



ANALYSIS OF MULTIDIMENSIONAL POVERTY RATE AMONG RICE
FARMING HOUSEHOLDS IN GOMBE STATE, NIGERIA

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ABSTRACT

The study was carried out on analysis of multidimensional poverty of rice farming households in Gombe state, Nigeria. Multistage sampling was employed in selecting 355 rice farmers. The primary data so obtained covered information demographic profiles and multidimensional parameters. The data were analysed using descriptive statistics, Multidimensional Poverty Index (MPI) and Likert scale. Results showed that rice farming was dominated by literate men in their youthful ages whose participation is cooperative membership is low and exhibit poor access to credit facilities. The respondents were basically rice farmers. The multidimensional poverty index of the rice farmers was 0.1 due to the fact that the depth of poverty was only 18% and the percentage of multidimensionally poor rice farming households was 47.89%. Amongst the factors that contributed to multidimensional poverty, the highest contributors to deprivation were cooking fuel which was 77.47%, asset ownership was 58.31%, housing was 53.31% and school attendance was 52.96%. The constraints to rice production ranked using a five-point Likert scale revealed that; 83.95% strongly agreed to insufficient funds, 69.01% agreed with increased costs, 60.56% agreed with poor infrastructure, 47.89% agreed with climate change, 29.86% strongly agreed with inadequate government funding. The study recommended that the respondents key into relevant government programmes that are aimed at boosting rice production.

Key words: Farming, Households, Multidimensional, Policy and Poverty.

INTRODUCTION

Agriculture is a key economic sector in Nigeria which plays significant role in economic growth and development (Abbas *et al.*, 2020). It contributes about 24 percent to the country's nominal GDP (National Bureau of Statistics NBS, 2022). Its share in employment is considerably higher at 51 percent and this ratio is estimated to have risen subsequently associated with the weakness in industry and services output in 2019/20 and an absence of notable structural transformation of the economy (International Monetary Fund IMF, 2023). According to Olarinde *et al.* (2020), that is the reason why despite being the largest contributor to economic growth, the agricultural sector (including especially the farming households) has the highest incidence of poverty compared to other sectors within the economy.

Poverty has always been a problem of man from time immemorial (Muhammad *et al.*, 2025). It was a difficult journey reaching a universally acceptable definition of poverty that is devoid of biasedness (Rukwe *et al.*, 2023). Although generally accepted definition is missing, narrow and broader perspectives of poverty exist in the literature with variations linked to diverse perceptions of well-being (Rohwerder, 2016).

Poverty is a multidimensional phenomenon which has been examined by many scholars and development associates in diverse ways (Muhammad *et al.* 2025). Chen *et al.* (2019) perceived poverty as a set of interrelated forces which are limited resources, need, pattern of deprivation, lack of entitlement and basic security, exclusion, dependency, social class, inequality, economic position and unacceptable hardship. According to Alkire *et al.* (2015), poverty is powerlessness, insecurity, low self-confidence, malnutrition, inadequate



health facilities and low social relations. Also, Michael *et al.* (2019) sees poverty as deprivation of, or insufficient access to resources is low to certain acceptable standard in the society. This study follows the Oxford Poverty and Human Development Initiative (OPHI) broader perspective and multiple deprivations in health, education and living standards. In Nigeria, multidimensional poverty is higher in rural areas, where 72% of people are poor, compared to 42% of people in urban areas and the intensity of rural poverty is also higher (42%) in rural areas compared to 37% in urban areas (NBS, 2022). The scale and complexity of poverty in Nigeria differs with location (Ifelunini *et al.*, 2013). For instance, the North-East sub-region has a very high incidence of both income and multidimensional poverty (NBS, 2017; OPHI, 2017). Overall, 65% of poor people represent 86 million people live in the North, while 35% nearly 47 million live in the South. In general, a disparity between North and South is evident in both the incidence and intensity of multidimensional poverty, with the North being poorer (NBS, 2022).

One of the most difficult challenges facing Nigeria and its people and the greatest obstacle to the pursuit of sustainable socioeconomic growth is the issue of poverty reduction (Olarinde *et al.*, 2020). The poor, especially farmers, perceive their economic circumstances to be fraught with uncertainty affected by events over which they have no control (Olarinde *et al.*, 2020). These economic circumstances are, for example, primary commodity prices, the volume of rainfall, pest attacks, fire outbreaks, changes in soil condition, and social conflicts. Of all these, lack of food is the most critical dimension of poverty (Olarinde *et al.*, 2020). The broad objective of the study was to assess the multidimensional poverty rate among rice farming households in Gombe State while the specific objectives were to: describe the socio-economic characteristics of farming households; assess the multidimensional poverty status of rice farming households; and identify the constraints to rice production in the study area.

MATERIALS AND METHODS

The Study Area

The study area was Gombe state which is one of six states in the North-east geopolitical zone of Nigeria. It covers an area of 20,265km² with a 2024 projected human population of 3,818,619 million; using population growth rate of 3.2% per annum according to NPC (2006). Gombe state shares common boundaries with Borno state to the east, Yobe state to the north-east, Bauchi state to the west, Taraba state to the south, and Adamawa state to the South-east (Gombe State Government [GSG] (2015). The climatic condition of the state is typical of the Sudan savannah zone characterized by long dry season lasting between October and April and short rainy season that lasts from May to September; with an average (850mm) amount of rainfall received per annum. The climate is characterized with a warm condition, having a mean diurnal temperature of 35°C – 40°C during the hottest months of (March – May) and to about less than 30°C during harmattan (GSG, 2015). Gombe state is a multi-ethnic state comprising of Fulani, Tangale, Waja, Tera, Bolewa, Tula, Cham, Dadiya and Hausa (GSG, 2015). The location of Gombe state in the centre of major trade routes which made it important commercial hub in the north-east region that linked to other parts of the country by road, air and rail networks.

The people of the state are mostly farmers, cattle-herdsmen, traders and other non-agricultural services (GOSEEDS, 2007). Crops produced and marketed in the study area include; maize, millet, sorghum, cowpea, groundnuts, bambara nuts, rice, vegetables and fruits; as well as livestock and fisheries are also raised. Industrial and other agro-business activities in the study area are in the form of large, medium, small and cottage scales which

include; ginnery, oil seeds milling, rice milling, table water production, leather works, fish and meat processing, etc. (GSG, 2015).

Method of Data Collection

The study relied principally on Primary data which was collected through the administration of structured questionnaires with the household being the unit of analysis. Trained enumerators on the study objectives using the data collection instrument assisted in the exercise. The questionnaire was designed in such a way as to accommodate open and close ended questions. Information on rice farmers' demographics and multidimensional poverty indicators were the data collected.

Sampling Techniques and Sample Size

Multistage sampling was employed for this study. In the first stage, two local governments were purposively selected from the three agricultural zones in the state based on concentration of rice farmers. They were; Nafada and Kwami LGAs from Gombe north, Akko and Yamaltu-Deba LGAs from Gombe central and, Balanga and Kaltungo LGAs from Gombe south.

In stage II, two districts were purposively selected from each local government area based on their prominence in rice farming. These were: Kalshingi and Kumo from Akko L.G.A; Yemaltu and Gwani from Yamaltu Deba L.G.A; Cham and Telesse from Balanga L.G.A; Kamo and Tungo from Kaltungo L.G.A; Malleri and Jurara from Kwami L.G.A; Barwo-wimde and Nafada from Nafada L.G.A. In stage III, one village where rice farming was most practiced was purposively selected from each district. The villages were; Gujuba, Kembo, Dadin-kowa, Shinga, Kulani, Galagun, Ture-okra, Dogon-ruwa, Daba, Malam-bura, Papa and Maruwa. In stage IV, a total of 355 rice farmers were randomly selected proportionate to sample population of the villages.

In determining the sample size appropriate for this study, the Taro-Yamane's model was used such that at least 95% level of confidence was obtained. According to Yamane (1967), the model in its implicit form as was employed by (Saleh, 2023) was expressed as;

$$n_i = \frac{N}{1+N(e)^2} \quad \dots(1)$$

Where;

n_i = sample size (number of rice farmers for the study),

N = Number of registered rice farmers with the Rice Farmers' Association,

e = sampling error (0.05),

1 = unity (constant).

Moreover, the Bowley's proportional allocation technique was used to determine the approximate sample size to be drawn from each of the selected village. The model is expressed and adopted by Adoyi *et al.* (2022) as;

$$nh = n * \frac{Nh}{N} \quad \dots(2)$$

where:

nh = Proportional number of rice farmers sample from each village

n = sample size (number of rice farmers to participate in the study),

Nh = Total number of rice farmers from each village

N = Number of registered rice farmers in the study area.

According to this model, the estimated sample size was 355 rice farmers spanning across the study area.

Method of Data Analysis

Descriptive statistics such as frequency, percentage, mean was used to analyse socioeconomic characteristics of the respondents as well as constraints to rice farming in the study area.

Multidimensional Poverty Index (MPI) Analysis: It was used to assess the multidimensional poverty status of the rice farming household. It was adopted from Alkire and Santos (2010), the MPI comprises two important pieces of information as;

- i. the proportion or incidence of rice farming households who experience multiple deprivations and
- ii. The intensity of their deprivation: the average proportion of (weighted deprivations they experience).
 - a. Basically, the first component is the multidimensional headcount ratio (H) and is expressed as:

$$H = \frac{q}{n} \quad \dots(3)$$

Where q represents the number of rice farming households that were multidimensional poor and n was the total sample size.

The second component captures the intensity (breadth) of poverty (A). It was the average deprivation score of the multidimensionally poor rice farming households and can be written as:

$$A = \frac{\sum_{i=1}^n c_i(k)}{q} \quad \dots(4)$$

Where $C_i(k)$ represented the censored deprivation score of individual i and q was the number of people who were multidimensionally poor.

The MPI was the product of both: $MPI = H \times A$, which was the incidence (H) and the intensity (A) and was given by:

$$MPI = H \times A = H \times \frac{\sum_{i=1}^n c_i(k)}{n} \quad \dots(5)$$

A five-point Likert scale was used to rank the perceptions of rice farmers to some of the constraints to rice production in the study area.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The sex, marital status, education, farm ownership, all season farming, cooperative membership and Anchors Borrower Programme participation of the respondents were highlighted on Table 1. It was revealed that rice production in the study area was a male dominated venture with 91.55% being male and 8.45% were females. This might not be unrelated with the existing sociocultural norms in the area where males were still being viewed as the major breadwinners of the family. This finding agrees with that of Abba *et al.* (2022) were they revealed an 89.4% male population in their study in Gombe state, Nigeria.

The results revealed a married population of 87.04%, where 5.07% were divorced, 4.51% were single and 3.38% were widowed. On the average, those who have been married were about 95.49% while only 4.51% have never been married before. This shows the significance of marriage in the socio-cultural setting of the study area and its possible ties to the economic status of the people. This conforms with the findings of Hassan *et al.* (2023) who in their study on household food insecurity in Gombe metropolis reported that 86.88% of the respondents were married.

Table 1 further revealed that 34.93% had secondary education, 22.25% had primary education, 18.87% passed through a non-formal education system, 17.75% were educated up to tertiary level and 6.20% had adult education. This shows that most of the rice farmers

were literate and can understand basic technology which is capable of improving their farming activities. Cumulatively, 82.25% had undergone a form of formal education. This is in tandem with the result of Hosea and Catherine (2018) who in an analysis of food access in southern Gombe Nigeria, reported that 90.8% were formally educated. Also, education can be an important facilitator towards enhanced food access and thus improved food security.

Results on farm ownership showed that 74.93% owned the farms on which they cultivate rice while 25.07% were rented farms. Diallo and Toah (2019) in a study on determinants of food insecurity among maize farming households in southern Mali found that farm (plot) ownership was a significant variable that influenced food security.

Cooperative membership can serve as support base for the farmers to enhance their productivity and can cushion them in times of shocks. Chinalurum *et al.* (2024) in a study on determinants of livelihood diversification among farming households in Nigeria reported that 90.68% of the respondents were not members of a cooperative association. Equally, Ajao *et al.* (2023) in a study of food insecurity in Ekiti state Nigeria reported that 64.3% of the farming households were not members of any cooperative association. Furthermore, 85.07% did not have access to formal credits while only 14.93% of the respondents had access to credits. This conforms with the findings of Tafida *et al.* (2022) on analysis of livelihood of rural irrigated crop farmers in kano state Nigeria, where they reported that 82.9% of the farmers had no access to formal credits.

Table 1: Socioeconomic characteristics of the respondents

Variable	Frequency	Percentage
Sex		
Male	325	91.55
Female	30	8.45
Total	355	100
Marital status		
Single	17	4.49
Married	308	86.76
Divorced	18	5.07
Widowed	12	3.38
Total	355	100
Education level		
Non-formal education	75	21.13
Adult education	22	6.20
Primary education	90	25.35
Secondary education	111	31.27
Tertiary education	57	16.06
Total	355	100
Farm ownership		
Yes	266	74.93
No	89	25.07
Total	355	100
Cooperative membership		
Yes	147	41.41
No	208	58.59
Total	355	100
Access to credits		
Yes	302	85.07%
No	53	14.93%
Total	355	100

Source: Field survey (2025)

Respondents' age, household size, farm size, farming experience

The age of the respondents, their household size, farm size and farming experience are presented on Table 2. The table shows that mean age of the rice farmers was 43.44 years with a standard deviation of 10.38, a minimum age of 14 years and a maximum age of 72 years. This shows that majority of the respondents were in their active years and can diversify their livelihood in order to ensure food security. This is consistent with the mean age of 40 years reported by Hosea and Catherine (2018) in a food access analysis among farming households in southern Gombe state Nigeria.

Table 2 also reveals a mean household size of 9 persons, a minimum and maximum household size of between 1 to 41 persons respectively with a standard deviation of 5.98. This is in agreement with the finding of Ajao *et al.* (2023) who reported a mean household size of 6 persons. Farming households with this size could leverage on family labor to carry out farm operations. The average farm size under the holding of the rice farmers was 2.14 hectares. The largest farm was 10 hectares while the smallest was half a hectare and the standard deviation was 1.27. This revealed that most of the respondents were small scale farmers and may have to engage in other livelihood activities to cater for their household responsibilities. This finding is consistent with that of Tata *et al.* (2024) who reported an average farm size of 1.62 hectares.

The result on farming experience showed that on the average each respondent had 17.62 years of experience. The highest farming experience was 45 years while the lowest was 1 year and standard deviation was 8.84. It shows that the farmers had a considerable experience in farming. This is similar to the findings of Adekola *et al.* (2023) in an effect of livelihood activities of smallholder crop farmers in Oyo state Nigeria where they found that the mean farming experience was 17.3 years. Also, Adewumi *et al.* (2022) in a similar study on livelihood activities in Niger state Nigeria reported a mean farming experience of 11 years. Farming experience can impact greatly on the productivity of the farmers and can hone their abilities to devise means by which they can broaden their revenue base.

Table 2: Respondents' age, size of household, farm size, farming experience

Variable	Mean	Standard Dev.	Min	Max
Age	43.44	10.38	14	72
Household size	9	5.98	1	41
Farm size	2.14	1.27	0.5	10
Farming experience	17.62	8.84	1	45

Source: Field survey (2025)

Multidimensional poverty incidence, depth and MPI

The multidimensional poverty status of the respondents is presented on Table 3. From the table, the percentage of multidimensionally poor rice farmers in the study area was 47.89% which also doubles as the headcount figure, while 52.11% were multidimensionally non-poor. This shows that the proportion of those who were poor was almost the size of those who were not multidimensionally poor.

Comparison among the three zones showed that Gombe north has the highest incidence of multidimensional poverty with 52.35% of the total state figure coming from the zone. This may be attributed to the socio-cultural disposition of households in the zone that downplays critical importance of schooling and access to basic amenities. Also, despite the ban on tree felling by the state government, firewood and charcoal continue to dominate as unimproved cooking fuel sources mostly by respondents in Gombe north.

Analysis of multidimensional poverty index (MPI) showed that the proportion of poor household (H) was 0.48 while the breadth or intensity of their collective deprivation was 0.18. This means that the poor rice farmers experienced deprivations in about 18% of

the combined weighted indicators at the same time and also represented the average percentage of the rice farmers in acute poverty. In other words, the multidimensional poor respondents on the average were deprived in around 18% of total dimensions. The MPI was therefore 0.1 and it is the product of headcount (H) and intensity (A). since an MPI of 0 signifies the absence of multidimensional poverty and a value of 1 indicates complete multidimensional poverty, this MPI result of 0.1 signifies that the multidimensional poverty level of the respondents was not high. This was in variance with the study of Jerumeh (2024) who reported an MPI of 0.35 and MP incidence of up to 75.9%. A similar work with four dimensions was carried out by the National Bureau for Statistics (NBS, 2022) revealed a country MPI of 0.257, incidence of 62.9% and intensity 40.9%. This reveals a lower from MPI of this study compared to what was reported from the national research by NBS. This may signify either an improvement in the general MP condition of the country over the three years research gap, or that the rice farmers were better off and hence less afflicted with multidimensional poverty.

Table 3: Multidimensional Poverty Status of the Respondents

MP Status Location/Coverage	Multidimensionally Poor		Multidimensionally Non-Poor	
	Frequency	Percentage	Frequency	Percentage
Gombe South	41	24.12	63	34.05
Gombe Central	40	23.53	78	42.16
Gombe North	89	52.35	44	23.78
State Summary	170	47.89	185	52.11
H 0.48 (48%)				
A 0.18 (18%)				
MPI 0.1				

Source: Field survey (2025)

Indicator deprivation proportion of respondents

The deprivation status of households in each of the ten indicators are presented in Table 4. This was analyzed without employing the dual cutoff used in categorizing households into MPI poor and non-poor groups. This was based on the indicators and offers

Table 4 shows that the four highest deprivations were cooking fuel (77.47%), asset ownership (58.31%), housing (53.31%) and school attendance (52.96%). This is similar to the findings of Mare *et al.* (2021) who in a study on multidimensional poverty in Southern Ethiopia reported that the highest deprivations were cooking fuel (97.8%) followed by housing condition (92.6%). The indicator with the lowest deprivation percentage was years of schooling where it revealed that all the households in the study area have at least one person who has completed 5 years of schooling. Alkire and Santos (2011) stipulated target households are extremely deprived in a set of indicators if impact of any one such indicators to whole multidimensional poverty is greater than its weight.

Table 4: Distribution of respondents according to deprivation

Dimension	Indicator	Frequency	Percentage
Health	Nutrition	29	8.17
	Child Mortality	91	25.63
Education	Years of Schooling	0	0.00
	School Attendance	188	52.96
Living Standard	Cooking Fuel	275	77.47
	Sanitation	47	13.24
	Drinking Water	116	32.68
	Electricity	141	39.72
	Housing	189	53.24
	Assets	207	58.31

Source: Field survey (2025)

Severity and vulnerability to multidimensional poverty

Households were categorized into four distinct groups based on their individual weighted MPI values. According to Alkire and Foster (2011) and Alkire *et al.* (2016), those with MPI values $\leq 20\%$ are considered not vulnerable to MP, from 20–33.3% vulnerable, between 33.3% to 49.9% are poor and greater than 50% are considered severely poor in MP.

As seen from Table 5, 30% or 107 households were found to be not vulnerable to multidimensional poverty based on the cut off of $\geq 33.33\%$. Those vulnerable to multidimensional poverty were 78 households representing 22%. Both vulnerable and not vulnerable categories were the non-multidimensional poor households. From the 170 multidimensional poor households, 123 (35%) were poor while 47 (13%) were severely poor. It can be seen that from the four MP categories, majority of the respondents were found in ‘mild’ Poverty representing 35%.

Table 5: Distribution of respondents based on their MP vulnerability and severity

MP Poverty	Frequency	Percentage (%)
Not Vulnerable	107	30
Vulnerable	78	22
Poor	123	35
Severely Poor	47	13
Total	355	100

Source: Field Survey (2025)

Constraints to Rice Production

The respondents were requested to rank the various constraints using a five-point Likert scale of strongly agree, agree, not sure, disagree and strongly disagree. The responses were recorded and presented in Table 6. Inadequate funds ranked first of the five major constraints faced by the rice producers followed by increased cost of production, inadequate government support, poor infrastructure and climate change effects ranking as 2nd, 3rd, 4th and 5th in that order. These findings agree with that of Olajide and Ogundele (2022) who in their work on livelihood and food security in Osun state Nigeria, reported inadequate capital and high labor cost among the major problem confronting farmers. Other constraints indicated but not ranked by 120 respondents were pests and diseases (74.17%), inconsistent/adverse government policies (17.5%), farm insecurity/produce theft (5%), clash with herders (3.33%).

Table 6: Constraints to rice production of the respondents

Constraint	Strongly agree (5)	Agree (4)	Not sure (3)	Disagree (2)	Strongly disagree (1)	Points	Rank
Increased costs of production	245 (69.01%)	100(28.17)	9(2.54)	1(0.28)	0(0%)	1656	2 nd
Inadequate govt support	233(65.63%)	106(29.86%)	14(3.94%)	2(0.56%)	0(0%)	1635	3 rd
Climate change	170(47.89%)	152(42.82%)	28(7.89%)	4(1.13%)	1(0.28%)	1551	5 th
Insufficient funds	298(83.94%)	54(15.21%)	2(0.56%)	1(0.28%)	0(0%)	1714	1 st
Poor infrastructure	215(60.56%)	125(35.21%)	14(3.94%)	1(0.28%)	0(0%)	1619	4 th
Other Constraints	Frequency	Percentage					
Pest and Diseases	89	74.17					
Government Policies	21	17.50					
Farm Insecurity/Theft	6	5.00					
Herders clash	4	3.33					

Source: Field Survey (2025)



CONCLUSION AND RECOMMENDATIONS

Rice farming in the study area was dominated by men who had attained at least primary rice farmers could education and have accumulated a substantial amount of farming experience. Most of the not access formal credits and were not members of cooperative societies. They were basically middle-aged small-scale farmers with large household size. This coupled with other factors were responsible for the food insecurity and multidimensional poverty of almost half of the respondents.

Multidimensional poverty index of the rice farmers was very low due to the fact that both the breadth of poverty was small despite the headcount being significantly large. This result compared to the national average showed that the rice farmers were a little better off than others within the study area that may not be into rice farming.

Recommendation

The following recommendations were offered based on the research findings:

- i. The rice farmers should be encouraged to participate in cooperative as this is capable of ensuring they have adequate resources to enhance and expand their farming operations
- ii. Females are encouraged to participate in rice farming as it has the potential to ensure food security on a subsistence scope, and serves as a means of generating revenue when commercialized.
- iii. Government should intensify efforts in achieving some of the sustainable development goals which include safe drinking water, improved sanitation and education. This would ensure that there is free access to these basic amenities by the year 2030.

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