



Evaluation of Conflict Between Fulani Herdsmen And Farmers In Northern Nigeria: A Statistical Approach

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ABSTRACT

The research investigated the factors contributing to conflict between Fulani herdsmen and farmers in Northern, Nigeria. An analytic research survey was employed. The study utilized structured questionnaire to obtained data. 388 participants from six selected states in Northern Nigeria were used for this study. The data collected were analysed using Factor analysis. The study revealed that land scarcity (.960), dismantling of insurgency from their base (.814), lack of security (.812), Illiteracy and lack of orientation (.799), easy access to local arms by the Fulani herdsmen (.780), lack of establishment of ranches (.774), corruption (.714), were the most frequents factors contributing to conflict between Fulani-herders and famers in Northern Nigerian. These factors accounted for about 70.360 percent of variation in the farmer and Fulani-herdsmen crisis in Northern Nigeria. The study concluded that conflicts between farmers and herdsmen hinged on land related issue, illiteracy, insecurity and corruption. The study recommended that Grazing reserves should be properly gazetted and customary owners paid adequate compensation to avoid the taking over of land by force and there is need for the Nigeria government to review the existing laws as it relates to accessibility to land by members of community. That way there will be equity to avert constant conflict. In doing the review, issues like indigeneship and settlers rights in communities, the land use acts which have been abused largely by the upper class should be reconsidered for review in the front burner in the constitution review process.

Keywords: Famers, Herdsmen, Factor Analysis, Conflict, Taro-yamane and Varimax,

INTRODUCTION

Currently, in Nigeria, one of the most trending problems facing the country is the attack by the Fulani herdsmen most especially in northern part of the country, this is so rampant due to some factor that seriously need to be address. More than 90 percent of pastoralists in Nigeria reportedly are Fulani, a large ethnic group straddling several west and central African countries. (Audu, 2013).

The conflict between Fulani herdsmen and farmers is becoming intolerable in the country, many has lost their lives, properties, many factors had been said to have contributed to this crisis such as unavailability of ranches, lack of land for grazing by the Fulani, land scarcity e.tc. The conflicts have not only heightened the level of insecurity, but have also demonstrated high potential to exacerbate the food crisis in Nigeria and other affected countries due to loss of farmer lives, animals, crops and valuable properties.

Fulanis thought to have originated from Futa-toro in Lower Senegal in the 14th century and they are predominantly found in Northern part of Nigeria. Most of the Fulanis that resides in Niger state believed to have migrated from Sokoto, during the time when Niger state was under Sokoto State, while some came from Kebbi and Kastina. They occupy some parts and they dwell there for shelter and rearing of their anima, some of them are engaged in other activities such as trading, shop keeping and also farming. (Adams et al, 2017).

The Fulani herdsmen may be dangerous but they also contribute about 95 percent of the 12 million cattle in Nigeria. The important role played by the Fulani-herdsmen can be seen in their being the major supplier of beef, mutton, hides and skin, hoof, horn, dung for manure, bones, cow urine used in the production of medicines etc. Satisfying about 95 percent of their compatriot's protein needs, they are undeniably an important segment of the nation's economy. The "janjali" tax which they pay should further elicit pity and consideration in the distribution of amenities which they are unfortunately denied." (Hameed, 2014).

(Bello, 2013) described the Fulani herdsmen in the region as made up of two categories, the resident pastoralists and the mobile armed pastoralists (the new arrival). While the former group is fully integrated into their host communities to the extent of speaking their languages and intermarrying with them, the latter group is comprised of the Bokolo or Bururu who are militant, armed and able to coerce their hosts to inflict mayhem on these host communities. He further described them as terrorists disguising as pastoralists with the primitive motive of the forceful acquisition of the land of the host communities through the re-launch of jihads or by acting out the script of the Boko Haram group.

However, this research work is subjected to Factor analysis. Essentially, the factors involved in farmer- herdsmen conflict are several, using this analysis will find the original variables that correlate highly with the derived factors.

According to Kleinbaum and Kupper (2007), factor analysis is used mainly when one is interested in knowing whether some underlying pattern or relationship exist among variables; discovering a new set of factors; or confirming (an) existing factor(s) as being the true factor(s).

Statement of Problem

The crisis between Fulani herdsmen and the famers in some part of the country in which Northern Nigeria cannot be excluded has posts serious threat on the security, it has affected high crops production in the country. It is quite uncluck that government of the country has failed to handle this conflict despite the fact that many lives and properties is affected on a daily basis. The Fulani Herdsmen sent fears, tension, sleeplessness, and shocks that led to the loss of lives and properties in other to secure positions of authority and economic resources.

The current and most serious version of insecurity challenge facing Nigeria today is the instigation of farmers-herdsmen violent conflicts. The major effect of the violent conflicts are food and livestock shortages, food price increase, lost in revenue, and income, thousands of lives and household properties, cattle routes, demarcated grazing reserves farm land and towns infrastructures are frequently destroyed and or denied access. Lack of ranching options and the effective checkmating of deforestation make it imperative for the herdsmen to roam freely. In Niger state, even within the residential areas of the metropolis, it is not out of place to encounter herdsmen and young boys leading herds comprising more of cattle, a few sheep and very rarely, dogs, across the major roads, and through undeveloped plots of vast land, etc. Sometimes constituting a nuisance to road users and other citizens.

Aim and Objectives of the Study

The aim of the study is to use Factor Analysis to analyze the factors that contributed to fulani-herdsmen and famers crisis in northern Nigeria. The specific Objectives of this study are:

- ✓ To determine the most frequent factors contributing to Fulani-herdsmen and famers crisis in Northern Nigeria.
- ✓ To suggest appropriate recommendations based on findings.

Review of related Literature

The crises between Fulani Herdsmen and Famer in Nigeria is not a new phenomenon, many life and properties have been wasted on this issue and governments are not ready to take quick action against it both at the Federal, State and the Local level. Nomadic herders are believed to have drifted from Senegambia and the high plateaux of the Futa-Jalon in modern-day Guinea more than a thousand years ago although pastoral nomadism and military conquest were the two processes that contributed immensely to their spread through West Africa (Blench, 2010).

The reports about Fulani herdsmen attacks all over the country are horrifying and many Nigerians now see them as Enemy of the human race. A report published by the SMB Intelligence, a mining and research firm on the attacks of the herdsmen in the north central region of the country accused the federal government of complicity through unhealthy silence on the "Terror in the food basket". The

report maintained that the attacks were not only on life and property but agriculture as well. The attacks on Benue, Nasarawa and Plateau states left many dead and thousands displaced. The report which saw the herdsmen menace as bigger problem than the Boko Haram insurgency said 2500 people were killed annually by the sect while the herdsmen killed 2000 in north central region alone in 2015. The report also said that, "Because the government has failed to respond adequately by protecting lives and property of the citizens in the region, the herdsmen have grown bolder, and their perceived attempt to wipe out the native ethnic groups has quietly morphed into low intensity warfare. Even where the traditional rulers have attempted to call the herdsmen to peace meetings, the herdsmen routinely take advantage of these occasions to perform reconnaissance for future attacks." (Ibekwe, 2015).

Campbell (2016) in his research, stated that the conflicts between the Fulani herdsmen and the farmers in Nigeria has been endemic over the years fuelled by land and water use, religion, boundary disputes and the manipulations of politicians with the new entrant on the stage being the magnitude of killings carried out by the herdsmen. He further said increase in population of famers and scarcity of land are the major factors that causes the crisis between famer and herdsmen. This view is the popular notion held about the herdsmen attacks since the usual reason of struggles over land resources is no longer as water-tight as it used to be.

Abass (2012) contends that the major source of tensions between pastoralists and farmers is basically economic, with land related issues accounting for the majority of the conflicts. This can then be situated within the broader context of the political economy of land struggle, traceable to a burgeoning demography in which there is fierce competition for fixed space to meet the demands of the growing population (Olabode&Ajibade 2010; Solagberu 2012).

Haman (2002) revealed that the nomadic herdsmen or grazers suffer from material damages when the crop farmers inflict physical injuries on the cattle by using cutlasses, spears or guns or by poisoning the cattle.

The attacks by Fulani herdsmen have in recent years taken many dimensions with the use of new and sophisticated types of weapons and communication devices such as AK 47 rifles. This has further aggravated violence, with destruction of lives and properties. Conflicts resulting from cattle grazing actually accounted for 35% of all reported crises between 1991 and 2005 in Nigeria (Adekunle&Adisa 2010). Another study revealed ethnic conflict, and integration as problems of inter-ethnic relation facing the grazers and their host crop farmers and Lack of education is the major causes of fight between Fulani Herdsmen and Fermers (Pelican, 2000).

Tenuche and Ifatimehin (2009) in their study observed that there is no resource sustainability in Nigeria. Because of this there is difficulty for a majority of its citizens who require land for farming and grazing to have access to land. And this is a major cause of conflicts in the Benue valley region. Consequently, they suggest that there is need for the State to review the existing laws as it relates to accessibility to land by members of community. That way there will be equity to avert constant conflict. In doing the review, issues like indigene-ship and settlers rights in communities, the land use acts which have been abused largely by the upper class should be reconsidered for review in the front burner in the constitution review process.

As a multivariate technique, Factor Analysis was used to study the interrelationship among the many variables that were included in the instrument of data collection, and to explain these variables in terms of their common dimensions (factors). The first output in factor analysis is the results of extraction of components/factors.

METHODOLOGY

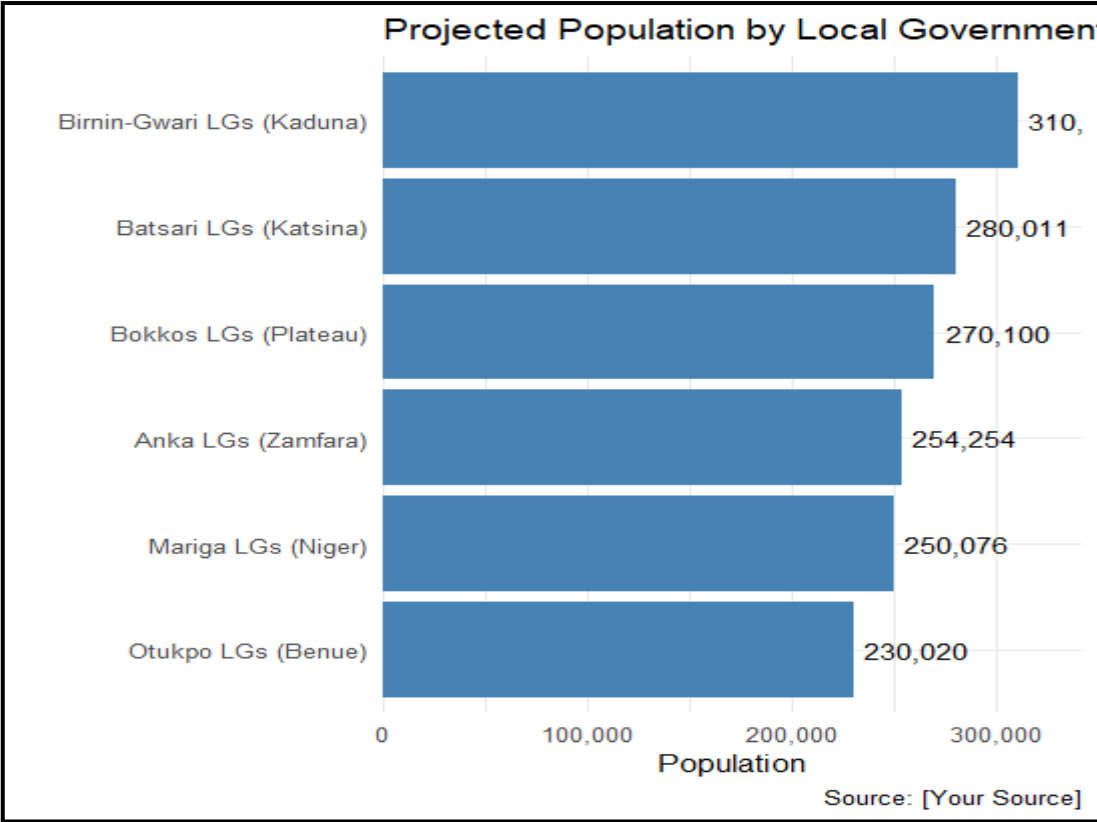
The targeted population of this study comprise of residents, Fulani and farmers within selected local government areas across six states in Northern Nigerian, where farmer and Fulani-herds crisis is prevalent. The local government areas include Anka local government (Zamfara State), Mariga Local Government (Niger State), Batsari Local Government (Katsina State), Kaba\Bunu Local government (Kogi State), Bokkos Local Government (Plateau State), Birnin-Gwari (Kaduna State). However, adequate sample size (n) was determined for this study using of Taro Yamane (1974) model because we cannot study the entire population as a result of insufficient of time and resources, as shown below:

Table 1: States Population Statistics

State	Local Government	Projected Population
Zamfara State	Anka LGs	254,254
Niger State	Mariga LGs	250,076
Katsina State	Batsari LGs	280,011
Benue State	Otukpo LGs	230,020
Plateau State	Bokkos LGs	270,100
Kaduna State	Birnin-Gwari LGs	310,611
Total		1,595,072

Source: National Population Commission

Figure 1: Projected Population Plot



The figure presents projected populations for six Local Government Areas (LGAs) across different states in Nigeria. Birnin-Gwari LGs in Kaduna State has the highest projected population at 310,000, followed by Batsari LGs in Katsina (280,011), Bokkos LGs in Plateau (270,100), Anka LGs in Zamfara (254,254), and Mariga LGs in Niger (250,076), while Otukpo LGs in Benue has the lowest at 230,020. The total projected population for these six LGAs sums to approximately 1.59 million, with a range of about 80,000 between the highest and lowest, indicating notable disparities in population distribution across the selected areas.

Taro Yamane model:

$$n = \frac{N}{1 + N(e)^2}$$

Where

- N = Overall population (1,595,072)
- e = Level of precision (0.05)
- n = Sample
- 1 = Constant

$$n = \frac{1,595,072}{1 + 1,595,072 (0.05)^2}$$

$$n = \frac{1,595,072}{1 + 1,595,072 (0.0025)}$$

$$n = \frac{1,595,072}{1 + 3987.86}$$

n = 399.9

However, a sample size(n) of 400 was determined for this study. The study then employed stratified sampling technique since the population under consideration is subdivided into different strata. Hence, both purposive and stratified sampling technique were adopted for this study

Table 2: Sample selected from the sub-population

Area	Subpopulation	Sample
Zamfara State	254,254	64
Niger State	250,076	63
Katsina State	280,011	70
Benue State	230,020	58
Plateau State	270,100	68
Kaduna State	310,611	77
Total	1,595,072	400

Source of Data Collection

Data for this study was collected from primary and secondary sources. Both questionnaire and interviews were used for collecting primary data while secondary data was collected from journals, articles, government publications, news media and letters.

Method of Data Analysis

Factor analysis using principal component approach was employed. Factor analysis is used mainly to determine some underlying pattern or relationship that exist among variables; discovering a new set of factors; or confirming existing factors as being the true factor(s) . The factor loading high under each factor variable (Beta weight) represents a correlation of variables to the identified factors and has the same interpretation as any correlation coefficient. However, only variables with loading of 0.40 and above (10% overlapping variance) were used in naming factors. Also factors that loaded in more than one places were discarded.

Mathematical Models

In the ‘classical factor analysis’ mathematical model, *p* denotes the number of variables (X_1, X_2, \dots, X_p) and *m* denotes the number of underlying factors (F_1, F_2, \dots, F_m). X_j is the variable represented in latent factors. Hence, this model assumes that there are *m* underlying factors whereby each observed variables is a linear function of these factors together with a residual variate. This model intends to reproduce the maximum correlations. $X_j = a_{j1}F_1 + a_{j2}F_2 + a_{jm}F_m$

where . j = 1,2,3,....., p

The factor loadings are $a_{j1}, a_{j2}, \dots, a_{jm}$ which denotes that a_{j1} is the factor loading of j^{th} variable on the 1st factor. The specific or unique factor is denoted by e_j . The factor loadings give us an idea about how much the variable has contributed to the factor; the larger the factor loading the more the variable has contributed to that factor. Factor loadings are very similar to weights in multiple regression analysis, and they represent the strength of the correlation between the variable and the factor.

On the other hand, factor analysis performed using a covariance matrix is conducted on variables that are similar (e.g., items from the same scales). The correlation matrix is often used because it is easier to interpret compared to the covariance tables, although there is not a strict requirement for which matrix to use. The diagonal element of the matrix is always the value 1 (i.e., the correlation of a variable within itself). In principal components analysis, the diagonal values of the correlation matrix, 1s, are used for the analysis. Conversely, computation for the factor analysis techniques involves replacing the diagonal element of the matrix with the prior communality estimates (h^2). The communality estimate is the estimated proportion of variance of the variable that is free of error variance and is shared with other variables in the matrix. These estimates reflect the variance of a variable in common with all others together. Factor analysis is also rooted in regression and partial correlation theory so analysing it from this perspective may shed light on the theories behind this technique. The basic idea behind this model is that factor analysis tries to look for factors such that when these factors are extracted, there remain no intercorrelations between any pairs X_i and X_j because the factors themselves will account for the intercorrelations. This means that for all pairs of any two elements, X_i, X_j, \dots, X_p , are conditionally independent given the value of F_1, F_2, \dots, F_m . Once a correlation matrix is computed, the factor loadings are then analysed to see which variables load onto which factors.

DATA PRESENTATION AND ANALYSIS

Out of 400 questionnaires administered to the participants in the study area, about three hundred and eighty-eight (388) questionnaires were retrieved and used, accounting for 97 percent

Table 3: The occupation of the Participants

Participants	Frequency	Percentage
Farmers	205	52.8
Herdsmen	132	34.0
Other (Residents)	51	13.1
Total	388	100

Source: Field Survey (2025)

Table above revealed that 205 respondents representing 52.8% were famers, 132 respondents representing 34.0% were Herdsmen, 51 respondents representing 13.1% were others. It could be deduced that majority of the sampled respondents for this study were famers and herders.

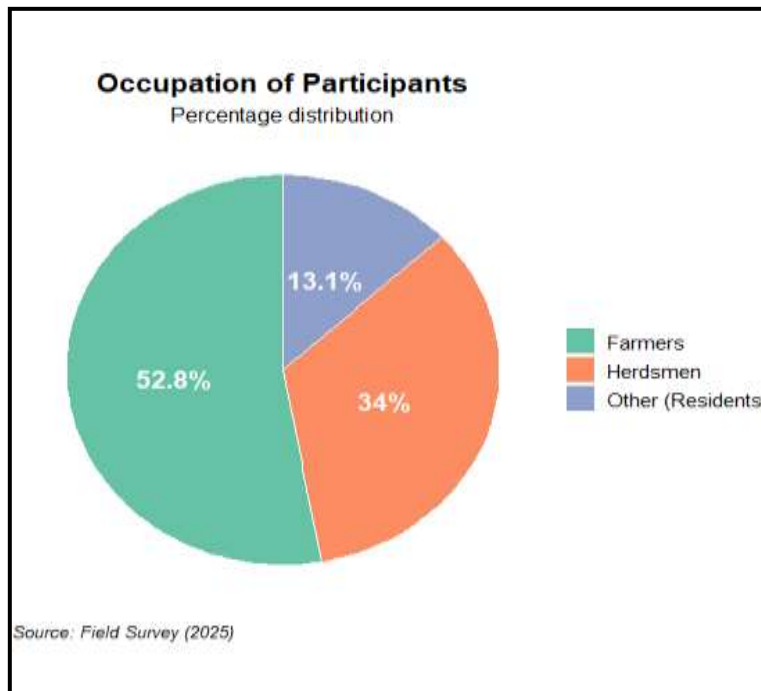


Figure 2: Pie-chart for Participant's occupation Percentage Distribution

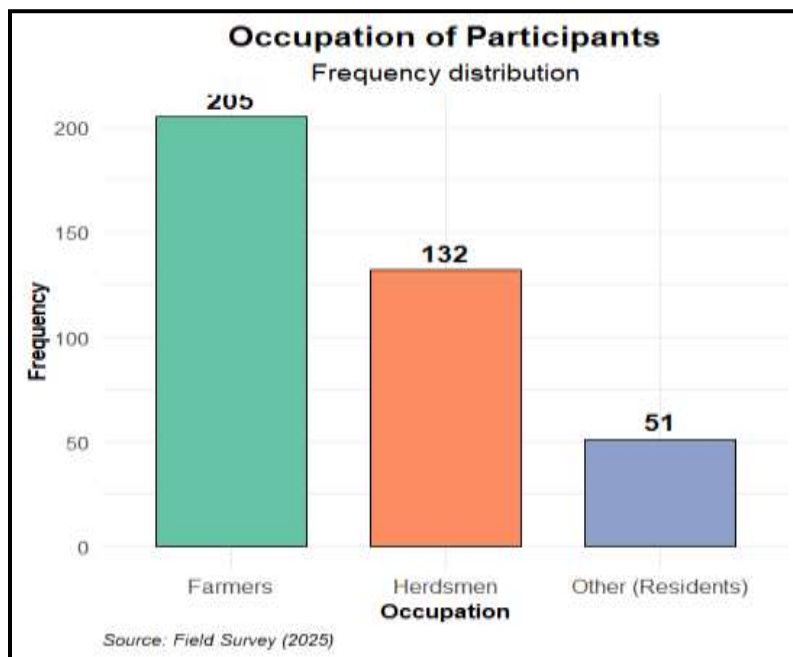


Figure 3; Bar-chart for Participants Occupation Frequency Distribution

Table 4: Kaiser-Meyer-Olkin and Bartlett's Test Table

Kaiser-Meyer-Olkin and Bartlett's Test Table		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.811
Bartlett's Test of Sphericity	Approx. Chi-Square	987.4251
	Degree of freedom	345
	Significant level	.000

Source: Field Survey (2025)

Table 4, reveals that the coefficient of KMO statistic was.811 with approximate Chi-square value of 987.4251, indicating that the sampling size used for this study is adequate. The Bartlett's test of sphericity is highly significant (p-value less than 0.05), suggesting that the null hypothesis should be rejected, meaning that factor analysis will yield distinct and reliable result. Hence, there is enough evidence that factor analysis is appropriate.

Table 5: Extraction Sums of Squared Loadings

Component	Initial Eigenvalues		Extraction Sums of Squared Loadings		
	Total	% of Variance	Total	% of Variance	Cumulative %
1	6.701	25.750	6.701	25.750	25.750
2	3.431	11.211	3.431	11.211	36.961
3	3.081	9.135	3.081	9.135	46.096
4	1.889	7.681	1.889	7.681	53.777
5	1.812	7.243	1.812	7.243	61.020
6	1.160	4.833	1.160	4.833	65.853
7	1.032	4.511	1.032	4.511	70.360
8	.913	3.894			
9	.825	3.433			
10	.791	3.232			
11	.699	2.754			
12	.614	2.511			
13	.561	2.200			
14	.516	2.151			
15	.482	1.832			
16	.399	1.712			
17	.353	1.532			
18	.284	1.184			
19	.265	1.102			
20	.237	1.038			
21	.226	1.017			
22	.218	.874			
23	.172	.764			
24	.169	.735			

Source: Field Survey (2025)

Table 5 presents the initial Eigen value associated with each factor under consideration. The result showed that seven factors with Eigen value greater than one and explained relatively large amount of variation. The first factor account 25.75% of variation in the farmer and Fulani-herdsmen crisis, the second factor account for 11.21% of variation in the farmer and Fulani-herdsmen crisis, the third factor account for 9.14% of variation in the farmer and Fulani-herdsmen crisis, the fourth factor account for 7.68% of variation in the farmer and Fulani-herdsmen crisis, the fifth component account for 7.243 of variation in the farmer and Fulani-herdsmen crisis, the sixth component factor account for 4.83% of variation in the farmer and Fulani-herdsmen crisis, the first component factor account for 4.511% of variation in the farmer and Fulani-herdsmen crisis. However, the extracted seven factors jointly accounted for about 70.360 per cent of variation in the farmer and Fulani-herdsmen crisis in Northern Nigeria while the remaining 19.6 per cent of variation in were contributed by the other factors farmer and Fulani-herdsmen crisis in Northern Nigeria

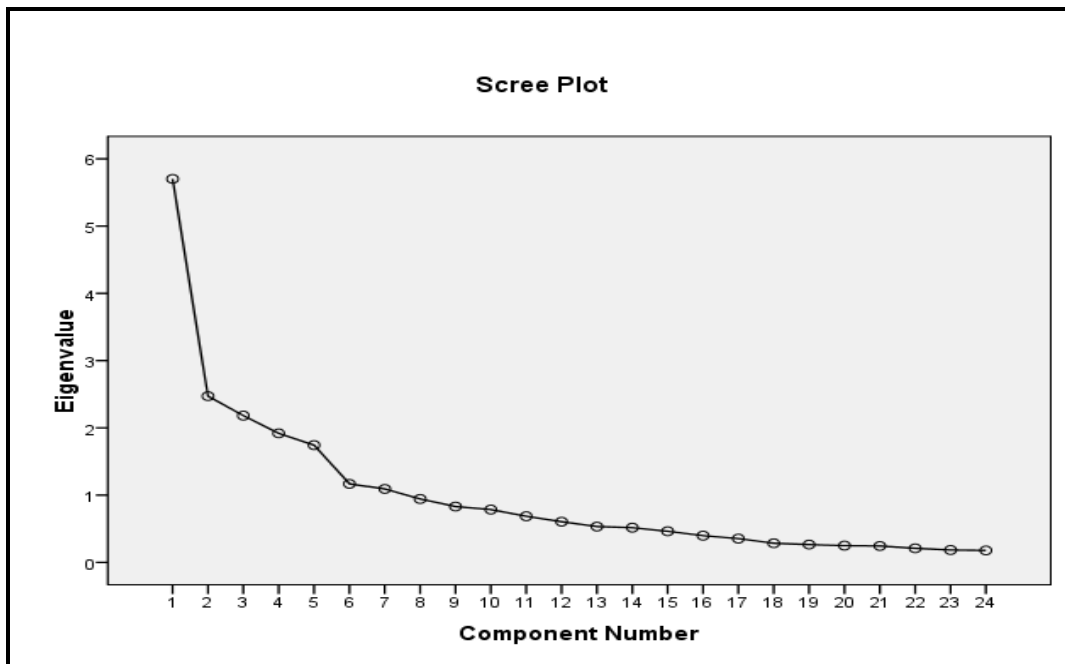


Figure 4: Scree plot

Figure 4, further displayed the retained seven factors with engine value greater than one. The graph displayed a downward movement with the first seven component seen to be above one.

Table 6: Communalities Among Factors Showing the Extractions

Factors	Extraction
Lack of Rational Thinking by the Herdsmen	.533
Illiteracy and lack of orientation	.799
Lack of training for the herdsmen	.678
Lack of relationship between the herdsmen and Fulani	.561
Poor communication	.420
Origin of the president	.232
Dismantling of insurgency from their base	.814
Political ambition by the opposite parties	.639
Corruption	.714
Lack of security	.812
Injustices by the Judiciary	.525
Easy access to local arms by the Fulani herdsmen	.780
Lack of establishment of ranches	.774
Slow decision making by the law maker	.587
Lack of infrastructural facilities	.474
Land scarcity	.960
Climate Change in the availability of water and forage crops	.624
Increase in cattle's population	.653
Desertification	.637
Low rainfall in the north	.432
Poverty among Nigeria	.611
Selfishness among elites	.519
Increase in farmers population	.674
Population explosion	.666

Source: Field Survey (2025)

Table 6 shows that among the seven extracted factors, Land scarcity has the highest contribution to the conflict with value of .960. The next factor identified was dismantling of insurgency from their base with value of .814. In the third position was Lack of security with value of .812 followed by Illiteracy and lack of orientation with value of .799. In the fifth position was easy access to local arms by the Fulani herdsmen with value of .780. Next factor identified was lack of establishment of ranches with value of .774. The last factor identified was corruption with value of .714. However, since the average communalities after extraction was approximately 0.7 then we can retain all factors with eigen value above 1. The communalities suggest that the model is good fit.

DISCUSSION OF FINDINGS

Having evaluated factors contributing to conflict between Fulani-herdsmen and farmers in Northern Nigeria using Factor analysis, the result identified seven most frequent factors contributing to farmer and Fulani herdsmen conflict in Northern Nigeria, including land scarcity, illiteracy and lack of orientation, corruption, easy access to arms, dismantling of insurgency from their base and lack of establishment of ranches. The findings revealed that land scarcity contributed the most to the conflict between farmers and Fulani herdsmen in Northern Nigeria. This may be attributed to lack of good relationship and communication between Fulani and farmers. However, this result is consistent with Campbell (2016) who also observed that the conflicts between the Fulani herdsmen and the farmers in Nigeria over the years has been fuelled by land insufficiency. And also, Tenuche and Ifatimehin (2009) in their study observed that lack of land for farming and grazing causes conflicts between Fulani and farmers in the Benue valley region.

CONCLUSION

The study evaluated factors contributing to conflict between Fulani-herders and farmers in Northern Nigeria. According to the result land scarcity (.960), dismantling of insurgency from their base (.814), lack of security (.812), Illiteracy and lack of orientation (.799), easy access to local arms by the Fulani herdsmen (.780), lack of establishment of ranches (.774), corruption (.714), were most frequent factors contributing to conflict between Fulani-herders and farmers in Northern Nigerian. These factors accounted for about 70.360 per cent of variation in the farmer and Fulani-herdsmen crisis in Northern Nigeria. In conclusion, conflicts between farmers and herdsmen hinged on land related issue, illiteracy, insecurity and corruption.

RECOMMENDATIONS

The study therefore made the following recommendations as panacea to achieving peace in the Northern Nigeria. Grazing reserves should be properly gazetted and customary owners paid adequate compensation to avoid the taking over of land by force.

There is need for the State to review the existing laws as it relate to accessibility to land by members of community. That way there will be equity to avert constant conflict. In doing the review, issues like indigeneship and settlers rights in communities, the land use acts which have been abused largely by the upper class should be reconsidered for review in the front burner in the constitution review process. Law enforcement agencies should be alive to their constitutional roles and government must strengthen the security around the farmers and herders across the state by providing necessary training and state-of-the-art equipment required anytime there is conflict.

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