Серия: Международные отношения, 20* (4), https://doi.org/698-706. 10.22363/2313-0660-2020-20-4-698-706

Olagunju, T. E., Adewoye, S. O., Adewoye, A. O. & Opasola, O. A. (2021). Climate Change Impacts on Environment: Human Displacement and Social Conflicts in Nigeria, *Earth Environ. Sci*. https://doi.org/10.1088/1755-1315/655/1/012072

Olaniyan, A., Francis, M. & Uzodike, U. O. (2015). Farmers Herders Conflicts, Expulsion Policy, and Pastoralist Question in Agogo, Ghana. *African studies quarterly*, *11*(2), 53-67.

Oli, N. P., Ibekwe, C. C. & Nwankwo, I. U. (2018). Prevalence of Herdsmen and Farmers Conflict in Nigeria. *International Journal of Innovative Studies in Sociology and Humanities*, 3 (1) 30-39.

Olumba, C.C., Olumba, C.N. & Alimba, J.O. (2021). Constraints to urban agriculture in southeast Nigeria. *Humanit Soc Sci Commun* 8, 329. https://doi.org/10.1057/s41599-021-01007-1

Okafor, S. O., Izueke, E. M. C., Onah, S. O., Ugwu, C. E., Chuke, N. U., Nkwede, J. O., Udenze, C. & Okoye, O. E. (2023). 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. DOI: http://dx.doi.org/10.15666/aeer/2103_18691889

Opitz-Stapleton, S., Cramer, L., Kaba, F., Gichuki, L., Borodyna, O., Crane, T., Diabang, S., Bahadur, S., Diouf, A. & Seck, E. (2021). Transboundary Climate and Adaptation Risks in *Africa: Perceptions From 2021 Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises* (SPARC))

Owoo, N.S. (2021). Demographic considerations and food security in Nigeria. *J. Soc. Econ. Dev.* 23, 128–167. https://doi.org/10.1007/s40847-020-00116-y

Pierce, S. (2013). Pointing To Property: Colonialism and Knowledge about Land Tenure in Northern Nigeria. *Africa, 83*(1), 142-163. https://doi.org/10.1017/S0001972012000757

Pona, H. T., Xiaoli, D., Ayantobo, O. O., & Tetteh, N. D. (2021). Environmental health situation in Nigeria: Current status and future needs. *Heliyon*, *7*(3). https://doi.org/10.1016/j.heliyon.2021.e06330

Serdeczny, O., Adams, S., Baarsch, F., Coumou, D., Robinson, A., Hare, W., Schaeffer, M. Perrette, M. & Reinhardt, J. (2017). Climate change impacts in Sub-Saharan Africa: from physical changes to their social repercussions. *Reg Environ Change* 17, 1585–1600 https://doi.org/10.1007/s10113-015-0910-2

SWAC/OECD (2020), Food and Nutrition Crisis 2020, Analyses & Responses, Maps & Facts, No. 3, November 2020

Teka, K. A., Rompaey, V., Poesen, J., Welday, Y. & Deckers, J. (2012). Impact of Climate Change on Small-Holder Farming: A Case of Eastern Tigray, Northern Ethiopia. *African Crop Science Journal*, 20, (s2), 337 – 347.

Turner, M. D. & Schlecht, E. (2019). Livestock mobility in sub-Saharan Africa: A critical review Pastoralism. *Research, Policy and Practice* (2019) 9:13 https://doi.org/10.1186/s13570-019-0150-z

Udoekanem, D. 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. https://core.ac.uk/download/pdf/234663719.pdf

Ugbem, C. E. (2019). Climate Change and Insecurity in Northern Nigeria. *International Journal of Innovative Social Sciences & Humanities Research* 7(2):10-20. https://seahipaj.org/journals-ci/june-2019/IJISSHR/full/IJISSHR-J-2-2019.pdf

Wudil, A.H.; Usman, M.; Rosak-Szyrocka, J.; Pilaˇr, L.; Boye, M. (2022). Reversing Years for Global Food Security: A Review of the Food Security Situation in Sub-Saharan Africa (SSA). *Int. J. Environ. Res. Public Health* 2022, 19, 14836. https://doi.org/10.3390/ijerph192214836

Zucaro, F., & Morosini, R. (2018). Sustainable land use and climate adaptation: a review of European local plans. *TeMA - Journal of Land Use, Mobility and Environment*, *11*(1), 7-26. https://doi.org/10.6092/1970-9870/5343

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