ISSN No:-2456-2165

Climate Change and Sustainable Development in Nigeria: Emerging Issues on Dry Season Rice Farmers and Fulani Cattle herders' Conflict, in Kebbi State

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Abstract:- In the ages past, famers/herders relationship seen to be cordial and encouraging in most occasions. Today the long historical mutual understanding between herd men and farmers has turned sour. Reports from the international and national media houses continue to give fatal information on frequent clashes between the two social groups. These conflicts have cut a crossed all the geo-political zones of Nigeria and is more pronounced in states such as Zamfara, plateau, and Nasarawa state. Have fatal due to change. Scholars blamed climate change to as the chief factor of such conflict as climate change resulted in the decline in arable land, dryness of water courses, prolong dry season among others. The present administration intends to diversify the sources of Nigeria revenue via revival of agricultural sectors. This is what motivated the researcher to undertake this research to find out the perception of climate change among dry season rice farmers and herdsmen in Kebbi State. Data for research was collected via interviewing method. Using taro Yamane formula of finding sample size. The sample of 166 farmers and 167 herdsmen) respectively were drawn out of estimated population of 10600 (farmers) and 3600 (herdsmen) in the area. Conclusively the study revealed that farmers are aware of climate change through media houses such as radio, television and most of them have benefited from anchor borrowers loan scheme. The paper suggested for the use of improves seedlings and awareness campaign on the need to promote peace among people of kebbi state despite the effects of climate change.

Keywords:- *Climate Change, Conflict, Cordial, Farmers / Herdsmen.*

I. INTRODUCTION

Farmers / herdsmen conflicts become a topic of discussion in most national and international media houses. these Conflicts have cut across all countries in Sub- Saharan West African Sub- region. in Nigeria for example these Conflicts resulted in the death of thousands of people and properties worth millions of naira were destroyed (TVC, 2028). in States Such as Zamfara, Katsina, Sokoto all in North western geo-political zone are the most States badly affected by Conflicts. In North Central States of Nigeria like Benue, Nasarawa Plateau and Taraba States have Since tested the impact of these Conflict. Scholars have blamed these Crises to the Impact of Climate Change in the Country. they Further maintained That, The world temperature is rising because of human activity, and this Climate Change is now threaten every aspect of Life. paragraph The Concept of Climate Change as defined by (NASA, 2019), as Change or long term Shifts in temperature and Weather Pattern and the Shift may be natural Such as through Variation in Solar cycle. However, Climate Change was described a Change in the average Condition Such as temperature and rainfall in a region over a long period of time (Climate kinds. Naija, Climate Channel). Therefore, this research attempt to find out the Impact of this Climate Change on Farmers/ herdsmen Kebbi State especially as it relate to dry season rice Farming.

Some of the evidences of Climate Change as described by (IPCC, 2018) include Causes Flooding, extreme weather and drought. Therefore these resultant effects of climate change many have impacts on both rice farming and cattle rearing most especially in the dry season period. However another cotastoptic effect of climate change which is association with global warning as maintained by (Ipcc,2018) is that global warning may led to disappearances of island nations due to melting of ice in the polar region of the world.

In Nigeria the Federal government in Collaboration with Kebbi State government Partner them in selves to revive the food production geared toward encouragement massive dry season rice Farming in the State, despite the issue of Climate Change. The dry season rice farming in the State take Place at Fadama area usually along The river Valleys and flood Plain areas riched in alluvial soil (hydromorphic soil) which support the growth of Cereal crops like rice. During The dry season period in the area the Upland areas are without grasses and water courses for Cattle to feed on and drinks and hence they only option remained for them is to go to Fadama area where rice Farmers are in operation to feed on the available pasture in and hence in doing this may likely generate tension among the Farmers and Cattle herders. This is what motivated The researcher to find the existing relationship among these Social groups in Kebbi State. Some of The local government

Selected included Augie, Bagudo, Yauri, Ngaski, Suru, Bunza, Jega to mention but few among them.

➢ *Research Objectives*

This research has the following objectives

- To highlight the socio demographic profiles of dry season rice farmers and herdsmen
- To access weather the dry season rice farmers and herdmen are aware of climate change
- To identify copping strategies adapted by rice farmers
- To describe the past and present relationship between the herders and farmers in the study area.

➢ *Rational in the Study*

Kebbi State is one of the major rice producing state in Nigeria, Climate Change has manifested and continues to become reality in the country. Climate change have affected dry season rice farmers and cattle herders as a result of Scarcity, dryness of up pasture as well as water sources for both plants and animals. The meeting point of farmers and herdsmen in the dry season is the Fadama area and with effects of Climate Change conflicts may likely occur. This research will be useful to the Federal, State and Local governments authorities toward understanding the problems been face by these social groups, with the view of helping the said groups. However, this research will be useful to Central Bank of Nigeria (CBN) who have spent huge money in an attempt to meet food security in the country. and stop mass importation of foreign rice from far south asian counties. Conclusively this research attempt to bridge in gap in knowledge as several studies have been conducted In the past but none of them paid attention to the impacts of climate change on dry season farmers and herdsmen in Kebbi State. However this research serve as bedrock to those who wishes to undertake similar research in future In addition to this, the research may be useful to securities agencies toward curbing any form insecurity regarding herdsmen and farmers (dry season) in the state and country at large

➢ *Statement of Research Problems*

Several studies have been Conducted in the past on the impact of climate change to mentioned but few among them include (Lam,1993), (Ayuba etal,2007), (Umar,2012), (oppon, 2017), (Blench,2004), (ochiaka, 2015), all these scholars paid their attention on the impact of Climate Change on Sudan Savannah region of west Africa. Therefore none of them relate climate change with pastoralist and dry season farmers in Kebbi State, North western Nigeria, This is exactly what motivated the researcher to look at how these social groups adopt to the changing in the global climate most especially issue that may generate tension among goal people of the state.

➢ *Scope of the Study*

This research was restricted to Kebbi State and Some Selected Local governments where dry season farming and pastoralist are found. These local government includes – Ngaski, Suru, ArgunguYauri, Bunza, Shanga , Bagudo, Binin Kebbi, Kalgo, jega,Dandi, Augie and Suru. The reason behind the selection of these L G A S is that during preliminary survey a the State these are the L G A S that have vast fadama land which allow dry season farming with herd men around the area. This research in also restricted to those in farming and cattle rearing from 2017-2023.

➢ *Study Area*

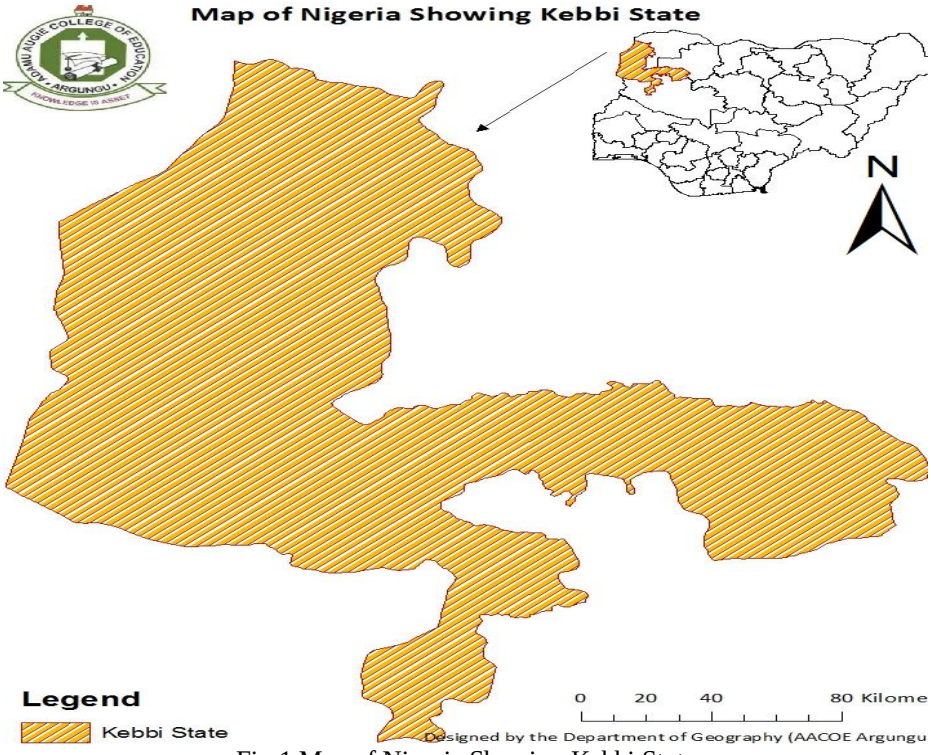

Fig 1 Map of Nigeria Showing Kebbi State

ISSN No:-2456-2165

Kebbi State is one of the 37 states that made up of present day Nigeria. Geographically kebbi state was located between latitude 11º30ºN and longitude 4º00'E. the administrative headquarter of the state was located at Birnin kebbi. Kebbi State is within the north west geopolitical zone with sister states like Zamfara, Sokoto, Kano and Katsina. The state was bordered to the east by Sokoto State and North by Republic of Niger, to the south by Zamfara and Niger State and to the west by republic of Benin and Niger. Majority of in habitants of the area are Hausas, Fulanis, Zabarmawa, Kambari, Dakarkari, Gyalawa, Gumgawa, Dukkawa. But other ethnic groups like Yorubas, Igbos, Nufe, kanure can be seen in the state. The state has a total population of 5,563,900, (NPC 2006) the state was marked by two (2) distinct seasons the dry and rainy season. The dry season in the state starts around September and October and last late April and March and in some part of the state till June. The rainy period is between April in southern part of the state and last October. The mean annual temperature is about 23ºC while .maximum temperature is up to 41ºC and minimum temperature is about 18ºC (NIMET, 2018). Kebbi State was blessed with different soil types including the sandy soil mostly in the northern part of the state and tropical soils in the southern part of the state while hydro morphic soil are found along the local rivers in the state and their flood plains. It is this hydro morphic soil type that facilitate the growth of rice in the state most especially in dry and rainy period.

II. METHOD OF DATA COLLECTION

In order to provide reliable information for this research work. The searcher employed four (4) pilot or preliminary survey to the study area. The first trip involved going round the state in order to identify local governments where dry season farming in on going. And this takes place between February to April 2018. The second trip involved going to the local governments to interact with traditional rulers of the area. dry season forming is taking place identify the villages The third visit involved introduction of researcher to the local leaders of these social groups like Ardos for herdmen and Sarkin Noma for farmers. The ensence was to provide researcher with rough estimate of their members to enable the researches to draw the Sample to be use for this research. The estimated population of dry season farmers given by their Sarakunan Noma was estimated to be ten thousand six hundred members (10600) while the estimated population of herdsmen was put to be three thousand six hundred members (3600). From this using Taro Yamanes (1967) formula of finding sample size was used.

The fourth trip involved going to administer the interviewing with the help of Ardor and Sarakunan Noma. Using purposive method in combined with snow balling method the desired Sample can be reach since their members known themselves members and by identifying one members the rest can be reach.

➢ *Tools for Data Collection*

In order to order take this study –Data was collected via structured interviewing method and the researcher take the burden of translating the question in Hausa for the respondents to choose the right option. Interviewing schedule was divide in to (two) 2 parts ,namely that farmers and and herdsmen in order to collect information that can be reliable to this study. Questions covered the following areas.

- Socio demographic profile of respondents
- Perception of climate change on farmer an herdmen
- Relationship between the 2 groups
- Coping strategies and conflict resolution mechanism
- Impact of climate change on farmlands and animals

➢ *Sample Size and Method*

The estimated population given by the heads of herdsmen and farmer are 3600 and 10600 and hence this served as sampling frame from which the sample will be drawn. Using Yamanes formula

$$\mathbf{n}= \frac{\mathrm{N}}{\mathbf{n}= \mathrm{N}\sqrt{1 + n(e)2}}$$

n=desired simple size
N=estimate of population
e=precision level at 0.06 confidence level

Table 1 Summary of Sample of Dry Season Farmers Drawn from Selected Local Government

S/N	LGA	Estimated population	Relative	Sample size
1.	Ngaski	400	400 /10600x100 = 5	5/10600 x 166 = 7
2.	Suru	2000	2000 /10600x100 = 19	19/10600 x 166 = 33
3.	Argungu	1000	100 / 10600 x 100 = 9	9/10600 x 166 = 15
4.	Yauri	500	500 / 1060 x 100 = 5	5/10600 x 166 = 7
5.	Bunza	500	500 / 1060 x 100 = 5	5/10600 x 166 = 7
6.	Shanga	1200	1200/10600 x 100 =11	11/100 x 166 = 18
7.	Bagudo	800	800/10600 x 100 = 8	8/100 x 166 = 13
8	B/Kebbi	500	500 / 1060 x 100 = 5	5/100 x 166 = 7
9.	Kalgo	800	800 / 10600 x 100 = 8	8/100 x 166 = 13
10.	Jega	400	400 / 10600x 100= 4	4/100 x 166 = 8
11.	Dandi	1500	1500/10600 x 100 = 14	14/100x166=23
12.	Augie	1000	1000/10600 x 100=9	9/100x 166=15
				Total 166

Source Field Work 2018

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Table 2 Summary of Estimated sample of Herdsmen from selected L G A S

L G A	Estimated of population	Relative percentage	Sample
Ngaski	250	7	7/100x 167=12
Suru	300	8	8/100x167=13
Yauri	200	6	6/100x167=10
Argungu	250	7	7/100x167=12
Bunza	350	10	10/100x167=17
Shanga	250	7	7/100x167=12
Bagudo	300	8	8/100x167=13
B/Kebbi	400	11	11/100x167=18
Kalgo	300	8	8/100x167=13
Jega	400	11	11/100x167=18
Dandi	350	10	10/100x167=17
Augie	250	7	7/100x167=12
			Total =167

Source Field Work 2018

In order to reach the sample purposive sampling in combined with snow balling will be used to reach the Target population and by tradition their local leaders knew their members.

III. METHOD OF DATA ANALYSIS

All information collected from the field will subjected to special package for social science research (SPSS software) in addition simple descriptive statistics involving the use of Bargraph, pie chart table and histogram will be use to illustrate the information collected .

IV. ANALYSIS AND DISCUSION ON THE RESULT

Table 3 Socio Demographic Profiles of Farmers.

Responses	Frequency	Percentages'
Gender		
Male	162	98
Female	4	2
Total	166	100
Marital status		
Married	131	79
Single	20	12
Divorcees	15	9
Total	166	100
Age		
15-35 years	109	55
36-45 years	35	28
Above 46 years	22	17
Total	166	100
Educational qualification		
Primary /s s c e/koranic	92	55
NCE/HND	46	28
BSC/HND	28	17
Total	166	100
Responses		
Farming	105	63
Trading	25	15
Civil servant	31	22
Total	166	100

Source Field Work 2017

Data for the socio demographic profile of farmers was collected and the result revealed that 98% (162) were males and 2% representing (4) were females. This revelation may not be surprise because the area is an Islamic community where women in purdah are not allow go outside their matrimonial house.

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Secondly, data on marital status of respondents were collected and the result indicates that 79% representing (131) were married while 12% representing (20) are single and 9% (15) were divorcees. However, information on approximate age of respondents was collected and the result shown that 55% (109) are between the age of 15-35 years old while 28% (22) have their ages fall between 36-45 years and 17% (22) are read above 46 years old. In addition information on educational qualification of respondents was collected result read as 55% (92) have primary/S S C E / koranic education and 28% (46) have attended N C E /OND while 17% (28) have attended B S C /HND in addition to this information on the major occupation of the respondent was collected and the result indicated that 63% (103) their major occupation is farming and 15% (25), engaged in trading a while 22% (30) are CIVIL servants and engaged in dry season rice farming.

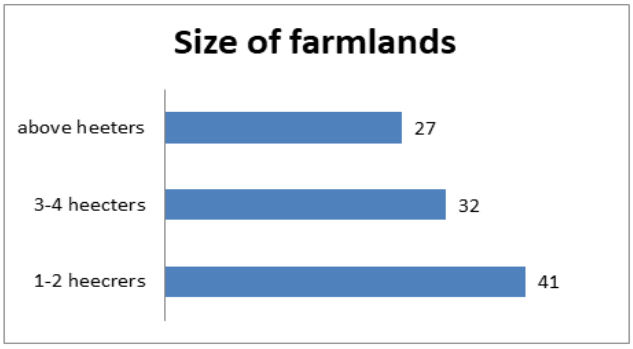

Fig 2 Size of Farmlands
Source Field Work 2018

The analysis above indicated that 41% representing (68) interviewed Showed that the size of their farmland ranges between 1-2 hecters and 32% (53) indicated that their farmland ranges between 3-4 hecters while 27% (36) depended that the size of their farmland was above 4 headers.

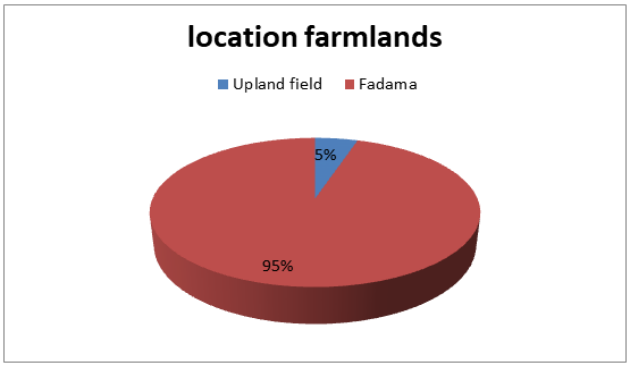

Fig 3 Location Farmland
Source Field Work 2018

However question was asked on the location of farm lands for the dry season rice farmers and data collected reveals that, 95% (158) have their rice field located at fadama are and 5% (8) have their farm lands located at up lands area. Therefore this result may not be a new thing Adeosun (2003) opined that rice cultivation is best suited at lowlands areas at edges of fadama (in land valleys).

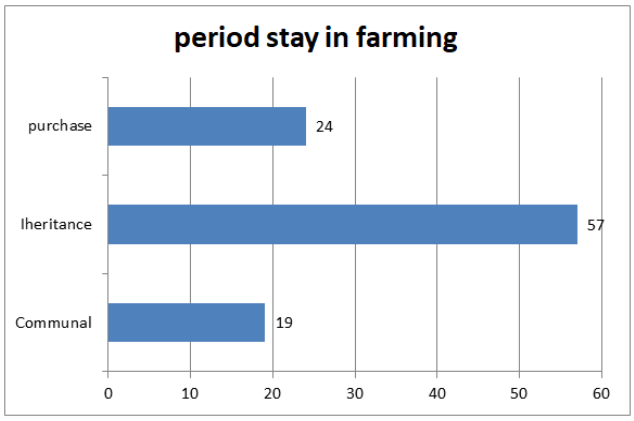

Fig 4 Period Stay in Farming
Source Field Work 2018

When question was asked on period stay in farming. The result indicated that 42% (70) have spent 1-10 years in dry season farming and 24% (40) have spent 11-10 years in farming while 34% (56) have spent over 20 years in dry season farming.

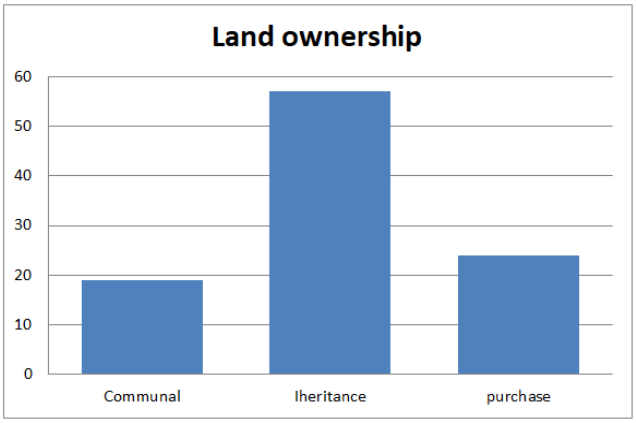

Fig 5 Land Ownership
Source Field Work 2018

In addition to this, the above analysis have reported that 19% (31) acquired their land through communal land ownership and 57% (95) owned their farmland via inheritance and 24% (40) have their lands through purchase. This revelation is in line with principle of land ownership in Africa as supported by (wicker and kalhen, (2010)).

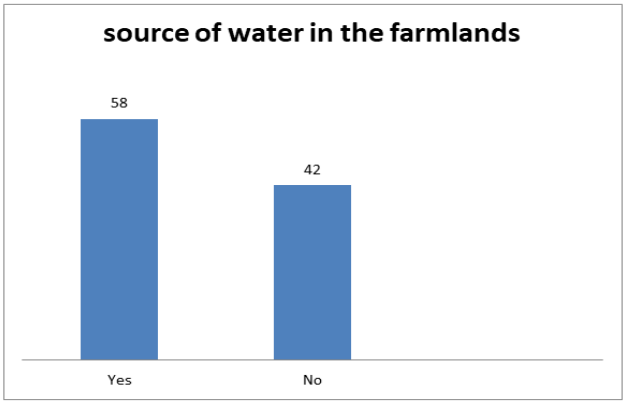

Fig 6 Source of Water in the Farmelands
Source Field Work 2018

ISSN No:-2456-2165

The above figure described that 60% (100) dry season farmers obtained water via local rivers in their domain and 36% (60) dug bore holes to Water their farm lands while 4% (6) used sprinkler method of Imation.

Table 4 Analysis of Dry Season Farmers Perception on Climate Change

Variable	frequency	Percentages
We are aware of climate change	161	97%
Not aware	5	3%
Total	166	100
Medium of information		
Radio	150	90%
Television	10	6%
Internet	6	4%
Total	166	100
Period of onset of rainfall		
March April	97	58
April june	69	42
Total	166	100
Period of cessation of rainfall		
October-November	120	72
September/October	46	28
Total	166	100
Comparison of rainfall in the last ten years		
The same	20	12
Decreases	46	28
Total	166	100
Temperature comparison in the last ten years		
Increases	142	86%
Decreases	24	14
Total	166	100

Source Field Work 2018

On the analysis of farmers perception on climate change revealed that 97% (161) are aware about climate change and 3% (5) are not aware about climate change. In addition to this when question was asked on where do they get the information on climate change 90% (150) got the information via radio and 6% (10), have got the information via television while 4% (6) sourced the information via internet service. This revelation may be due to the fact that radio is the most common communication gadget in our localities. Thirdly analysis of data on the period of onset of rainfall was asked 58% (97) indicated that rainfall starts in their domain around march/April and 42% (69) indicated that rain fall in their area start around June/jolly. More over analysis of data on the period of cessation of rainfall was analysis the result revealed that 72% (120) stated that rainfall in the areas end October and November and 28%(46) indicated that rainfall ends around September to October. In another development information on the comparison of rainfall for the last ten years was asked the result indicated that 12% (20) described the amount of rainfall as the same 60% desorbed in increase Fail 28% describe describes in rain fail temperature comparison of the last ten years was asked and the result indicate that 86% (142) agreed that there is increased in temperature and 14% (24) indicated decreases in temperature.

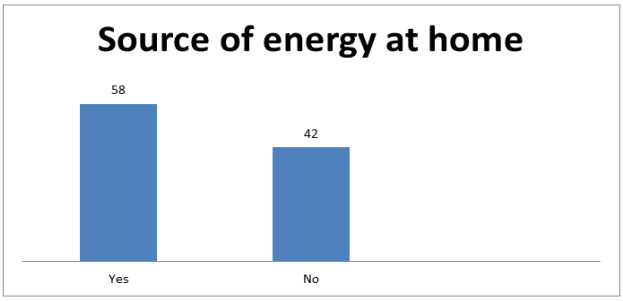

Fig 7 Source of Energy at Home
Source Field Work 2018

Data was collected on the source of energy by dry season rice farmers at home. The analysis indicated that 10% (16) dry season farmers uses electric store as source of cooking energy and 27% (45) uses charcoal while 63% (105) firewood as source of energy

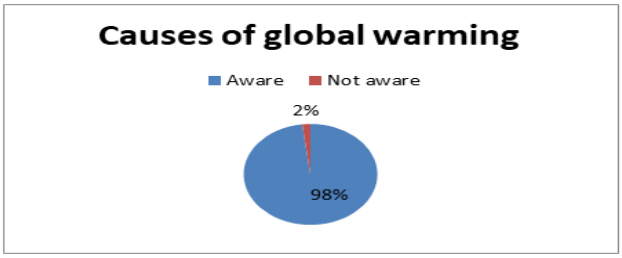

Fig 8 Causes of Global Warming
Source Field Work 2018

ISSN No:-2456-2165

Moreover, information was further collected on the effect of smoke generated due to burning of woods in the houses. The data revealed that 98% (162) are not aware about the effect of smoke to global warming and 2% (4) indicated that, they are aware about the danger.

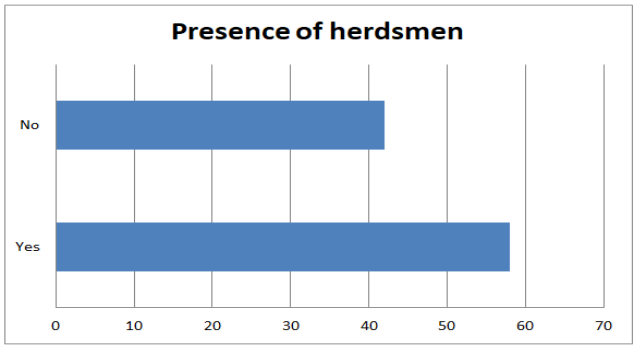

Fig 9 Presence of Herdsmen
Source Field Work 2018

In addition to this question was asked on the presence of herd men around the farmlands. Information collected revealed that, 76% (126) answered that they have Fulanis around their farmlands and only 24% (40) Stated that they not have herd mens around their Farmlands.

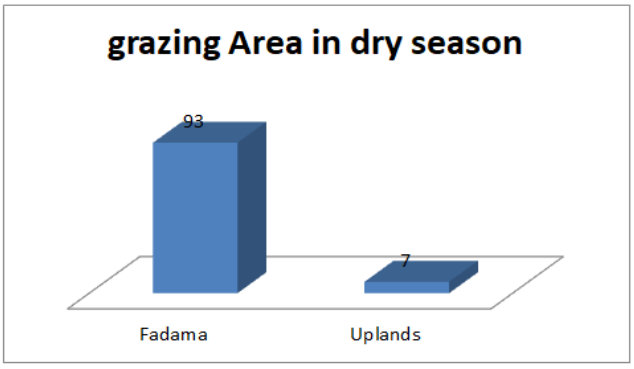

Fig 10 Grazing Area in Dry Season
Source Field Work 2018

Information was collected on where Fulanis graze their animals during the dry season. Data revealed that 93% (155) said that Fulanis graze their animals at Fadama area while 7% (11) said that, fulanis do graze their animals at up land area. This revelation may be due to the fact that during the dry season the upland is dry without vegetation covers. And hence no food for cattle's except at Fadama area where there is green vegetable cover.

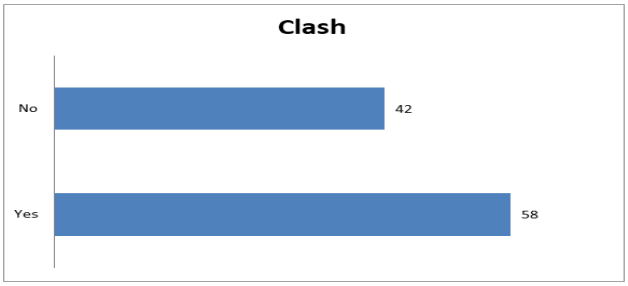

Fig 11 Clash
Source Field Work 2018

Question was asked to determine if there is any attempt to have clash between dry season farmers and cattle researchers. Information reveled that 51% (86) Stated that, they have not experienced any form of clash with Fulanis but 49% (80) Stated that they do experienced clashes with Fulanis but not fatal these clashes may be due to the fact that in the dry season period Fulanis are anxiously looking for fresh grasses and water for their animals to drinks.

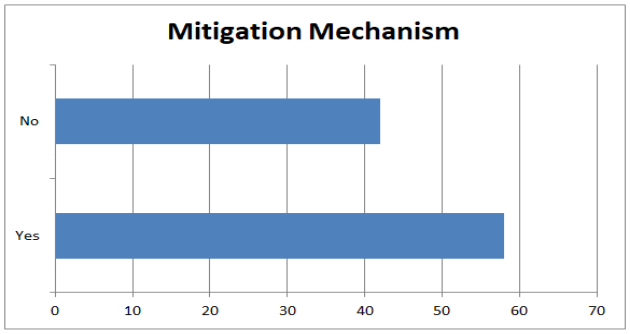

Fig 12 Mitigation Mechanism
Source Field Work 2018

Information on the mitigation of climate change by dry season farmers was asked and the result indicated that, farmers have adopted coping mechanisms as a result of climate change by planting early matured rice Seedling in case of prolong dry season and flood disaster. and others have not adopted any method. Having 76% (126) and 24% (40) respectively.

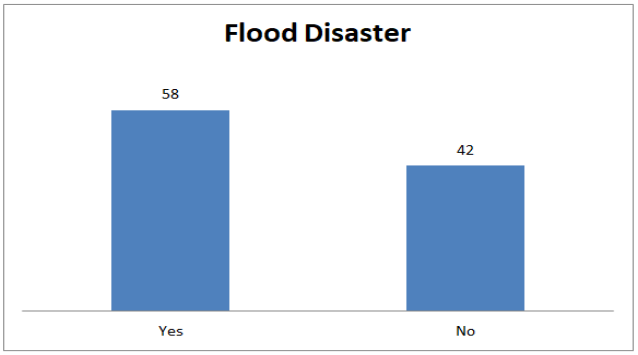

Fig 13 Flood Disaster
Source Field Work 2018

Information on occurrence of floods due to climate change was asked and result indicated that 58% (96) have experienced such disaster and 42% (70) have not experienced such disaster.

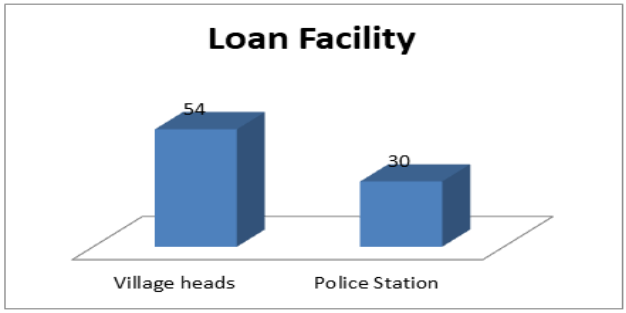

Fig 14 Loan Facility
Source Field Work 2018

ISSN No:-2456-2165

However, question was asked about the loan facility disburse to dry season farmers by Central Bank of Nigeria (Anchor famers loan scheme information collected revealed that 80% (133) have enjoyed the loan facility and 20% (33) have not succeeded in getting the facility.

Table 5 Socio Demographic Profile of Herdsmen

Variable	Frequency	Percentage
Gender		
Male	165	99
	2	1
Total	167	100
Occupation		
Animal rearing	155	93
Farming	2	3
Animal/crops	5	4
Total	167	100
Age		
15-31 years	60	36
32-41 years	90	54
Above 42 years	17	10
Total	167	100
Marital Status		
Married	160	96
Not married	5	3
Divorcee	2	1
Qualification	167	100
Quranic	165	98
Primary/secondary	1	1
Others	1	1
Total	167	100

Source Field Work 2018

The table above described the socio demographic profiles of herdsmen data on gender revealed that 99% (165) are males and 1%(2)are female. the finding revealed that men are the bread winners, they are the one responsible for caring of animals. Secondly information on the major occupation was asked 93% (155) engage in animals rearing and 3%(2)engaged in farming while 4%(5) engaged in both crops and animals rearing. Thirdly information on the age of herdmenis were collected and the result indicated that, 36%(60)are between the age of 15-31 year and 54% have their ages between 32-45 years while 10% (17) are above 45 year old. Fourthly data on the marital status of respondents revealed that 96% (160) are married and 3% (5) have not married while 1% (2) are divorcee. Fifthly information on the educational and qualification of herdmen revealed that 98% (165) have attended quranic schools and 1% (1) have attended primary /secondary and lastly 1% (1) fall within others qualification.

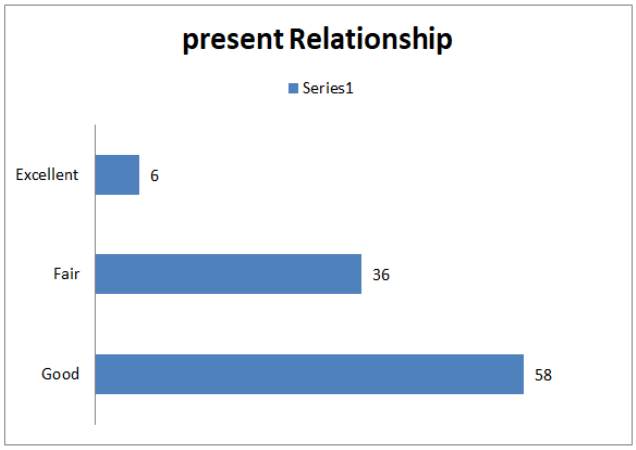

Fig 15 Present Relationship
Source Field Work 2018

In order to present reliable information on the relationship between the two groups. this question was repeated and information revealed that 58% (97) herd men described their relationship with farmers as good and 36% (60) described the relationship as fair while 6% (10) described the relation excellent. This revelation looked similar to that of (Hagberg 2000), who found out that despite persistent conflict, farmers and herders still engage in social and economic cooperation.

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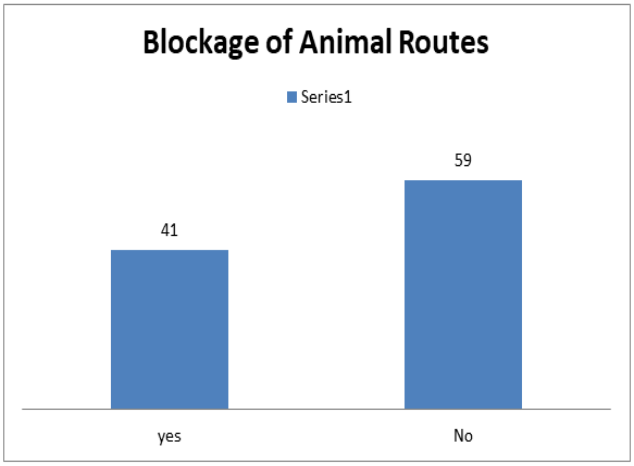

Fig 16 Blockage of Animal Routes
Source Field Work 2018

Information on weather farmers have blocked the animals route to gain access to Fadama land during the dry season rice farming was collected and information revealed that 59% of the herders (98) Stated that farmers have not blocked their traditional routes of having access to Fadama land and 41% (69) herders said yes to this question.

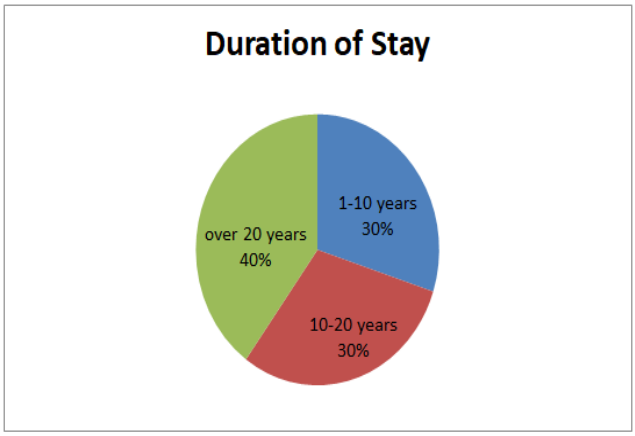

Fig 17 Duration of Stay
Source Field Work 2018

However, data collected on the duration of stay for the herdsmen in the study area revealed that 30% (50), have stayed in the area for about 1-10 years and 30% (50) were there for about 10-20 years and 4% (66) stayed for over 20 years.

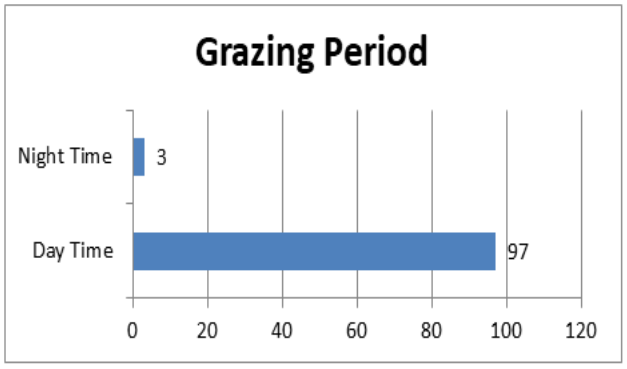

Fig 18 Grazing Period

Information was further collected from herders on the period of grazing. Data revealed that 97% (162) graze their animals in the day time and 3% (5) graze their animals at night. This finding help in building good nation ship between the herdsmen's and herders in the state.

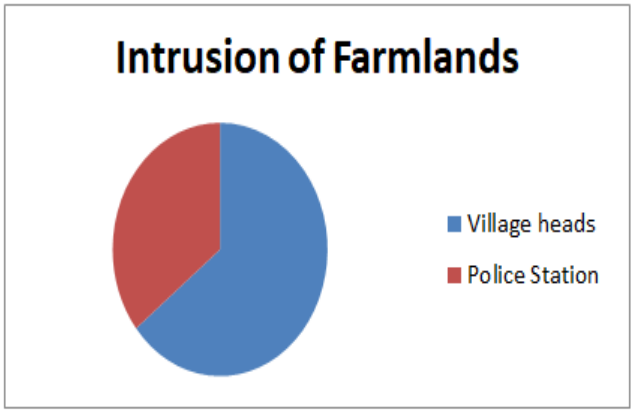

Fig 19 Instrusion of Farmlands
Source Field Work 2018

In addition to this data analysis on the intrusion of rice farmlands during dry season period by herdsmen was collected and result revealed that 94% (157) have never intruded in to any person farmland and 6% (10) have stated that, they have intruded in to farmers farmland.

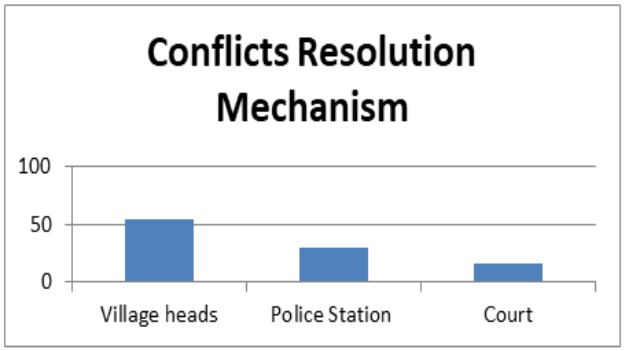

Fig 20 Conflicts Resolution Mechanism
Source Field Work 2018

Analysis of data on medium of Conflicts Resolution was asked, it revealed that 54(90) herders indicated that, when ever Conflicts erupted with farmers, they do report the case to their village head and 30% (50) herders stated that Conflict between them and farmers are reported to police station while 16% (27) herders reported that Conflicts are best solve in the court by judges.

V. SUGGESTIONS

The following are author suggestion on the issue of farmers/ herdsmen conflicts in Kebbi State.

- Since the issue of Climate Change is real and have manifested every where in the world. farmers and herders should be educated most especially the dry season farmers on the needs to understand themselves and selve any problem emanating from them amicably

ISSN No:-2456-2165

- Kebbi State government should help the = dry season farmers and Fulanis with current knowledge about climate change mitigation as climate change effects all the groups interim of productivity
- the federal government in partner with Kebbi State government should enact law prohibiting dry season rice farmers blocking animal routes that helps them to have access to fadama land during dry season when pasture are unavailable. at upland areas.
- Since climate change is natural and human factors therefore farmers should desist from activities that induced Climate change such as burning of wood and emission of carbon dioxide to the atmosphere.

VI. CONCLUSION

Evidences of climate change have manifested almost everywhere and this include dryness of wet land, drought, floods among others all these have great effects on Agriculture. However, the country can attained food security if its citizens engages in Agriculture. therefore the federal government in partner with Kebbi State government should do everything possible toward achieving food security as found in developed world The modern ranching method should be encouraged among herdsmen's toward mitigating conflicts and issue of climate change as found in Apalanchia basin of united state of America. in addition proper policies' and program that ensure peaceful and profitable agriculture should be addressed in Agricultural plans in evolving dry season farmers cattle rearers.

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