(RESEARCH ARTICLE)

Analysis of consumption expenditure on animal protein among farming households in Osun state, Nigeria

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Abstract

This study investigated the consumption expenditure on animal protein in Osun State, Nigeria with a view of describing the Socio-economic characteristics of farming households consuming the selected animal protein foods studied. A probability sampling method was employed to randomly pick a sample size comprising 120.0 responders within the designated study area. The data revealed that a majority of household heads were male, with limited formal education, and primarily engaged in agricultural occupations.

Data gathered from the participants was subjected to descriptive analysis techniques, including frequency distribution, percentage calculations, and the budget share index. The findings from this analysis revealed a significant influence of socio-economic factors, including gender, marital status, and educational level, on the demand for animal protein foods within the studied households. The mean price for the animal protein products is as follows: Beef N3,540, Goat meat N3,877.5, Sheep meat N2,922.5, Egg N1,756.2, Fish N4,219.1 and Chicken N4,417.5 respectively. Percentage share in the following animal protein is as follows: beef (7.11%), Goat meat (18.69%), Sheep meat (14.09%), Egg (8.47%), Fish (20.34%) and Chicken (21.30%) respectively.

The study recommends that rural households be encouraged to diversify their income sources and informal Education should be provided on the outcome of inadequate protein in their diet. It helps to prevent malnutrition in the study area and the nation at large.

Keywords: Consumption Expenditure; Animal Protein; Budget Sharing; Osun state

1. Introduction

Nigeria's population is growing exponentially, leading to a corresponding rise in the food demand. Several projections are indicating that the Nigerian population will surpass 400 million by 2050 [1]. Studies published in 2020 forecast a substantial increase in livestock product consumption by 2050, with potential growth exceeding 180% for milk and 90% for eggs [2]. Meat consumption is also anticipated to rise considerably. This scenario presents potential challenges for the country's food security. Recent data reveals an upward trend in the prevalence of severe food insecurity among the Nigerian population. Between 2017 and 2019 pre-pandemic, an estimated 9% of the population experienced entire

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days without food due to resource limitations while at the height of the pandemic, there was an increase of 58% of Nigerian households who experienced acute food insecurity [3].

Nigeria faces a constantly growing challenge in balancing food production with escalating population growth demands. While the population increases at an accelerating rate, food production growth is decelerating and falling short of population growth and overall food demand. This leaves a gap by relying heavily on the importation of food to compensate and complement domestic production deficiencies, a trend the government is seeking to reverse.

Protein constitutes roughly about 20% of the human body. Due to the body's inability to store protein, daily dietary intake is crucial for cell growth and development. Different sources, including plant and animal products, can provide protein. Proteins obtained from animals are considered "complete" as they include all necessary amino acids needed for optimal bodily function. While plant-based protein sources like beans, lentils, and nuts are deemed "incomplete" due to the absence of one or more essential amino acids.

[4] estimated the minimum daily protein requirement for Nigerian adults to range from 65g to 85g per person, with at least 35g derived from animal sources. Nigeria's annual poultry value chain demand surpasses N500 billion. This translates to a yearly requirement exceeding 165,000,000 birds, 650,000 metrics tons of eggs, and 290,000 metrics of meat. However, domestic production fulfills only 30% of this demand, with the remaining 70% gap is being filled by direct import of the products.

Despite having abundant natural and human resources, Nigeria remains one of Africa's lowest protein consumers. Research by [5] indicates that Nigeria's average protein intake is around 53.8 grams, with only 6.0 - 8.44 grams /capita daily requirement originating from fish and animal sources. This dietary intake falls below the recommended daily protein allowance of 0.7 grams per kilogram of body weight [6]. Furthermore, the FAO recommends a minimum daily intake of 35g of protein from animal sources. It is not surprising, therefore, that Nigeria faces a significant animal protein deficiency, with a per capita intake of 9.3g daily requirement compared to the FAO's recommended minimum of 35g/day for optimal bodily growth and development [7].

As stated earlier, dietary protein intake in Nigeria falls short of the Food and Agriculture Organization (FAO) suggested intake (53.8g) and global intake of (64g). This deficiency is linked to protein deficiency diseases such as stunting growth, reduced metabolism. Socioeconomic factors significantly influence household nutritional status, including food and non-food item prices, income levels, and allocation within households. [8] emphasizes the influence of family income, composition, education, and cultural preferences on consumption patterns.

The study aims to give description on the socioeconomic characteristics of rural dwellers in the designated area, analyze protein consumption patterns within these households, and determine household expenditure levels on major animal protein sources.

Animal protein is crucial for human survival and growth, playing a vital role in tissue development, repair, and disease prevention. Protein malnutrition is a significant public health concern due to limited access to animal protein sources. This deficiency, prevalent in many developing countries including Nigeria, contributes to food insecurity and hinders healthy living [9].

The Nigerian government implemented measures to curb and reduce malnutrition with the introduction of agricultural programs like Operation Feed the Nation (1976), Green Revolution (1979), Family Support Programme (1994), and Structural Adjustment Programme (1994). These initiatives aimed at stimulating small-scale farmers through subsidized inputs and improved pricing policies [9]. However, protein intake remains inadequate for a substantial portion of the population. Despite these efforts, protein intake remains below recommended levels. The research carried out by [9] seeks to identify the expenditure-related variables responsible for inadequate animal protein consumption in rural Nigerian households. The research also identified the factors contributing to this disparity by analyzing household expenditure patterns about animal protein consumption [10].

[11] analyzed the consumption of animal protein and food security among rural households in Kwara State. The analysis utilized descriptive statistics, a food security index, t-test, and Tobit regression model. The study revealed that 36.67% of the households were food secure, with an average daily per capita calorie and protein availability of 2696.42 kcal and 73.92g, respectively. A significant difference was observed in the t-value of plant protein (41.288) and animal protein (27.190) consumption among responders. The study recommends encouraging rural households to diversify income sources and adopt modern family planning techniques to reduce household size.

[12] study addresses the data gap on nutrient and dietary by analyzing factors influencing household mean nutrient adequacy and Household Dietary Diversity Score (HDDS), with an emphasis on components of food systems in Nigeria. Utilizing data from the 2015/16 Nigeria General Household Survey, it was found that fruits and animal-source foods were the least consumed food groups. Despite this, these groups were significant determinants of HDDS and were closely linked to the mean probability of nutrient adequacy, controlling for covariates.

[13] evaluated protein intake adequacy and identified factors influencing protein intake among rural farm households in Sudan. The actual protein intake levels were assessed using food composition tables for Sudan and Africa, while the required protein intake levels were evaluated for all household members using the Recommended Dietary Allowances (RDA) and Adequate Intakes (AIs) from the Food and Nutrition Board (FNB). The determinant factors of adequate protein intake were analyzed using a binary logistic model. Results indicate that 34% of the farm households have inadequate protein intake levels. The logistic model revealed that an increase in total household income is likely to improve protein intake adequacy, whereas household size and the age of the household head negatively impact protein intake adequacy at a statistically significant level.

The study will contribute to existing empirical information on animal protein demand for the use of stakeholders in the livestock industries towards ensuring an adequate supply of animal protein sources to reduce protein malnutrition in the country at large.

2. Material and method

2.1. Study Area

This research was carried out within the State of Osun, Nigeria. Established in 1991, the State of Osun is situated in the southwestern region Nigeria. It borders Kwara to the north, Ogun to the south, Oyo to the west, and Ondo State to the east. Administratively, Osun State is comprised of thirty local government areas (LGAs) further sub-divided into three Agricultural Development Programmes (ADPs) regions [14]

2.2. Sampling Techniques and Procedures

Osun State was divided into three (3) agricultural zones. The zones are as follows:

- Region A: (Iwo and Ikere)
- Region B: (Osogbo and Ikirun)
- Region C: Ife-Ijesa (Ilesa and Ife)

This study utilizes a three-stage simple random (probability) sampling technique in selecting participants. Stage one: one local government area (LGA) was randomly chosen from each pre-defined zone to ensure regional representation. Stage two involved randomly selecting two villages within each chosen LGA. Finally, in stage three, twenty households were chosen at random from each village. This resulted in a total sample size of 120 households. The sample demographics revealed that 56.7% of responders were male, while 43.3% were female.

This study employed a three-stage random sampling technique to ensure representative of the selected ADP zones was captured. In the first stage, one Local Government Area (LGA) was randomly selected from each of the designated zones within Osun State, Nigeria. The second stage involved randomly selecting two villages from each chosen LGA. Finally, in the third stage, twenty households were randomly selected from each of the selected villages. This resulted in a final sample size of 120 households.

Analysis of the sample demographics revealed a gender distribution of 56.7% male and 43.3% female responders. This indicates that male responders bear the responsibility for the family more than female responders.

2.3. Methods of Data Collection

The data for this study was gathered through a primary source, utilizing a questionnaire alongside an interview schedule. This approach ensured consistency in data collection while allowing for in-depth analysis of participant responses. The service of an extension agent was used and enumerators were trained in the questionnaire distribution and data collection process.

2.4. Analytical Technique

Data were analyzed by using descriptive statistics to identify socioeconomic characteristics and protein consumption of the selected household. Budget share index is used to determine the level of household expenditure, LA-AIDS is used to determine the own price and expenditure elasticity, Multiple regression and Chi-square is used to determine the factors influencing household consumption

3. Result

3.1. Socio-economic characteristics of farming households

3.1.1. Distribution by Gender

Figure 1 presents the distribution of responders using their gender in the study area. It reveals that 56.7% of the responders were male, and 43.3 % were female responders. This shows that male responders bear the responsibility for the family more than female responders.
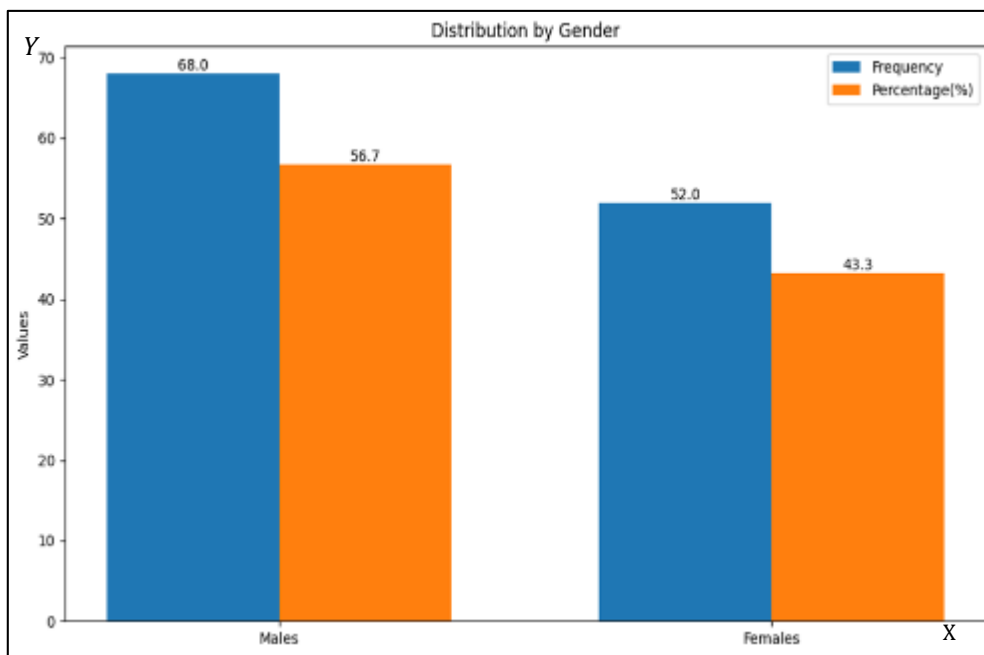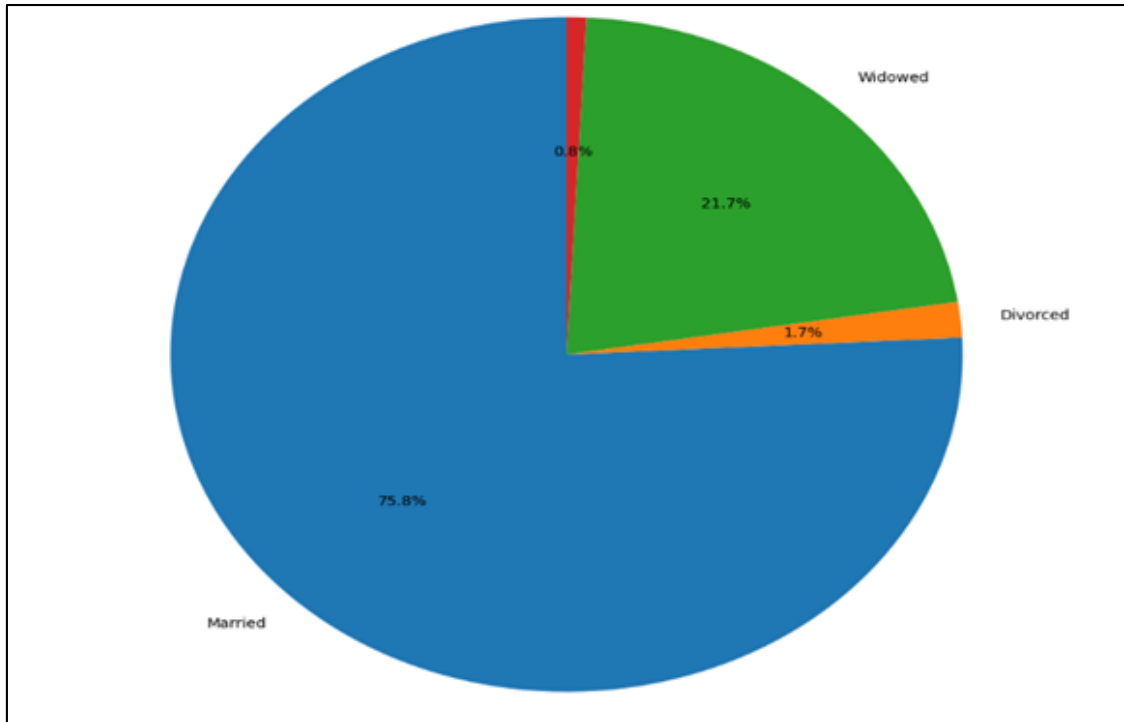

Based on Field Research, 2021

Figure 1 Distribution by Gender

3.1.2. Distribution by Marital Status

The study results showed that most of the responders are married with 75.8% while about 24.2% as shown in the figure below. This indicates that most of the responders were married (75.8%). Since most of the farming households are married, consumption of animal protein food sources will be taken more seriously as more responsibilities is on them.
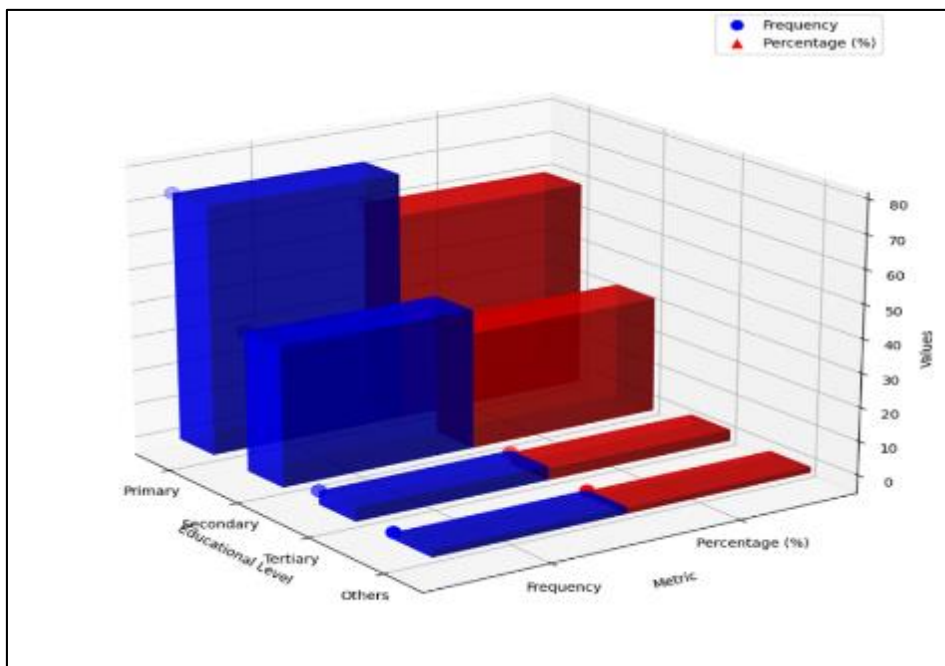
Source: Field Research, 2021

Figure 2 Distribution of Marital status

3.1.3. Distribution by Educational Level

The study results showed that 60.80% of the responders have primary education, 34.2% of the responders have secondary education, 3.30% of the responders have tertiary education while the rest (1.7%) did not specify their educational level as shown in figure 3 This implies that most of the responders have adequate knowledge about animal protein food sources.
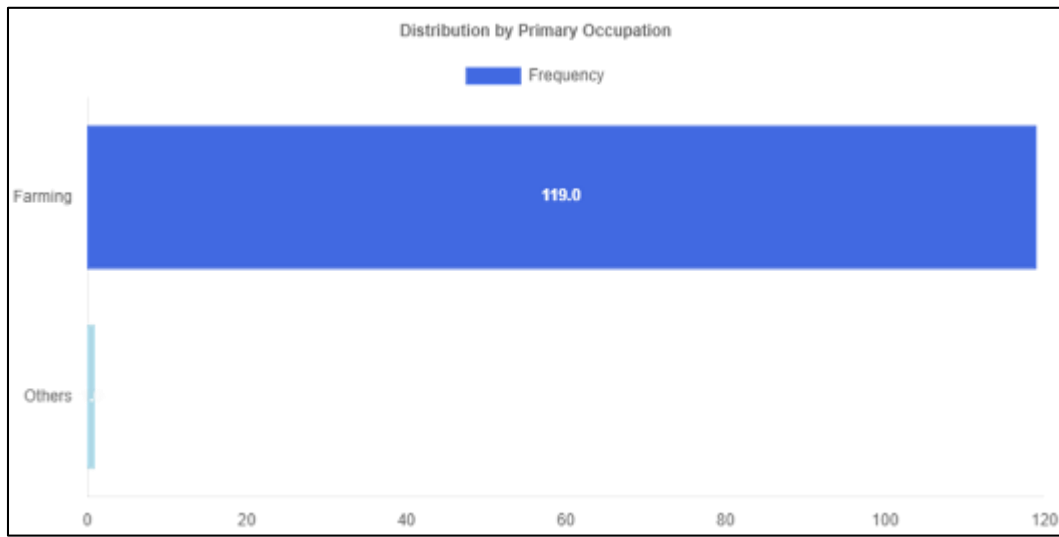

Based on Field Research, 2021

Figure 3 SD Visualization of Educational Levels, Frequencies and Percentage

3.1.4. Distribution by Primary Occupation

The study results show that 99.2% of the responders were engaged in farming as their primary occupation while others, 0.8% did not specify their primary occupation as displayed in figure 4 below.
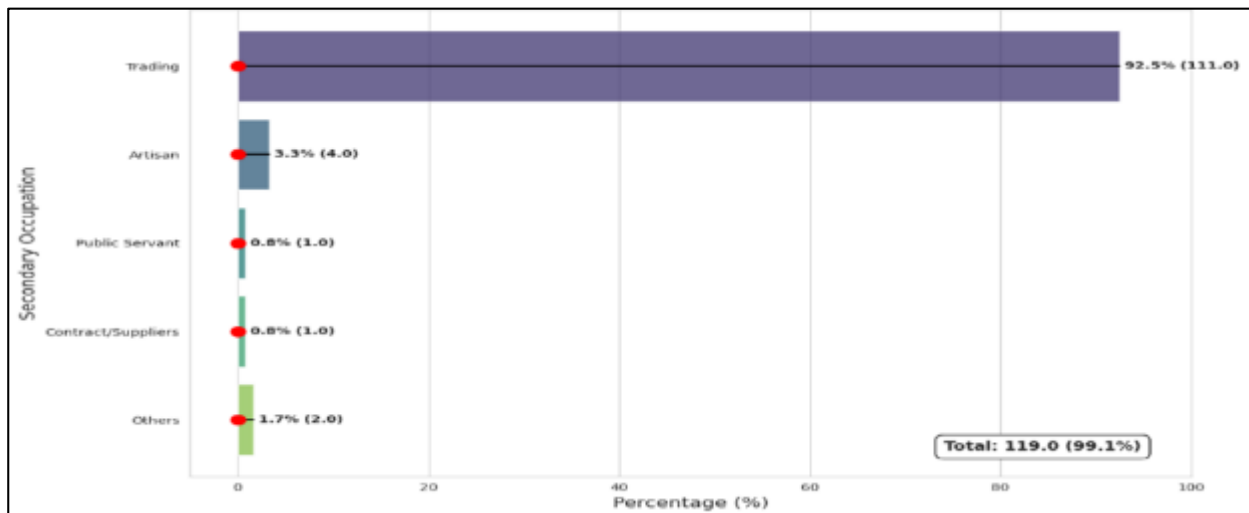

Based on Field Research, 2021

Figure 4 Distribution by Primary Occupation

3.1.5. Distribution by Secondary Occupation

The study results show that 92.5% of the responders were involved in trading as their secondary occupation apart from farming while others, 6.6% were involved in other occupations as shown in the figure below.
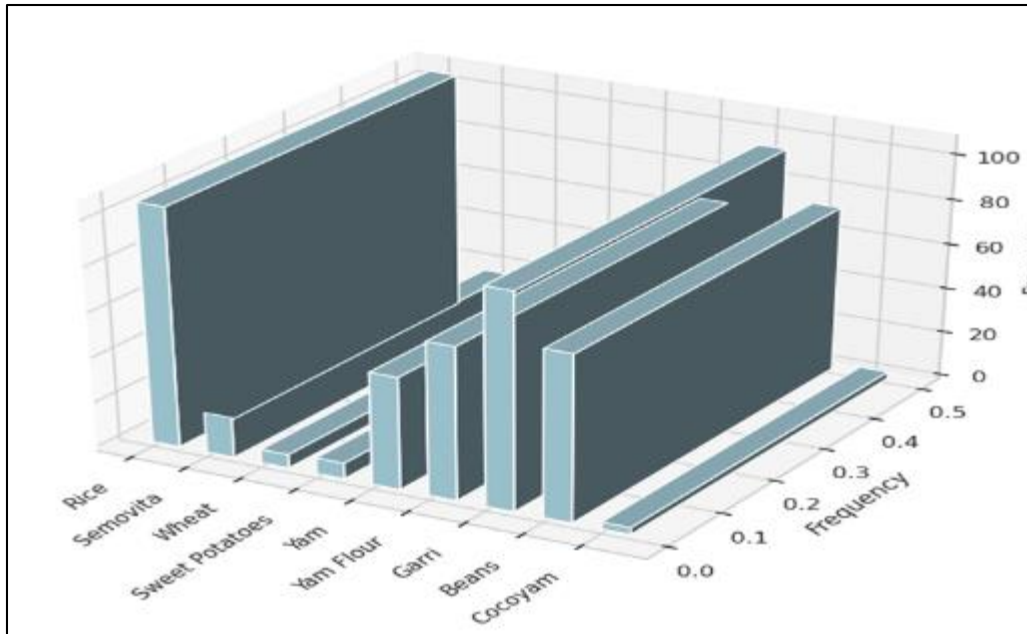

Source: Field Research, 2021

Figure 5 Distribution by Secondary Occupation

3.2. Protein consumption profile of farming households

3.2.1. Distribution by the types of foodstuffs consumed by Farming Households

This study results show that 88.3 percent of the responders consume Rice frequently followed by Garri (80 percent) and Beans (79.1 percent) while other foodstuffs can be consumed occasionally as shown in the figure below.

Source: Field Research, 2021

Figure 6 Distribution by the types of foodstuffs consumed by Farming Households

The chart illustrates the frequency of consumption for various foodstuffs among farming households:

- Rice: The tallest bar, indicating it's the most frequently consumed foodstuff.
- Garri: The second-highest bar, suggesting it's also a staple food.
- Beans: The third most consumed food item.
- Yam Flour: Fourth in consumption frequency.
- Yam: Fifth most consumed.
- Semovita: Sixth in consumption frequency.

Wheat, Sweet Potatoes, and Cocoyam: These have the shortest bars, indicating they are consumed less frequently.

This distribution replicates the typical Nigerian diet, with a heavy dependence on carbohydrate-rich foods like rice, garri (cassava flour), and yam. The high consumption of beans suggests a good source of plant-based protein in the diet. The lower consumption of wheat might indicate that it's less readily available or more expensive compared to local staples.

3.2.2. Distribution by the expenditure spend on food monthly.

The study results show the distribution of responders based on the amount they spend on food monthly and the category they fall into.
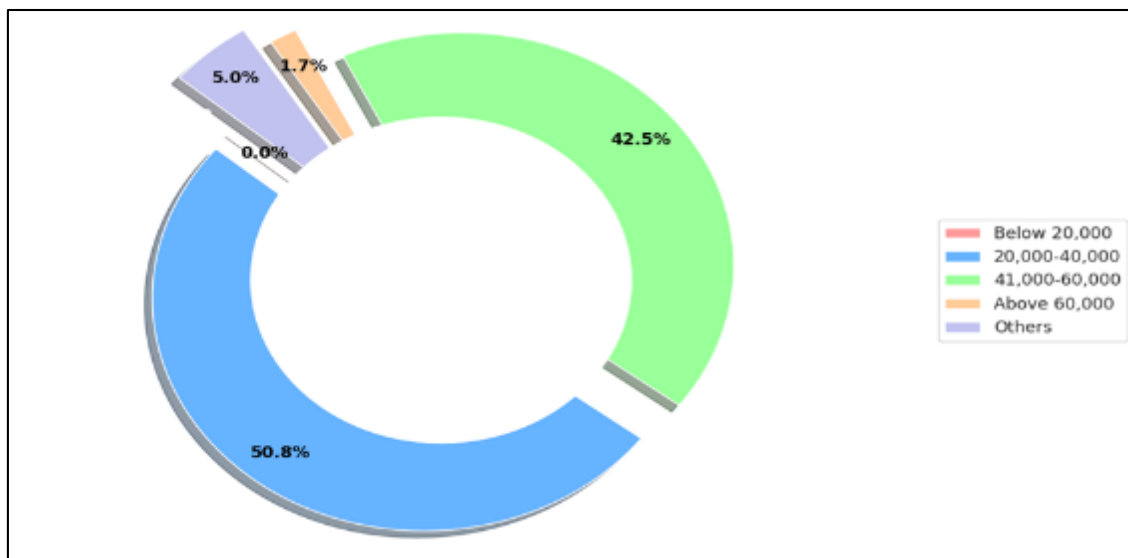
Figure 7 Distribution of responders by the Expenditure Spent on Food Stuffs Monthly

This pie chart illustrates the distribution of responders based on their monthly foodstuff expenditure.

20,000-40,000 (50.8%): The largest segment of the chart, representing just over half of the respondents. This indicates that most households in the study spend between 20,000 and 40,000 (seemingly in Nigerian Naira) on foodstuffs monthly. This could be considered a middle range of food expenditure for the area studied.

41,000-60,000 (42.5%): The second-largest group, comprising nearly as many responders as the first group. This shows that a significant portion of households have a higher food budget, spending between 41,000 and 60,000 monthly on foodstuffs.

Others (5.0%): This category might include responders whose spending patterns don't fit into the other defined categories or those who didn't provide clear information.

Above 60,000 (1.7%): A small percentage of responders spend more than 60,000 monthly on foodstuffs. This could represent higher-income households or those with larger family sizes.

Below 20,000 (0%): Interestingly, no responders spend less than 20,000 monthly on foodstuffs. This could recommend a minimum threshold for food expenditure in the studied area, or it might imply that the survey didn't capture very low-income households.

Key observations

The vast majority (93.3%) of responders fall into two main categories: 20,000-40,000 and 41,000-60,000.

There's a relatively even split between these two main categories, suggesting a diverse range of household incomes or food consumption patterns.

Very high food expenditure (above 60,000) is rare among the responders.

The absence of responders spending below 20,000 could indicate a cost-of-living threshold in the area or a limitation in the survey's reach to very low-income groups.

This distribution provides insights into the economic status and food spending habits of the surveyed population, which could be valuable for understanding food security, nutrition, and economic conditions in the studied area.

3.3. Expenditure level on major animal protein

3.3.1. Budget Share of Monthly Household Expenditure on Beef, Goat meat, Sheep meat, Egg, Fish and Chicken.

The budget share on the animal protein presented in figure 8 indicates that Budget Share on Beef, Goat meat, Sheep meat, Egg, Fish and Chicken were 17.11%, 18.69%, 14.09%, 8.47%, 20.34% and 21.30% respectively. This indicated that Chicken constituted a large proportion of household expenditure followed by Fish among the animal protein food included in the system.
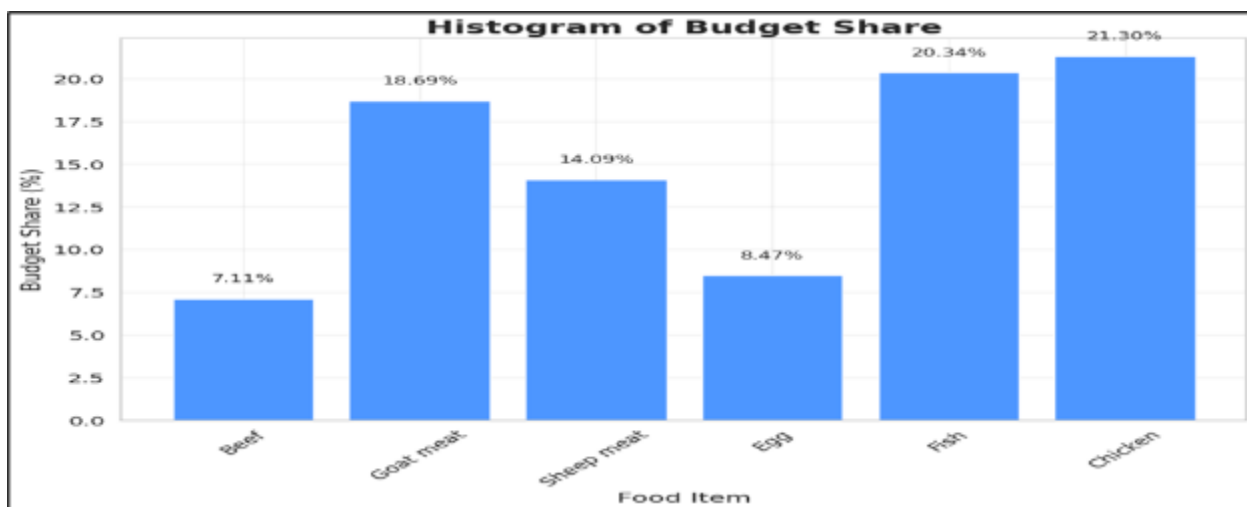
Source: Field Research, 2021

Figure 8 Histogram of Budget Share

4. Conclusions and recommendations

This study revealed that socio-economic factors such as gender, marital status, educational level, have influence on animal protein foods demanded by the households. Constraint faced by households in demanding these animal proteins includes high prices, low level of income, rapid spoilage and low supply.

The study analyzed the consumption expenditure on animal protein among farming households in Osun State, Nigeria. The key findings include:

- Socio-economic factors such as gender, marital status, and educational level significantly influence the demand for animal protein foods among households.
- Chicken constitutes the largest proportion of household expenditure on animal protein (21.30%), followed closely by fish (20.34%).
- The main constraints faced by households in consuming animal proteins include high prices, low-income levels, rapid spoilage, and low supply.
- Educational level and income emerged as common factors influencing the consumption of animal protein products across households.
- The study revealed that most respondents (60.8%) had tertiary education, indicating a generally high level of awareness about the importance of animal protein in their diet.
- Farming was the primary occupation for 99.2% of respondents, with trading (92.5%) being a significant secondary occupation.
- These findings underscore the complex interplay between socioeconomic factors and dietary choices, particularly concerning animal protein consumption in rural Nigerian households.
- It can therefore be concluded that these animal protein foods demanded can be increased when the prices are set in line with different household income levels. The following recommendations were made:
- Government and private institutions should enable easier access to credit for livestock farmers and provide supported inputs like feed to increase livestock production and potentially decrease the price of animal products.
- Implement informal education programs to raise awareness about the values of adequate protein intake, helping to prevent starvation in the study area and the nation at large.

- Encourage households with backyard spaces to engage in small-scale poultry production or fish farming. This can be achieved through creating publicity and awareness campaigns.
- Implement policies that align animal protein food prices with various domestic income levels to make these foods more available across various socio-economic groups.
- Invest in infrastructure and expertise in areas of health and technology to reduce the rapid spoilage of animal products, thereby increasing their availability and potentially reducing prices.
- Advocate nutritional education programs in schools and communities to highlight the importance of a balanced diet rich in animal proteins.
- Encourage diversification of protein sources, including plant-based options, to ensure a more balanced and supportable method to meet protein needs.

Limitations:

- Geographic scope: The study was limited to Osun State, which may not be a true representative of the entire country. Future studies could expand to other states for a more comprehensive national picture and for researchers to highlight more areas of focus.
- Sample size: While the sample of 120 households provided valuable insights, a larger sample size could enhance the statistical power and generalizability of the findings.
- Limited focus on animal protein: While the study focused on animal protein, it didn't broadly provide insights into alternative protein sources or the motives behind preferences for specific protein types.

These limitations provide opportunities for future research to build upon this study's findings and further enhance our understanding of protein consumption patterns in Nigeria.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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