

# Effects of Climate Change Induced Farmer-Herder Conflicts on Socio-Economic Development of Farmers in Giwa Local Government Area, Kaduna State, Nigeria

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## Abstract

*The effects of climate change in Giwa Local Government Area (LGA) is worrisome. Several impacts of climate change such as drought, desertification, unpredicted rainfall and increasing temperature are evidenced in the area. This situation has intensified conflicts between farmers and herders who are always competing to control the scarce natural resources. This study is aimed at assessing the effects of climate change induced farmer-herder conflicts on socio-economic development of farmers in Giwa LGA, Kaduna state. To achieve its aim, the study adopted quantitative approach where structured questionnaire was used to collect primary data from 384 respondents. Data collected were analysed using descriptive statistics (percentages). Findings from the study revealed that rainfall is becoming irregular (71%), there was high incidence of sunshine (74%), increased incidence of drought (59%) and drying up of surface and underground water sources (80%). As a result of the negative effects of climate change in the area, the study also revealed that there were serious conflicts between farmers and herders which causes social and psychological disorders (65%), loss of lives (67%), vandalism of properties (73%), as well as forced migration and displacement of people (74%). Based on the research, the study recommends the need to enhance farmers/herders' adaptation strategies through effective water harvesting techniques and establishment of public ranches with modernised technologies that can restrict the movement of herders.*

**Keywords:** Climate Change, Farmers, Herders, Conflict, Adaptation

## INTRODUCTION

Climate change has been confirmed as one of the problems facing the global world since the beginning of 19<sup>th</sup> Century (Abaje, *et al.*, 2016). It is manifesting worldwide with rise in sea levels, unpredictable rainfall, drought, desertification and continuous increase in temperature. Experts have projected that the global temperature will increase by 1.4°C by the year 2030, 2.8°C by 2060 and 4.7°C by 2090 (Thakur & Bajagain, 2019). Climate change has been defined by Intergovernmental Panel on Climate Change (IPCC, 2007), as a statistical variation in either the mean state of the climate or in the variability of the mean state of the climate, occurring for long period. Climate change usually exposes the environment to several challenges thereby, affecting the economy, health and agriculture as well as food and human security (Nyong, *et al.*, 2007).

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Like other African countries, Nigeria is seriously undermined by the menace of climate change (Idowu, *et al.*, 2011). Crop and animal production, which are the major economic activities of the country, faces severe failures including decreasing agricultural production, leading to hunger, malnutrition and diseases. It is quite unfortunate that, as farmers and herders struggle to overcome high poverty and enhance economic growth, climate change has continued to increase the number of vulnerable people, thereby undermining the prospects of development in the country (Idowu, *et al.*, 2011).

Vulnerability to climate change in Northern Nigeria is very high. This is mainly due to the rapid advancement of the Sahara desert (Farauta, *et al.*, 2011). The region is also populated with numerous vulnerable groups such as landless farmers, poverty-stricken livestock keepers (herders), those living with poor health, among others. All these categories of people are exposed to the severe impacts of climate change in the region. Climate change impacts in this area include high frequency of drought, increased environmental damage, increased migration, and so on (Farauta, *et al.*, 2011).

It is obvious that, farming and animal rearing are the major occupation of people in northern Nigeria. Unfortunately, desertification occasioned by climate change is severely threatening the peaceful co-existence of farmers and pastoralists (herders) in the region. The rapid growth in population coupled with high urbanisation have led to over exploitation of resources such as vegetation and freshwater, leading to the destruction of valuable features of the environment and forcing plants, animals and other inhabitants into extinction (Lawal, *et al.*, 2021). The growth in population also led to the need for food production causing rapid expansion of farmland over the available grazing land that have already been threatened by climate change. These areas have already experienced severe rainfall and temperature variations affecting the vegetal cover, as well as the surface and groundwater for grazing animals and farming purposes (Lawal, *et al.*, 2021). These causes serious struggle between farmers and herders over limited farming and grazing lands which may subsequently lead to conflicts between them (Lawal, *et al.*, 2021).

The climate change induced conflicts between farmers and herders have resulted to several deaths, displacements, loss of properties such as livestock, settlements, among others. These conflicts have lingered for many years and it has since metamorphosed into full blown banditry where herdsmen are classified as notorious terrorists disturbing many parts of the region (Lebari, *et al.*, 2022). Crop farming and animal rearing is essentially, the major occupation of people in Giwa LGA (Babajo, *et al.*, 2018). Unfortunately, the farmers/herders' conflicts is gradually threatening the socio-economic development of people in the area. For instance, Daily Post (2022) have reported that herdsmen had killed twenty-three (23) people with several others sustaining gunshot injuries during separate attacks in some villages of the area. The same report noted the attack of nine (9) villages in the same LGA where fifty (50) people who are mostly farmers were killed, many were displaced and properties worth millions of Naira lost. This mayhem has led to many social and economic challenges to the people of the LGA.

Based on the foregoing, it is clear that, resource scarcity (especially fertile land, water and pasture) is the major cause of conflicts between farmers and herders, and this is induced by climate change impacts on the environment over the years. However, the extent of socio-economic effects of these conflicts on the economy of the study area had not been empirically established by scholars. Most researches in the study area are tilted toward theoretically investigating the nexus between climate change and conflicts, or scarcity of resources and

conflicts in other parts of the country (examples; Wakdok and Raimund, 2021; Samuel and Bamigboye, 2022). No attempt had been made to investigate empirically, how climate change impacts triggers conflicts and how it (conflicts) affects the socio-economic development of farmers and herders in the study area. The broad objective of this study is to assess the effects of climate change induced farmer-herder conflicts on socio-economic development of farmers and herders in Giwa LGA, Kaduna state. To achieve this, the study seeks to achieve the following specific objectives, which are to:

- a) assess awareness of the effects of climate change among farmers and herders in the study area
- b) examine the effects of climate change induced conflicts on socioeconomic development of the study area.

**THE STUDY AREA**

Giwa LGA is located between Latitudes 10° 50' 00" N and 11° 30' 00" N and Longitude 7° 05' 00" E and 7° 40' 00"E (see Figure 1). The Local Government Area is found in Kaduna state, north-western Nigeria. It is bounded in the North by Funtua and Malumfashi LGAs of Katsina state and on the west and south by Birnin Gwari and Igabi LGAs of Kaduna State respectively (Babajo, *et al.*, 2018).

The climate of the area is generally tropical continental (tropical wet and dry) represented by Aw based on Koppen’s classification. The general pattern of rain is mainly affected by two principal air masses which are Tropical Continental (cT) and Tropical Maritime (mT) air masses. The mean annual rainfall is about 1,100mm (Yakubu & Abbass 2009). The area records maximum temperature of up to 30°C. The lowest mean temperature (18°C – 23°C). The major source of economic activity in this area is agriculture where crop production and animal rearing are undertaken by small farmers and Fulani herdsman respectively (Yakubu & Abbass, 2009).

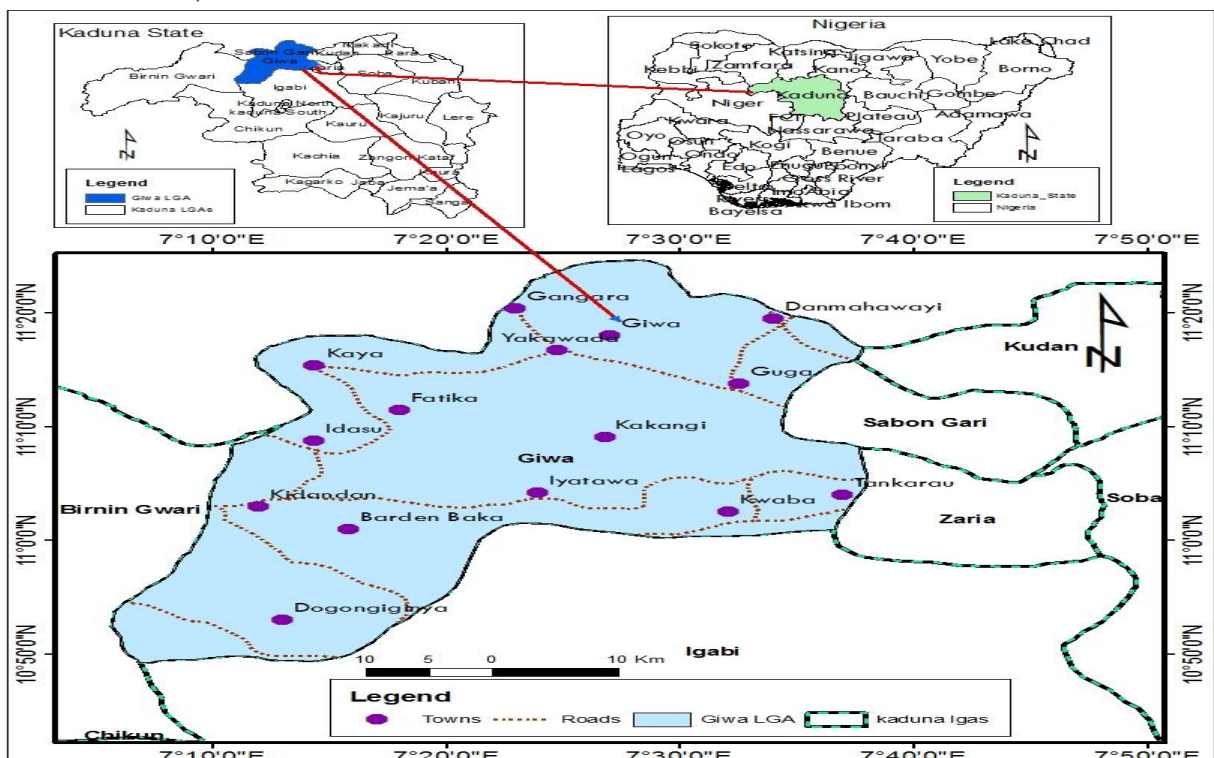


Figure 1: The Study Area  
Source: Goggle Earth, 2019

**METHODOLOGY**

The study employed quantitative approach where primary data was generated from farmers and herders using structured questionnaire in the study area. The study adopts a multistage sampling technique. In the first stage, systematic sampling technique was employed and, in this case, the eleven (11) wards of the LGA were arranged in alphabetical order and every second ward was selected as a sample. Galadimawa, Giwa, Kadage, Kidandan and Shika were therefore sampled (see Table 1).

**Table 1: Sampled Wards for the Study**

Wards	Sampled Wards	Population (1991)	Projected 2022	Sample Size
Danmahawayi		12, 361		
<b>Galadimawa</b>	Galadimawa	8, 896	19, 927	36
Gangara		15, 576		
<b>Giwa</b>	Giwa	32, 388	72, 549	131
Idasu		4, 246		
<b>Kadage</b>	Kadage	14, 871	32, 716	59
Kakangi		12, 089		
<b>Kidandan</b>	Kidandan	11, 899	26, 653	48
Panhauya		18, 116		
<b>Shika</b>	Shika	27, 541	60, 590	110
Yakawada		13, 078		
<b>Total</b>		<b>171, 061</b>	<b>212, 435</b>	<b>384</b>

Source: Author’s Compilation, 2022

In the second stage, purposive sampling technique was used; farmers and herders who must have at least 45 years of age, lived in the study area for minimum of 30 years and have adequate experience of farming and herding were sampled. These categories of respondents are believed to have requisite information about climate change and its effects in the study area.

Due to the deficiency of 2006 census data in providing population for localities, the 1991 census was used. Based on the 1991 data, the study area had a population of 171, 061 with a projected population of 376, 334 in 2022 at a growth rate of 3.0 per cent (NPC, 1991). Krejcie and Morgan’s (1970) Table was used to determine sample size. The Table states that, where the population of an area is between 250,000 to 500,000, the sample size to use is 384 at 95% confidence level. With total population of 376, 334, the sample size of 384 is therefore adequate for the study. To determine the number of respondents (farmers and herders) from each of the sampled wards, Yamane’s (1967) method was used (see Table 1). The method is given as;

$$Pr = \frac{n \times SS}{N}$$

Where: Pr = proportion of respondents;      n = population of each of the selected area  
 SS = Sample Size; and                              N = total population of all the selected areas

Out of the 384 copies of the questionnaire administered, a total of 371 copies were successfully retrieved and analysed. The data for this study were analysed and presented using descriptive statistics (percentages and tables) with the application of the Statistical Package for Social Sciences (SPSS) version 20.

## RESULTS AND DISCUSSION

### Socio-demographic Characteristics of the Respondents

Table 2 shows the demographic characteristics of the respondents. From the table, 49% of the respondents were found to be between the ages of 45 to 50 years while 51% were more than 50 years of age. This agrees with the findings of Gbegeh and Akubuilo (2013) who acknowledged that older farmers have more experience in farming/herding and consequently have a higher probability of knowing the strategies needed to resolve conflicts emanating from farmer-header conflicts than the ones.

**Table 2: Socio-demographic Characteristics of the Respondents**

Parameters	Options	Percentages (%)
Age	45 - 50 years	49
	51 years and above	51
		<b>100</b>
Number of Years in the Area	30 - 35 years	33
	36 years and above	77
		<b>100</b>
Gender	Male	72
	Female	28
		<b>100</b>
Level of Education	SSCE/GII	16
	Degree/HND	12
	NCE/Diploma	10
	No formal education	62
		<b>100</b>
Occupation	Farming	21
	Herding	32
	Farming/Herding	41
	Others	06
		<b>100</b>

Source: Field Survey, 2022

The table also shows that 100% of the respondents have stayed in the area for minimum required period of the study. This corroborates with the report of Ude (2014) who stated that respondents who lived in an area for at least 20 years usually have the needed information about climate change.

Table 2 also indicates that 72% of the respondents were males while only 28% were females. The reason for this disparity is due to the tradition and culture of the study area where most of the inhabitants are Hausa/Fulani who usually keep their women under Islamic purdah and so having access to them during the study was hard. The gender distribution in the study area have implications on conflicts as Eriksen & Lind (2005) observed that men are always participating in raiding, killing and defence of their area from attacks. In so doing, men usually loss their lives thereby leaving women with the burden of taking care of their children. The table also shows that 16% of the respondents had attained secondary education, 12% were degree holders while majority (62%) of them had no formal education. This indicate that respondents had low level of education in the study area. In relation to this, Soomiyol & Fadairo (2020) reported that low level of education may have implications on the respondents' ability to cope with shocks and stress emanating from farmer-herders' conflicts.

**Awareness of the Effects of Climate Change among Farmers and Herders**

Table 3 shows that 71% of the respondents agreed that rainfall have become so irregular in the study area due to the effects of climate change, while only 20% disagreed on this. The Table also shows that 72% agreed that there is continuous rise in temperature while 17% disagreed on the issue. The result agrees with that of Abaje, *et al.*, (2016) who observed that the impacts of climate change on agriculture is through increasing temperature and changes in rainfall pattern especially, variability and seasonality.

**Table 3: Farmers/Herders Awareness of the Effects of Climate Change**

Climate Change Indices	SA (%)	A (%)	I (%)	D (%)	SD (%)
Irregular rainfall	42	29	9	11	9
Continuous rise in temperature	39	33	4	14	10
High incidence of sunshine	36	38	9	7	10
Decrease in crop yield	31	39	3	15	12
High rate of livestock mortality	36	32	8	12	12
Increased incidence of drought	19	40	12	18	11
Erratic and devastating winds	23	43	7	16	11
High rate of erosion and loss of soil fertility	35	41	4	10	10
Frequent flood occurrence	25	40	8	11	16
Drying up of surface and underground water	42	38	2	9	9
Causes poverty and migration	41	37	4	10	8
Infestation of crops/ animals by pests/diseases	42	41	3	8	6

Where: SA - Strongly Agree, A - Agree, I - Indifferent, D - Disagree, SD - Strongly Disagree

Source: Field Survey, 2022

Table 3 also shows that 74% of the respondents reported high incidence of sunshine in the study area. This indicates that there may be high evapo-transpiration of moisture in the area which will subsequently influence water availability for use by both farmers and herders especially during the prolonged dry season. This situation may also subsequently lead to conflict between farmers and herders. Furthermore, the table shows that majority (70%) of the respondents agreed that climate change has led to decreasing crop yield in the study area. It also shows that 68% reported climate change as causing high rate of livestock mortality in the area. This indicate that both farmers and herders have been facing serious challenges caused by climate change in the study area. The problem is even worsened when significant number (59%) of the respondents agreed that climate change has increased the incidence of drought in the area. Drought coupled with increasing dry spells is likely to affect the growth and development of both crops and livestock in the study area. The result here agrees with the findings of Abaje, *et al.* (2016) who reported a decline in crop yield and an increase in drought in their study.

Table 3 also shows that majority (66%) of the respondents agreed that climate change has caused increased erratic winds in the study area. It also indicates that 76% of the respondents reported the same problem as causing high rate of erosion and loss of soil fertility. This is supported by the study of Abraham, *et al.*, (2012) who reported the impacts of climate change as being able to reduce soil fertility and vegetation resources. The table further shows that 65% of the respondents agreed that climate change has led to frequent flood occurrence in the study area. Udeh, *et al.*, (2014) also reported high incidence of flood in his study on farmers' perception and adaptation strategies to climate change in Kano. The table shows further that majority (80%) of the respondents agreed that climate change leads to early drying up of surface and underground water sources. This result agrees with that of Abaje, *et al.* (2016) who reported decrease in length of rainy season and high inter-annual variability in rainfall in northern Nigeria. This means therefore that, there will be competition between farmers and herders on who to control the limited water sources in the

study area. As a result of climate change impacts, the respondents (78%) reported high incidence of poverty which may also subsequently lead to migration of people within the study area and away from it. The result is also in congruence with the findings of Abaje, *et al.* (2016) who reported high rural-urban migration due to the impact of climate change. This movement induced by climate change may also cause conflicts between the migrants and host communities. The table also indicate that majority (83%) of the respondents reported that climate change has induced many diseases to both crops and animals in the study area. This coincides with the report of Abaje, *et al.* (2016) who revealed that the impacts of climate change induces sicknesses due to extreme heat conditions.

**Effects of Climate Change Induced Conflicts on Socioeconomic Development**

Table 4 shows the effects of climate change induced conflicts on socioeconomic development of the study area. Based on the table, majority (73%) of the respondents reported that climate change induced conflicts has caused injuries to people of the study area. The study area had faced serious conflicts between farmers and herders over the years (Owolabi, *et al.*, 2016). This led to physical fights between farmers and herders.

**Table 4: Effects of Climate Change Induced Conflicts on Socioeconomic Development**

Weather and Climate Change indices	SA (%)	A (%)	I (%)	D (%)	SD (%)
Led to many physical Injuries	35	38	5	12	10
Causes social and psychological disorders	31	34	6	14	15
Several lives are lost	28	39	6	10	17
Properties are vandalised or destroyed	37	36	10	7	10
Led to homelessness	41	39	4	9	9
Occupations are severely hampered	25	36	5	18	16
Affects the activities of periodic markets	37	31	8	19	5
Increases the prices of goods and services	32	36	6	17	9
Loss of rural income	27	43	10	10	10
Increases migration/displacement of people	42	32	4	7	15

**Where:** SA - Strongly Agree, A - Agree, I - Indifferent, D - Disagree, SD - Strongly Disagree

**Source:** Field Survey, 2022

Table 4 also shows that majority (65%) of the respondents agreed that farmer-herder conflicts due to the effects of climate change causes social and psychological disorders. This is the reason why Ugbem (2019) asserts that climate change and its attendant consequences have resulted to conflicts which reconfigures social relations from mutual social existence to that of mutual suspicion that may lead to social problems. This is the reason why majority (73%) of the respondents agreed that properties worth billions of Naira are vandalised or destroyed as a result of climate change induced farmers-herders conflicts in the study area. Furthermore, Table 4 shows that 80% of the respondents have agreed that climate change induced conflicts in the study area has caused many people to lose their homes. This coincides with the report of Ubelejit (2016) who stated that conflicts between farmers and herders have engulfed many communities in Nigeria. The table also indicates that majority (61%) of the respondents agreed that climate change induced conflicts leads to loss of occupation among the people in the study area. Even though studies such as Babajo, *et al.* (2018), have shown that the people in the area are into many occupations like farming, animal rearing and trading of agricultural products, conflicts have rendered many of them jobless. The table also shows that majority (68%) of the respondents agreed that climate change induced conflicts in the area have affected the activities of periodic markets. The LGA operates many periodic markets including Giwa, Shika, Galadimawa and Da'a. However, climate change induced conflicts between farmers and herders have affected the activities of these markets. In a similar vein, Akiyode & Daramola (2011) observed that the

exacerbation of conflicts by climate change have contributed negatively to the economic and social development of Africa.

Table 4 also indicates that majority (70%) of the respondents agreed that climate change induced conflicts has caused significant loss of rural income in the study area. This implies that rural population in the study area are gradually becoming poor despite the assertion of Oyinbo & Olaleye (2016) that only 30% of the farm household in Giwa LGA were poor. The table further shows that, 74% of the respondents agreed that climate change induced conflicts has increased migration and displacement of people in the study area. The LGA is one of the areas affected by increased desertification, deforestation and loss of livelihoods due to climate change impacts (Oyinbo & Olaleye, 2016)). The implication of this is that both farmers and herders have to migrate to more fertile areas where farming and/or animal rearing are possible. This may result to conflicts between the migrants and the host communities both within and outside the study area. This also cause the problem of Internally Displaced Persons (IDPs) within and outside the area. This is related to the assertion of Ugbem (2019) that climate change induced conflicts have led to the formation of many IDPs in Benue state, Nigeria.

## **CONCLUSION**

Efforts was made to assess the effects of climate change induced farmer-herder conflicts on socio-economic development of farmers in Giwa LGA, Kaduna state. The study area is confronted with many effects of climate change which include irregular rainfall, increased rise in temperature as well high incidence of sunshine, high livestock mortality, decrease in crop yields and increased incidence of drought, among others. These effects have induced conflicts between farmers and herders which has negatively impacted on farmers and herders socioeconomic development. These conflicts has led to physical injuries, social and psychological disorders, destruction of settlements/communities, hampering of people's occupation, displacement of people as well as halting the activities of periodic markets. The negative effects of climate change induced conflicts on socio-economic development of farmers in the area could be worsening by day. To address this problem therefore, there is need for appropriate adaptation measures such as effective water harvesting and its utilisation during stress as well as the establishment of public ranches with modernised technologies that can restrict movement of herders.

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