ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14621401

Analyzing the Effect of Petrol Subsidy Removal on Food Security among Households in Kebbi State

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Abstract:- This study analized the influence of petrol subsidy removal on food security among Kebbi State households in Nigeria. The study applied a primary data aided by a binary logistic model which were obtained from the respondents using a questionnaire approach. The strategy adopted in this study revealed an interesting finding as all the variables of interest were found to significantly affect food security. Petrol subsidy removal, food inflation, and transport fare negatively affect the food security of households on the other hand rise in food expenditure augments food security. Recommended by the study that, the government should imbibe serious commitment to checkmate pervasive corruption on the issue of subsidy payment rather than just removing it completely.

Keywords:- *Petrol Subsidy, Food Security, Households.*

JEL: H24, H31, Q18

I. INTRODUCTION

Many countries in the world have implemented energy subsidy reforms in their economies as part of government efforts to improve the economic welfare of their citizens (Breisinger et al., 2019). Petrol subsidy reforms on domestic economies especially the oil-producing nations have been identified with significant impacts in Africa. (Babatunde, 2019). For decades long Nigerian government has implemented a petrol subsidy regime as part of its effort to mitigate the impact of oil price shocks on the economy and the well-being of its citizens. This implies that the government regulates domestic prices of Premium Motor Spirit (PMS) and domestic marketers are paid the difference between the regulated domestic price and the Expected Open Market Price (EOMP). On record, the Nigerian government spent more than N10 trillion for the payment of fuel subsidies from 2010-2022 (CBN, 2023). These figures indicate a significant drain on the public revenue, hindering its ability to invest in some important sectors of the economy which could bolster economic growth and development. However, on 29th May 2023 in his inaugural speech, President Bola Ahmed Tinubu of Nigeria announced the removal of fuel subsidies, cited deficit in budgetary allocation, pervasive corruption, ambiguous payment figures, and inequality as the basis for his decision, and echoed his desire to channel the funds towards public infrastructure and improving the lives of the Nigerian people. Suddenly, the prices of Petroleum Motor Spirit (PMS) rose by more than 400% (i.e. from N165 to almost N1,000 naira). This immediately triggered an upsurge in food production and a hike in the prices of foodstuff in markets which invariably threaten food security in the country. It further aggravates poverty, hunger, and hardship by reducing consumer's purchasing power and living standard among households, particularly in Kebbi state where the majority of households largely depend on agricultural food production for their means of livelihood. To ameliorate the negative impact of the policy among households, the government introduced many measures such as the distribution of palliatives, granting access and suspending import duties on some essential food items, granting a tax holiday to some industries producing essential food items to boost their productivity, upward review of salaries and wages of workers, provision of Compress Natural Gas (CNG) Buses to ease transportation, introduction of students loans among others.

Therefore, it is against this backdrop that, this study will analyze the effect of petrol subsidy removal on food security among households in Kebbi state. The results of this study would provide constructive insight relating to the fiscal sustainability of the petrol subsidy removal as well as pave the way for effective government reforms that will cushion its effect on food security. This study will also help policymakers in designing policies and programs that will improve food sufficiency in the country. The findings of this research will also help to identify the efficacy and loopholes of palliative measures provided by the government to cushion the effect of petrol subsidy removal among households. It will also provide reliable information on households' socio-economic well-being which is a pre-requisite for accurate and effective design, monitoring, and development of projects. The outcome of this study will also complement government efforts in attaining sustainable development goals by finding solutions

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

to the lingering issues of hunger, poverty, and food insecurity among households in the country.

Nigeria is endowed with abundant natural resources and vast arable land but its economy is characterized as a monolithic economy depending largely on the exportation of crude oil as its major revenue source (Edime et al., 2023). In Africa, Nigeria is the largest producer of crude oil resources (OPEC, 2020). However, the inability of Nigeria to fix its refineries to refine crude oil has been a major challenge to satisfying domestic needs for refined petroleum products. Thus, crude oil had to be exported to developed countries to refine which in turn Nigeria incurred expenses of importing it back to the country (David & Presley, 2024). This implies that a significant portion of the country's revenue is been spent on the importation of refined petroleum products. Because of this, successive administrations attempted to remove petrol subsidies but have been revolted by Nigerians on many occasions.

According to the World Bank (2023) report, the multidimensional effect of fuel subsidy removal may drive millions of Nigerians into the menacing trap of poverty, hunger and low standard of living by 2030. Therefore, in other to ameliorate the effects of petrol subsidy removal on households' well-being and to avoid food insecurity. Nigerian government at all levels introduced palliative measures by providing food items, cash tokens, and other agricultural inputs. Other measures recently introduced were tax holidays on essential commodities, relaxation of import duties on some staple food products, student loans, upward review of salaries and wages, and many others. However, people express concerns regarding the efficacy of such measures and their implications for fiscal sustainability. The report of the Nigeria Bureau of Statistics (NBS) indicates that Kebbi state is among the states with a high rate of poverty and low standard of living in Nigeria from 2010 to 2022 (NBS, 2022). Statistics further showed that, in Nigeria, fuel subsidy gulped about 32.4% of the aggregate income in 2022, which was more than the combined budgetary allocations for health, education, and social security (World Bank, 2022).

However, most of the existing studies on fuel subsidy removal were grossly inadequate due to inherent methodological issues. Concerning the effect of petrol subsidy removal on both household socio-economic factors and food security, there are divergent approaches that create a literature gap for this study which raises two main questions. First, how does the removal of fuel subsidy affect food production, and second, what are the implications of the policy on household socio-economic well-being in the study area? To address these questions, this research explored a novel approach of using descriptive statistics and logistic regression analysis to analyze the pass-through effect of the policy on households' elasticity of demand and supply.

To mitigate the effect of petrol subsidy removal among households a significant portion of the country's revenues were expended on the provision of palliatives which further increases the fiscal burden on the country's economy. In addition, some government officials disclosed that the government is still paying subsidies on petrol indirectly. Despite all these measures, the effect of petrol subsidy removal continues to be a great threat to food security among households, particularly in the study area. This necessitates the need to conduct a study on the effect of removing subsidies on refined petroleum products by the Nigerian government, particularly among households in Kebbi state. Several research studies reviewed showed that there is little or no research on the effect of fuel subsidy removal among households in Kebbi state. To this end, the main objective of this study is to examine the effect of fuel subsidy removal on households' food security in Kebbi state.

The study is structured as follows; section one has been discussed above, while relevant literatures are reviewed in section two, methodology is discussed in section three, findings from the study are presented in section four, and the study is concluded in section five.

II. LITERATURE REVIEW

Different studies examined the effect of petrol subsidy on various macro and micro economic issues. For example, Meludu et al. (2023), investigate the influence of fuel subsidy removal on the prices of major food commodities in southeastern Nigeria. The study sourced data from the National Bureau of Statistics and was analyzed using descriptive and inferential statistics (t-test) and presented in histograms and charts. Findings revealed that prices of commodities were significantly higher after the subsidy removal by 10 and 5 percent levels of significance respectively. Abdulkareem et al. (2024) examined the deterministic model and analysis of fuel subsidy in Nigeria's commodity market dynamics. Using a deterministic model the study analyzed the dynamics of fuel subsidy, consumer purchasing power, the oil-pirating groups, and the commodity markets. To gain insight into oil-leakages impact on the government oil revenue, time delay is used to depict the oil theft control by the Nigerian government. The findings of the study revealed that there is a significant impact on the veritable conditions for acceptable implementation of subsidy reforms that will improve the income of consumers and checkmate oil theft. Oyasipe & Olukoya (2024) analyse the effect of fuel subsidy on the profitability of entrepreneurial businesses in Lagos state, Nigeria. Chi-square was used to analyse data, leading to the rejection of the null hypothesis, indicating a significant impact of fuel subsidy removal on the profitability of entrepreneurial businesses. Findings revealed that the removal of fuel subsidies led to a tremendous escalation of running costs of businesses, a reduction in sales, a decline in stock, and less profitability.

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

In a study by Idisi et al. (2024), the presence of compensational palliatives for the removal of fuel subsidies in Nigeria was used as a case study. The study adopted the use of a multi-stage random sampling technique for the selection of 600 sample sizes from three local government areas of Kogi state. Structured questionnaire aided data collection. Percentile analysis using charts and chi-square was used to analyse data. The findings of the study show that the majority of the palliative beneficiaries have preferences. Most of them prefer food stuff to cash tokens or agricultural inputs and there is a difference between and among the channels of distributing palliatives to households. A study by Goji etal. (2024) Examines fuel subsidy removal and socio-economic services in Nigeria: a study of the Lafia local government area in Nasarawa state. Some specific objectives of the study were to examine the implication of the policy on transportation, workers' earnings, and household living standards. Both primary and secondary data were used for the study. System theory propounded by David Easton was used for the study. Data was analysed using simple statistical percentages and tables. The findings of the study showed that there was a high cost of transportation in Lafia local government which also affected the cost of commodities in the market. It also induces more hardship among the people of the state. Okereke et al. (2024). Examined Nigeria's fossil fuel subsidy reforms and the welfare effects on households with a special focus on the socio-economic impact of the hike in prices of petrol which was caused by the removal of fuel subsidy. The study employed a Quadratic Almost Ideal Demand system (QUAIDS) model to explore household's energy consumption patterns, estimating budget, own-price, and a cross-price elasticity for petrol. Results showed that there were significant changes in household welfare across different quintiles and locations, with rural and lower-income earners experiencing high welfare losses.

In a study by Neil et al. (2021) which focused on fuel subsidy reform and the social contract in Nigeria. The primary dataset was sourced with the aid of Focus Group Discussion (FGD). Household survey and a survey of small firms was conducted during the year 2018. Findings showed that there was a fragmented opinion among households on the efficacy and sustainability of fuel subsidies. The direct welfare effect of fuel subsidy removal has been investigated by Rentschler (2016). The applied regional data to determine the variability of such effect. Findings indicate that subsidy removal exacerbates poverty by between 3 – 4 percent. In sixteen of the 36 states and Federal capital it is found that cash compensation aims at mitigating the negative effect of subsidy removal have failed to achieve the desired result. In a representative household survey among Nigerian men and women, McCulloch et al. (2021) observed that the perception of the surveyed group revealed those who pay higher pump prices and experience a lack of availability of the product tend to support subsidy reform. Another category of surveyed groups cite corruption and lack of capacity to implement the reform and come up with a compensation strategy as their reason for opposing it. However, being religious has been to improve the acceptance of subsidy reform.

According to the Food and Agricultural Organization [FAO et al., (2023)], food security is a situation that exists when people at all times meet their dietary needs and preferences for an active and healthy life. About 25.3 million people in Nigeria have been projected to face acute food insecurity (FAO et al., 2023). Alternatively, food insecurity is associated with a lack of food access, malnutrition, and a lack of resources to afford adequate quantity and quality food among households (Nkoko et al., 2024). A quarterly report released by the global organization shows that the figure projected was even higher than the 19.5 million forecasted in 2022 (Meludu et al., 2023). The main goal of addressing food security is for individual households to be able to obtain and afford adequate food required by the body to survive. World Bank (2022), identified three determining factors of food security; these include food availability, food accessibility, and food utilization. Nkoko et al. (2024). Investigate the factors associated with food security among small-holder farming households in Lesotho. Household food security has been assessed using the Household Food Access Scale (HFIAS) and Household Dietary Diversity Score (HDDS). 236 farming households data was collected and a Logistic model was employed to analyse the study. Results show that 40 percent of the respondents were food secure, while others were mildly, moderately, or severely food secure, and severe food insecurity was mostly experienced in the highlands.

A study by Yahaya & Danmaigoro (2020) analyses the food security status among farming households in the Zuru agricultural zone of Kebbi state, Nigeria. 253 farming households were sampled in the study. Data was analyzed using descriptive, Food security index, and the Logistic regression model. The result indicated that 83.4% of the households were food insecure and were not able to meet 2/3 Mean per capita food expenditure (N) 36,353.88.

III. METHODOLOGY

For this research work, the survey research design was adopted to examine the effect of oil subsidy removal on food security among households in Kebbi State, Nigeria. The methodological approaches are explained in the following paragraphs;

The criteria for choosing Kebbi state as an area of study was due to its track record in agricultural food production. Kebbi State is located in the North-Western geopolitical zone of Nigeria. It has 21 local government areas with four different first-class emirate councils of Argungu, Gwandu, Yauri, and Zuru. The state has the coordinate direction of 11^0 30N 4^0 00E on the hemisphere the land mass area of the state is 36,800km^2 and the mean average temperature is within the average of

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

21^0C and 40^0C during cold and dry seasons respectively. Major occupation and economic activities of people in the area are farming, fishing, livestock farming, pottery, hunting, and businesses (Kebbi State Government, 2024).

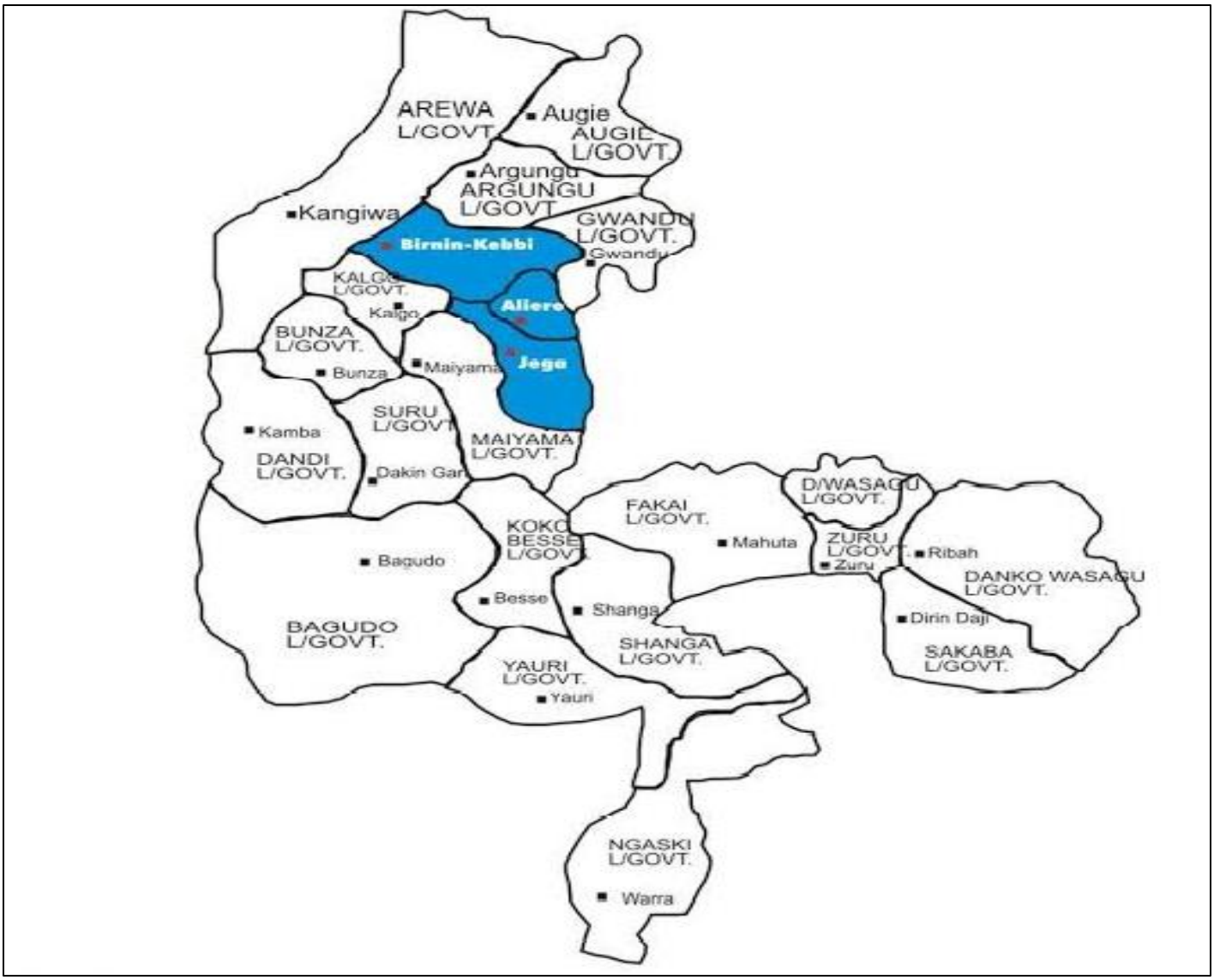

Fig 1: Map Showing Local Government Areas of Kebbi State
Source: Kebbi State Urban and Regional Development (2021)

In this study survey research design was adopted, and both primary and secondary data sets were utilised. Primary data were sourced with the aid of a structured questionnaire administered to respondents. A Multi-stage sampling technique was initially employed to select the sample size population for the study. In the first stage, the purposive sampling technique was employed to select six seven (6) LGAs (Aliero, Argungu, Birnin Kebbi, Dandi, Yauri, and Zuru) from each senatorial geopolitical zone of Kebbi state. In the second stage, a cluster sampling technique was administered to select one (1) community from each of the 6selected local government areas. Finally, in the third stage, a random sampling technique procedure was employed to select 100 households as respondents from each cluster for the administration of the questionnaire. A total of 573 questionnaires were retrieved and validated which served as the population size of the study out of the 600 administered. While secondary data sets were sourced from the National Bureau of Statistics (NBS) data catalogue.

The study designed a structured questionnaire to aid the collection of data from respondents and it was duly validated by five (5) experts. Two from the University of Nigeria, one from Federal University Birnin, and two from UsmanuDanfodio University Sokoto. The experts validated

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

the instrument under different types of validation such as face, content, criteria and construct validity.

Reliability of the instrument was carried out in the study area by administering a pilot test of the instrument with a sample size of the population. Ten (10) households in each community from the six (6) local governments in the study area were used. A total of 120 respondents was used for the pilot test to ensure the degree of consistency and reliability of the instrument. Results from the pilot test were estimated using Cronbach's Alpha procedure because it is more robust in determining instrument reliability than the conventional Kudder-Richardson (K-R). The estimation result showed that the scale reliability coefficient is 0.9199 which indicates a significant relationship at 5% (i.e. the instrument is adequately reliable) as noted by (Abdul-Azeez et al., 2023).

Given by:

$$r_t = \frac{k}{k-1}\left\{1 - \frac{\sum s_i^2}{s_t^2}\right\} \quad \text{or} \quad r_t = \frac{k}{k-1}\left\{1 - \frac{\sum V_i}{V_t}\right\} \quad (1)$$

Where k= Number of items
S_i^2 or V_i = variance of a single item
S_t^2 or V_t= variance of the whole instrument

➢ *Data Collection*

Before the commencement of actual data collection. Research assistants were trained on the ethics of how to administer questionnaires to respondents. A pilot survey was conducted to assess the instrument of data collection, the enumerator's capability, and a general feasibility study. The pilot test was conducted at Kalgo local government area which did not constitute part of the selected area for the study. In the course of the pilot test, some amendments were noted and adjusted accordingly. Data for the study were collected in August, September, and October 2024 using a structured questionnaire. The researchers and the trained enumerators carry out a physical administration of the questionnaire to ensure reliability and minimize respondent misinterpretation of the exercise. The questionnaire consists of three sections which include socio-economic characteristics, household food security measures, and measures of fuel subsidy removal. Ethical clearance was conducted was also conducted.

➢ *Data Analysis*

This study incorporates the effect of fuel subsidy removal on food among households into a logistic regression model and estimates the pass-through effect of a hike in fuel prices on food insecurity in the study area. Descriptive and inferential statistical techniques were also used to analyze the quantitative data sets collected by the structured questionnaire. Statistical tool STATA/SE version 18 and E-views 13 were used for the analysis.

➢ *Measurement of food security*

The Food and Nutritional Assistant (FANTA) a subsidiary of the Food and Agricultural Organization (FAO) of the United Nations developed a set of questions that contains a predictable outcome on household food insecurity. The questions were analyzed on a scale known as the Household Food Insecurity Access Scale (HFIAS) as noted by (Nkoko et al., 2024). The HFIAS contains nine questions which entail three broad categories: (1) Anxiety and uncertainty about food access. (ii) Dietary diversity (Lack of access to quality, variety, and nutritious food) (iii) Insufficient food consumption and resultant consequences.

The following nine questions of the HFIAS were administered to respondents and were categorized based on domains.

- Did you worry that your household would not have enough food to eat due to a shortage of cash or other resources?
- Were you or any member of your household unable to eat a variety or preferred type of food due to a lack of resources?
- Was there ever a moment when you or any of your household members had to eat limited nutritious food due to a lack of resources?
- Did you or any of your household members have to eat some food that they did not like to eat due to shortages of resources to buy the needed one?
- Was there a time when you or any of your household had to eat less food than you felt you needed due to a lack of funds or other resources?
- Did you or any of your household members have to miss or eat fewer meals due to shortages of funds or other resources?
- Was there ever a time when there was no kind of food to eat in your household due to a lack of funds or other resources?
- Did you or any of your household members go to sleep at night hungry because there was not enough food to eat?
- Did you or any of your household members spend a whole day and night without eating anything because there was not enough food or resources to buy?

However, to access household food insecurity status, the HFIAS were grouped into four levels. Food secure, mildly food insecure, moderately food insecure, and severely food insecure (Nkoko et al., 2024). Food secure; if all nine questions were answered "No" by the households. Mildly food insecure; if the household answers "Yes" to at least one of the first three questions while giving a score of zero for the remaining inquiries. Moderately food insecurity; questions four or five were answered, with "Yes" by the household, whereas questions six, seven, eight, and nine were answered with no. Severely food insecure; If the household answered "Yes" to any one or more of the final three HFIAS questions

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

➢ *Measurement of Fuel Subsidy Removal*

Fuel subsidy removal means the government no longer pays the difference between the actual market price and the expected cost of importation. Indirectly government established full deregulation of the downstream sector to ease the way for potential competitors and investors. Consequently, the price of Premium Motor Spirit (PMS) will have to be determined by the prevailing forces of demand and supply in the market based on the real cost of importation (Yunusa et al., 2023). Drawing inspiration from existing literature shows that different researchers such as Neil et al, (2021), Usman et al. (2023), Adewunmi, et al. (2023), and Alli et al. (2024), employed the pump price of petroleum as a proxy to measure fuel subsidy removal. Therefore, for this study, the price of PMS was incorporated into the model to measure the effect of fuel subsidy removal.

➢ *Model Specification*

Given that, the dependent variable of interest in the model is a binary indicator. Therefore, logistic regression models were employed for estimation. The primary stochastic model is specified as follows:

$$\text{Logit}[p(HFS = 1)] = \alpha + \beta_1 \text{Income}i + \beta_2 \text{Foodprice}i + \beta_3 \text{Foodexp} + \beta_4 \text{Transpi} + \beta_5 \text{Foodprodi} + \beta_6 \text{Pumpricei} + \beta_7 \lambda i + \varepsilon i \quad (2)$$

Where i index individual households. The dependent variable is a binary indicator of whether the removal of fuel subsidy significantly affects a household's $_i$ food security (HFSi = 1) or not ((HFSi = 0). The variables of interest such as food production, food expenditure, and pump prices denote vectors in each of the explanatory categories. In addition, we include a battery of control variables which are included in a vector of controlled variables (λi) which includes gender, income, household size, transportation, and occupation., the Ɛi is the conventional classical error component, In other to build confidence in the model and address potential weaknesses of biases or omitted variable data in the analysis. Some strategies for robustness checks were performed on the model. These include checks for multicollinearity, outlier influence, unobserved heterogeneity, endogeneity, and robust standard errors.

IV. RESULTS AND DISCUSSION

➢ *Distribution of Respondents*

Tables 1 – 12 show the distribution of the respondents categorised according to their gender, age, marital status, family size, level of education, income, food expenditure, food production, transport cost, food inflation, pump price, and household food insecurity access scale.

Table 1. Distribution of Gender

Gender	Frequency	Percentage	Cum.
Male (1)	444	77.49	77.49
Female (2)	129	22.51	100.00

Table 1 above shows that about 77.49% of the respondents are male while 22.51% of household respondents were male. This opines that the majority of the households are men and were severely affected by the removal of fuel subsidies particularly in Kebbi state.

Table 2. Distribution of Age

Age	Frequency	Percentage	Cum.
18-30 Years	105	21.29	21.29
31-40 Years	197	34.38	55.67
41-50 Years	201	35.08	90.75
51 & Above	53	9.25	100.00

Table 2 revealed that the majority of households affected fall within the age range of 41 to 50 years which is about 35% of the total respondents. While only 9.25% of the households were 51 years of age and above.

Table 3. Distribution of Marital Status

Marital status	Frequency	Percentage	Cum.
Single	105	18.32	18.32
Married	422	73.65	91.97
Divorce	24	4.19	96.16
Widow	22	3.84	100.00

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

Table 3 indicates that 73 percent of the respondents were married accounting for 73% and about 3.84% were widows affected by the subsidy removal in the study area.

Table 4. Distribution of Household Size

Household size	Frequency	Percentage	Cum.
5 & below	175	30.54	30.54
6-10	302	52.71	83.25
11-15	70	12.22	95.46
16 & above	26	4.54	100.00

Table 4 revealed that about 52.7% of household sizes of the respondents in the study area contained about 6-10 family members. While about 4.5% only contained family members of 16 and above. This indicates that households with the largest number of members were more severely affected by the policy than those with low household sizes.

Table 5. Distribution of Education Level

Education level	Frequency	Percentage	Cum.
Primary	136	23.73	23.73
Secondary	110	19.20	42.93
Tertiary	147	25.65	68.59
Others	180	31.41	100.00

Table 5 shows a very close association among the educational status of respondents with little difference which indicates that the subsidy removal on household food security severely affected all categories of households irrespective of their educational status, be it primary, secondary, tertiary, or others like Qur'ani education, nomadic education, adult education, etc.

Table 6. Distribution of Income

Income	Frequency	Percentage	Cum.
N30,000 & below	334	58.29	58.29
N31,000-N60,000	123	21.47	79.76
N61,000-N90,000	80	13.96	93.72
N91,000 & above	36	6.28	100.00

Table 6 shows that about 58.3% of households in the study area are low-income earners while 6.3% are average high-income earners. This indicates that the increase in the cost of transportation and food prices as a result of subsidy removal severely affected households' food security. A similar, effect of fuel subsidy removal on poor and rural households relative to rich and urban households was noted in literature by (David & Presley, 2024).

Table 7. Distribution of Monthly Food Expenditure

Food expenditure	Frequency	Percentage	Cum.
N50,000 & below	218	38.05	38.05
N51,000-N100,000	275	47.99	86.04
N101,000-N150,000	42	7.33	93.37
N151,000 & above	38	6.63	100.00

Table 7 distribution revealed that there was a pervasive increase in household food expenditure due to rises in food prices. About 47.9% of respondents' average food expenditure had increased to about 51,000 to 100,000 naira without any corresponding increase in income. This alternatively threatens households' food security because households may not be able to afford the required meals.

Table 8. Distribution of Food Production

Food production	Frequency	Percentage	Cum.
N50,000 & below	155	27.05	27.05
N100,000-N150,000	157	27.40	54.45
N200,000-N250,000	130	22.69	77.14
N300,000 & above	131	22.86	100.00

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

Table 8 indicates that the majority of the household's annual food production has been affected by the subsidy removal due to an increase in the cost of food production which includes the cost of farm implements, fertiliser, transport costs, etc. The result also shows that the majority of the households about 93% cumulatively are subsistent farmers and only produce an estimated food between ₦50,000 to ₦250,000 annually.

Table 9. Distribution of Transport Cost

Transport Cost	Frequency	Percentage	Cum.
N2,000-N5,0000	194	33.86	33.86
N10,000-N15,000	275	47.99	81.85
N20,000-N25,000	65	11.34	93.19
N30,000 & above	39	6.81	100.00

Table 9 reveals the increase in the cost of transportation incurred by households as a result of the removal of the fuel subsidy. About 48% of the respondents lamented the high increase in transport fares which also affects the price of transporting goods, particularly from farmland to market.

Table 10. Distribution of Food Inflation

Food inflation	Frequency	Percentage	Cum.
30%-40%	19	3.32	3.32
50%-100%	175	30.54	33.86
Above 100%	379	66.14	100.00

Table 10 shows households' perception of the average food price increase which was caused by the effect of fuel subsidy removal. The result indicates that about 66.1% believed that the prices of food items had skyrocketed to more than 100% as a result of the sudden removal of fuel subsidies.

Table 11. Distribution of Pump Price

Pump price (#)	Frequency	Percentage	Cum.
N980	64	11.17	11.17
N1,080	83	14.49	25.65
N1,100	88	15.36	41.01
N1,150	128	22.34	63.35
N1,200	210	36.65	100.00

Table 11 revealed that, since the removal of the fuel subsidy, the prices of the premium motor spirit (petrol) fuelling station became highly unstable. According to the state data on pump prices from the National Bureau of Statistics (NBS) indicate that within a short period prices of PMS had increased from N980 naira in September 2024 to 1200 in October 2024.

Table 12. Distribution of Household Food Insecurity Access Scale

HFIAS	Frequency	Percentage	Cum.
Food secured	10	1.75	1.75
Mildly food insecure	60	10.47	12.22
Moderately food insecure	213	37.17	49.39
Severely food insecure	290	50.61	100.00

Table 12 shows the summary of households' food insecurity access scale questions administered to the respondents. Based on their responses about 50.6% of households were severely food insecure due to inadequate resources to purchase enough food items. Most of them could not afford three square meals due to the high cost of food items. Among the respondents, only 1.8% were found to be food-secured. These indicate a significant threat to food security among households, particularly in the study area.

Table 13.Results of the Logistic Regression

Variable	Coefficient	Marginal Effect
Pumpprice	-6.151*** (1.441)	-1.374*** (0.325)
Foodprice	-1.825***	-0.408***

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14613747

	(0.475)	(0.100)
Transp	-6.700*** (1.172)	-1.497*** (0.278)
Foodexp	8.509*** (1.523)	1.901*** (0.350)
Education	-1.888*** (0.455)	-0.423*** (0.100)
Hsize	2.007*** (0.748)	0.448*** (0.161)
Mstatus	-2.193*** (0.370)	-0.490*** (0.076)
Constant	10.387*** (1.492)	-----

Table 13 shows the logistic regression which indicates that all the variables of interest are significant at 1% level. Thus, if the household food expenditure increases by 1%, the household food security is more likely to be affected by 85%. Also, if the cost of transportation increases by 1% as a result of the removal of fuel subsidy household food security is likely to decrease by 67% at a 1% level of significance. Similarly, if the cost of food prices increases by 1% household food security is more likely to decrease by 18% at a 1% level of significance. Also, when the pump price of petroleum increases by 1% the household food security is likely to decrease by 61% at a 1% significance level. These results indicate a severe threat to household food insecurity as a result of subsidy removal.

Column two of Table 13 revealed the result of the marginal effect of the logistic regression which indicates a clear association between the dependent and independent variables. As the independent variable food expenditure increases by 1% the dependent variable household food security is more likely to be affected by 19%. However, if the cost of transportation increases as a result of subsidy removal by 1%, household food security is likely to decrease by 14%.The increase in food prices is also likely to decrease by 4% at a 1% level of significance. These results show interesting similarities with the logistic regression.

V. CONCLUSION AND POLICY IMPLICATION

Consequent to the removal of fuel subsidy in Nigeria by President Bola Ahmed Tinubu in 2023, the economy resulted in overall shocks and hikes in the prices of premium motor spirit (Petroleum pump price) which invariably led to unprecedented high increases in the cost of transportation, food prices, food production, food expenditure and hunger. Similarly, this has caused a serious threat to household food security particularly in Kebbi state. However, this research work examined the implication of the policy on household food security by analysing different models which proved positive results. Findings revealed that the policy implication had caused a regressive impact on household's food security and food expenditure. It was also discovered that the removal of fuel subsidy negatively affected agricultural food production which is a major source of income in Kebbi state due to the high cost of farm inputs thereby posing a serious threat to household food security.

Based on the findings of this study, we recommend the need for government to focus more on improving agricultural food production through value-chain agricultural financing and the provision of subsidized farming inputs particularly to smallholder farmers. Due to the negative consequences of fuel subsidy removal, the government should imbibe serious commitment to checkmate pervasive corruption on the issue of subsidy payment rather than just removing it completely. As many countries in the world provide subsidies to their citizens in terms of energy consumption and other aspect of welfare. The government should provide subsidized means of transportation for both humans and goods. This may reduce the cost of goods that are associated with the cost of transportation. The government should introduce measures to control exorbitant prices of food items in the market. The government should intensify efforts toward fixing the country's refineries and encourage more private investors to build refineries. This would go a long way in combating the importation of refined petroleum products.

➢ **Funding Statement:*

This research was funded by the Federal University Birnin Kebbi – Nigeria, under the Tertiary Education Trust Fund (TETFUND) Institutional Based Research (IBR). Funding Number: FUBK/ACA/65/Vol.4

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