



ASSESSMENT OF THE LEVEL OF HUMAN CAPITAL DEVELOPMENT AND FOOD SECURITY AMONG MAIZE-BASED FARMING HOUSEHOLDS IN KWARA STATE, NIGERIA

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ABSTRACT

This study assessed the human capital development and food security status of maize-based farming households in Kwara State, Nigeria. A three-stage sampling procedure was used to select 178 maize-based farming households, while primary data were collected using structured questionnaire. Data were analyzed using descriptive statistics, human capital index (HCI) and a food security measure. The results showed that 85.4% of respondents were males, with a mean age of 39 years, indicating that most farming household head were in their productive age. Education attainment was generally low to moderate and household sizes were relatively large. Access to credit and extension services was limited. The human capital index revealed that 50% of households had low human capital, 40.4% had medium and only 9.6% had high human capital. Furthermore, 63.5% of households were food insecure, 16.3% were moderately food secure, while only 20.2% were food secure. The finding concludes that inadequate human capital development and food insecurity remain important challenges among maize-based farming households in the study area. The study recommends the need to strengthen farmers' education, skills, training and health, alongside interventions that improve household access to adequate food, which important for improving household welfare and food security.

Keywords: Human, Capital, Development, Food-security, Maize, Farming.

INTRODUCTION

Agriculture remains the backbone of Nigeria's economy, playing a central role in food security, employment and income generation. In the first quarter of 2025, Nigeria's agricultural sector contributed 23.33% to real GDP (NBS, 2025). This represented a modest 0.07% year on year growth but declined compared to 2.54% recorded in the previous quarter. Historically, agriculture has contributed over 23% to Nigeria's GDP, emphasizing its continued importance in economic development (World Bank, 2021). Agriculture remains the largest employer of labour in Nigeria, accounting for about 30.1% of total employment in 2023, while agriculture, forestry and fishing accounted for 68.7% of employment among the rural workforce (NBS, 2024). Within this structure, smallholder farmers, typically cultivating less than two hectares of land dominate the sector and produce approximately 80-90% of the country's food supply including staple crops such as cassava, rice and maize (Trade.gov, 2025).

Food security remains a major development concern in Nigeria. The Food and Agriculture Organization and its partner organizations define food security in terms of physical and economic access to sufficient, safe and nutritious food that meets people's dietary needs and food preferences for an active and healthy life (FAO, 2024). Food insecurity occurs when households lack reliable access to adequate food or are unable to obtain the quality and quantity of food required for healthy living. In Nigeria, food insecurity is particularly pronounced among rural households whose livelihoods depend heavily on agriculture and are affected by low productivity, limited income and inadequate access to productive resources. Evidence from Nigeria farming households has shown that socioeconomic and agricultural factors are important determinants of household food security outcomes (Otekunrin *et al.*, 2021).

Maize is one of Nigeria's major staple crops and is widely cultivated by smallholder farmers. It serves as both a source of food and income and therefore has important implications for household welfare. However, the ability of maize-based farming households to achieve sustainable food security



is influenced not only by the availability of land and other physical resources but also by farmers' knowledge, experience, health and productive capacities. Constraints in these areas may limit farmers' ability to adopt improved production practices, access agricultural information and efficiently manage farm resources.

Human capital refers broadly to the knowledge, skills, education, health and capabilities embodied in individuals that enhance their productivity and welfare. Investment in human capital can improve individuals' capacity to participate productively in economic activities and respond to changing economic and technological conditions (World Bank, 2024). In agriculture, human capital is particularly relevant because farmers require appropriate knowledge and skills to interpret information, adopt improved technologies, manage farm resources and respond to production challenges. Education and access to agricultural information have, for example, been associated with improved food security outcomes among smallholder farming households in Nigeria (Otekunrin *et al.*, 2021).

The importance of human capital is particularly relevant to maize-based farming households in Kwara State, where agriculture constitutes an important livelihood activity. Farmers' educational attainment, experience, training and health may influence their productive capacity and ability to secure adequate food for their households. Nevertheless, human capital status of maize-based farming households and its coexistence with household food insecurity require greater empirical attention at the local level.

Existing studies in Nigeria have largely examined food insecurity from the perspectives of agricultural productivity, socioeconomic characteristics, income and access to productive resources. Although these factors are important, examining the level of human capital among farming households alongside their food security status provides additional insight into capacity of rural households to improve their livelihoods. This is particularly relevant because human capital represents capabilities that can influence how effectively farmers use available physical, financial and institutional resources. Therefore, this study assessed the human capital development and food security status of maize-based farming households in Kwara State, Nigeria. Specifically, the study sought to

- i. describe the socioeconomic characteristics of maize-based farming households;
- ii. determine the human capital index of maize-based farming households; and;
- iii. determine the food security status of maize-based farming households.

METHODOLOGY

Study Area

The study was conducted in Kwara State, Nigeria. Kwara State is located in the North-Central geopolitical zone of Nigeria. Geographically, Kwara State lies between latitudes 7°45'N and 9°30'N and longitudes 2°30'E and 6°25'E. The state share boundaries with Niger State to the north, Kogi State to the east, Ekiti and Osun States to the South, Oyo State to the southwest and the Republic of Benin to the west. The state covers a land area of approximately 36,825 square kilometers. Maize is among the crops cultivated by farming households in the state. The agricultural activities of rural households provide an important source of food and income, making the area suitable for examining the relationship between human capital development and household food security.

Sampling Size and Procedure

The primary data used for the study were collected through administration structured questionnaire tailored towards realizing the objectives of the study. A three-stage sampling technique was adopted in selecting 178 respondents. The first stage was purposive selection of three Local Government Areas (LGAs) in Kwara State. The choice of these Local Government Areas are based on the fact that they have more maize-based farming households than other LGAs in the state as indicated in the sampling frame collected from Ministry of Agriculture (2025). The second stage was random selection of three farming villages from each Local Government Area of Kwara State using a list obtained from the Ministry of Agriculture and the third stage was random selection of 20 maize-based farming households from each selected villages making one hundred and seventy eight (178) respondents. The descriptive statistics, human capital index and food security index were used to analyze the data collected.



Analytical Techniques

Descriptive statistics

Descriptive statistics summarize, organize and describe data measures of central tendency (mean, median, mode), dispersion (standard deviation, range, interquartile range), table (frequency, contingency) and charts (bar, pie, histogram, box plot, violin plot, rainbow plot) were used to describe the socio-economic characteristics of the respondents.

Human Capital Index (HDI)

The HCI is based on four indicators: education, training, experience and health. Individual indices can be computed for any component of the human capital development according to the general formula for normalization:

$$HCI = \frac{\text{Actual value} - \text{Minimum value}}{\text{Maximum value} - \text{Minimum value}}$$

Human Capital Index Indicators

Based on the study to compute the human capital index of individual maize-based farming households in Kwara State. Computation is based on four indicators. These include the following:

- Education (years)
- Farmer's experience (years)
- Health status (ordinal, 1-5)
- Training (days)

Table 1: Classification of Households Based on Human Capital Index

Range	Category
0.00-0.33	Low human capital
0.34-0.66	Medium human capital
0.67-1.00	High human capital

Source: Field survey, 2026

Household Dietary Diversity Score (Food Security Index)

This is a widely used, simple and effective tool for measuring food access and nutritional quality. It measures the number of different food groups consumed by a household over the previous 24 hours. It is based on the assumption that higher dietary diversity indicates better household food access and nutritional adequacy.

$$\text{HDDS Score} = \sum_{i=1}^{12} x_i$$

Where

- Cereal (maize, rice, wheat, pasta)
- Roots and tubers (yam, cassava, potatoes)
- Vegetables (leafy greens, tomatoes, carrots)
- Fruits (mango, orange, banana, apple)
- Meat (beef, goat, chick)
- Eggs (eggs of any kind)
- Fish and seafood (fresh or dried fish, crayfish)
- Legumes, nuts, seeds (beans, peas groundnut)
- Milk and dairy (milk, yoghurt, cheese)
- Oils and fats (palm oil, vegetable oil, butter)
- Sugar and sweets (sugar, honey)
- Condiments and beverages (magi, salt, tea)

For each "Yes" answer, assign 1 point and for each "No" answer assign 0 points



Table 2: Classification Based on Household Dietary Diversity Score (HDDS)

Household Dietary Diversity Score (HDDS)	Category	Food Security Status
0-3	Low dietary diversity	Food insecure
4-5	Medium dietary diversity	Moderately food secure
6-12	High dietary diversity	Food secure

Source: Field survey, 2026

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Maize-Based Farming Households

The result of socioeconomics distribution of the respondents was presented in Table 3. The result revealed that majority (85.4%) of the farmers were male while 14.6% were females. This implies that more men engage in farming activities than women in the study area. This may be due to cultural norms, land ownership patterns and the labor intensive nature of maize production, which often favors male participation. The low involvement of women could have implications for inclusive human capital development and household food security, as women play critical roles in food production and nutrition. The finding is consistent with Olatinwo *et al.* (2024), who reported that maize-based farmers in Kwara State were predominantly male.

The age of the farmers ranges from 19-72 years. The mean age of the farmer was 39 years. Almost half (46.6%) of the farmers were not older than 40 years, 29.2% fell within 41-50 years, 16.9% were between 51-60 years and only 7.3% are above 60 years. This inferred that most of the farmers were still in their productive age. The dominance of younger farmers implies a potentially higher capacity to adopt innovations, improved farming techniques and human capital development initiatives which can positively influence food security.

The findings also showed that 59% of respondents were married, 27%, 6.7%, 5.6% and 1.7% were single, divorced, separated and widowed, respectively. This is in line with the study by Olatinwo *et al.* (2022), reported that 87.8% of maize-based farmers in Kwara State were married. The high proportion married respondents suggests that most farmers have family responsibilities, which may influence their production decisions and food security strategies. Married households often have access to family labor, which can enhance farm productivity but may also increase household consumption pressure.

The educational distribution indicates that 65.7% of respondents had between 1-5 years of schooling, while 28.7% and 5.6% had 6-10, 11-15 years respectively. This confirms that most farmers have low to moderate levels of formal education. Limited years of schooling may constrain access to advanced agricultural knowledge and technologies, thereby affecting productivity and food security. The results indicated that 48.3% of respondents had household sizes of 6-10 members, while 25.8%, 17.4% and 8.5% had 1-5, 11-15 and more than 15 members, respectively. This shows that large household sizes are common in the study area. Larger households may provide more labor for farming activities which can enhance production. However, they may also increase the dependency ratio and food consumption needs, potentially exerting pressure on household food security.

The results further showed that 49.4% cultivate between 1-5ha, 34.8%, 14.1% and 1.7% operate on 6-10ha, 11-15 and 16-20ha respectively. This indicates that the majority of maize-based farming households in the study area operate on small to medium-scale farms. The finding is consistent with previous research by Ahmadu *et al.* (2021) reported a mean maize farm size of 2.14ha among maize farming households in Lagos State. Farm size is important to household food security because larger cultivated areas may provide opportunities for increased production and marketable surplus.

The results revealed that 42.1% of the respondents had no contact with extension agents, while 38.2% had between 1-3 contacts and only 19.7% had 4-6 contacts. This indicates that a substantial proportion of maize-based farming households in the study area have limited or no access to agricultural extension services. The finding is consistent with evidence from Kwara State, where Olatinwo *et al.* (2024) reported that maize-based farmers had varying levels of access to public extension services and that access to extension services and years of schooling were important in explaining farmers' perceptions of extension effectiveness.



The results showed that 51.7% of the respondents own their farmland, 21.3% operate on rented land, 12.9% use family land while 14.1% acquire land through other means. This indicates that land ownership is the predominant form of land access among maize-based farming households in the study area.

The results indicated that only 26.4% of the respondents had access to credit, while a large majority (73.6%) did not have access to any form of credit. This suggests that most maize-based farming households in the study area face significant financial constraints. Limited access to credit can adversely affect farmers' ability to purchase essential farm inputs such as improved seeds, fertilizers and agrochemicals. It may also restrict their capacity to adopt modern agricultural technologies and expand their scale of production. Consequently, this can lead to low productivity and negatively impact household food security.

The results showed that 14.6% of respondents reported excellent health, 33.7% reported good health, 35.4% reported average health and 16.3% reported fair health. This indicates that the majority of maize-based farming household heads perceive their health status as average to good.

The results revealed that only 28.7% of the respondents reported having access to safe, sufficient and nutritious meals while a large majority 71.3% indicated that they do not have such access. This suggests that most maize-based farming households in the study area are food insecure.



Table 3: Socioeconomic Characteristics of the Respondents

Characteristics	Category	Frequency	Percentage
Gender	Male	152	85.4
	Female	26	14.6
Age(years) (mean age 39 years)	≤40	83	46.6
	41-50	52	29.2
	51-60	30	16.9
	61 and above	13	7.3
	1-5	117	65.7
Years of schooling (Mean=4)	6-10	51	28.7
	11-15	10	5.6
Household size (mean= 8)	1-5	46	25.8
	6-10	86	48.3
	11-15	31	17.4
	>15	15	8.5
Farm size (Hectares) (Mean = 7.5ha)	1-5ha	88	49.4
	6-10ha	62	34.8
	11-15ha	25	14.1
	15-20ha	3	1.7
Number of extension contact (Mean =2)	0	75	42.1
	1-3	68	38.2
	4-6	35	19.7
Land ownership	Owned	92	51.7
	Rent	38	21.3
	Family Land	23	12.9
	Other	25	14.1
Access to credit	Yes	47	26.4
	No	131	73.6
Annual household farming income (Mean = 270,000)	< 200,00	17	39.9
	200,000-400,000	71	9.6
	401,000-600,000	54	30.3
	> 600,000	36	20.2
Health status	Fair	29	16.3
	Average	63	35.4
	Good	60	33.7
	Excellent	26	14.6
Access to safe, sufficient and nutritious meal	Yes	51	28.7
	No	127	71.3

Source: Field
Survey,2026

Measurement of Human Capital Index of Respondents

Table 4 revealed that, 50% of the maize-based farming households had a low human capital index, 40.4% had a medium index, while only 9.6% had a high human capital index. This distribution has important implications for food security in the study area. The predominance of households (50%) with low human capital suggests that many farmers may lack the necessary knowledge, training,



experience and health required to adopt improved maize production practices such as the use of improved seed varieties, proper fertilizer application, pest control and modern techniques.

As a result, these households are more likely to experience low agricultural productivity which directly affects food availability at the household level. In addition, limited human capital can reduce farmers' ability to efficiently manage resources, respond to climate variability and access extension services or market opportunities, thereby increasing their vulnerability to food insecurity.

The 40.4% of households with medium human capital may have moderate capacity to adopt innovations and improve productivity, however, their potential may still be constrained by gaps in knowledge or access to information. Only the 9.6% with high human capital are likely to possess the competencies required to optimize production and maintain more stable food supplies, making them less vulnerable to food insecurity. This is in line with the study by Ajijola *et al.* (2022), reported substantial deficits in education attainment among rural farming households in Nigeria and emphasized education as an important component of human capital for exploiting economic opportunities.

Table 4: Human Capital Index

HCI Range	Frequency	Percentage (%)	Ranking
0.00-0.33	89	50	Low
0.34-0.66	72	40.4	Medium
0.67-1.00	17	9.6	High

Source: Field survey, 2026

Food Security Status of the Respondents

Table 5 showed that, 63.5% of the maize-based farming households are food insecure, 16.3% are moderately food secure, and only 20.2% are food secure. When considered alongside the human capital index result where 50% of households had low human capital, 40.4% medium and only 9.6% high a clear relationship emerges between human capital development and food security in the study area. The high proportion of households with low human capital corresponds with the high percentage of food insecure households (63.5%). This suggests that limited education, training, experience and health may be restricting farmers' ability to improve productivity and income. As a result, such households are more likely to rely on less diverse diets, leading to low dietary diversity and food insecurity. Human capital influences food security through several pathways. Farmers with low human capital may struggle to adopt improved agricultural technologies, make efficient use of inputs or respond effectively to challenges such as climate variability and pest infestations. This leads to reduced maize output and lower household income, which in turn limits access to a variety of nutritious foods. The 40.4% of households with medium human capital aligns with the 16.3% that are moderately food secure, suggesting that some level of knowledge and skills can improve food access but may not be sufficient to guarantee stable food security.

The small proportion of household with high human capital (9.6%) helps explain why only 20.2% of households are food secure. These households are more likely to adopt improved practices, diversify their production and income sources and access better market opportunities thereby enhancing their dietary diversity and overall food security. This is in line with the study by Otekunrin *et al* 2021 which reveals a high prevalence of food insecurity, with only 12.8% of households classified as food secure. The authors further identified education, farm size, farming experience and access to extension services among the factors associated with household food insecurity.

Table 5: Measurement of Food Security Index

Household Dietary Diversity Score (HDDS)	Frequency	Percentage (%)	Category	Food Security Status
0-3	113	63.5	Low dietary diversity	Food insecure
4-5	29	16.3	Medium dietary diversity	Moderately food secure
6-12	36	20.2	High dietary diversity	Food secure

Source: Field survey, 2026



CONCLUSION AND RECOMMENDATION

The study found that human capital development among maize-based farming households was generally low, with 50.0% of households classified as having low human capital. Food insecurity was also widespread affecting 63.5% of the households. The findings demonstrate the need to strengthen the human capital capacity of rural farming households while simultaneously implementing measures that improve food access and agricultural productivity.

The study recommends the following; strengthening farmer education and adult learning programmes, expanding practical agricultural training, improving access to effective agricultural extension, improving rural health services, strengthening access to productive financial resources and implementing targeted food security interventions for vulnerable farming households.

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