EFFECTS OF FUEL SUBSIDY REMOVAL ON RURAL FARMERS PRODUCTION IN KWANDE LOCAL GOVERNMENT AREA, BENUE STATE, NIGERIA.

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Key words:	Abstract:
Effect, Fuel, Subsidy Removal, Production, and Rural Farmers.	*This study examines the effect of fuel subsidy removal on rural farmer production in Kwande Local Government Area of Benue State. Public opinion survey design was adopted for the study; multi-stage sampling technique was used to select 100 rural farmers. Data for the study were collected from primary source using questionnaire. Descriptive statistic and multiple regressions were used to analyze data. Results of the ordinary least square revealed that; fuel price (-0.106), fuel subsidy removal (-0.008), high cost of production inputs (-0.292) and cost of labour (-0.050) negatively and significantly influenced agricultural production outputs while farm size (0.349), annual income (0.476), and farming experience (0.033) positively and significantly influenced agricultural production outputs. The result further revealed that minimum farm size cultivated before and after the removal of fuel subsidy was 2 hectares, while the maximum farm size cultivated by rural farmers before the removal of fuel subsidy was 5 hectares while after the removal of fuel subsidy the maximum farm size cultivated by rural farmers was 4 hectares. The average area of land cultivated before the subsidy removal was 3.95 hectares, while the average area of land cultivated by rural farmers after the removal of fuel subsidy was 3.06 hectares. The removal of fuel subsidy significantly reduced the farm size (hectares) cultivated by rural farmers in the study area. It was concluded that concludes that rural farmer's agricultural production outputs were negatively and significantly influenced by the Federal Government removal of fuel subsidy. The study also concludes that the removal of fuel subsidy significantly reduced the hectares of land cultivated by rural farmers because the removal of fuel subsidy led to high cost of production inputs. It was recommended that government should subsidize agricultural production inputs to enable rural farmers afford production inputs at subsidized rate.*

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INTRODUCTION

Agriculture serves as the backbone of Benue State's economy. Benue State, often referred to as the 'Food Basket of the Nation,' boasts the widest array of agricultural produce among all the States in Nigeria, increasing food availability, creating employment opportunities in the form of farm labour and facilitating markets for agricultural products (Soomiyol & Fadairo, 2020). Benue State boasts the widest array of agricultural produce among all the States in Nigeria. The State is home to a wide variety of crops including rice, maize, sorghum, millet, vegetable and so on (Terdoo, *et al.,* 2016).

The Agricultural sector also contributes significantly to Benue State's GDP, accounting for about 23% to the total GDP in 2020. Agriculture servers as the backbone of the State's economy, and if its potential is effectively harnessed, Benue State could unquestionably become the nation's agro-industrial hub and a regional food supermarket in the near future (Benue State Government, 2020).

Despite its importance, the Nigerian agricultural sector faces challenges such as inadequate infrastructure, limited access to finance, insufficient extension services, climate change and market volatility. One of the most significant barriers to productivity is the cost of fuel, which is essential for farm machinery, irrigation systems, and transporting agricultural produce to markets. Consequently, fluctuations in fuel prices have a profound impact on agricultural productivity and the livelihoods of rural farmers (Eneji & Cajethan, 2024).

Nigeria's agriculture sector remains the country's largest employer in 2023, with over 25 million individuals engaged in agriculture, forestry, and fishing activities representing 30.1% of the total work force (National Bureau of Statistics, 2024). Agriculture contributes around 22.72% to the national GDP in 2023 (https://www.statista.com.statistics/382311/nigeria-gdp-distribution-across-economics-sectors/). It plays a pivotal role not only in food production but also in socio-economic development, where the income generated from farming supports sectors like education, healthcare, and local commerce, thereby driving community growth (Nwogwugwu, *et al.*, 2023).

Nigeria has been subsidizing petrol for her citizens over the years. This has been in practice to ensure that the citizens purchase petroleum products below the global price. Fuel subsidy is the financial supported provided by the government to lower the price of petrol or gasoline for the citizens (Akinnibi, 2023). The subsidy was introduced in Nigeria in 1970s by the federal government of Nigeria as a response to the oil price shock in 1973 (Okongwu & Imoisili, 2022).

Under the current administration of the president of Nigeria, President Bola Ahmad Tinubu delivering his inaugural speech on the 29th May, 2023, announced fuel subsidy removal when he said "fuel subsidy is gone" (Garba, 2023). Ever since the announcement was made, there has been increase in the cost of fuel across the nation, a situation that has led to high cost of transportation fare which has seriously affected

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farmers. The cost of buying farm inputs has tripled and as well as bringing farm produce to the consumers (Evans *et al.*, 2023).

Fuel subsidy removal has exerted a substantial influence on Nigerian's agricultural sector. The removal of fuel subsidy has led to an immediate increase in fuel price, which has triggered the chain reaction; causing higher transportation costs and markets instability (https://noiler.net/impact-of-fuel-subsidy-removal-on-nigerias-agricultural-sector/). The major effects is the increased transportation costs due to high fuel prices, directly impacting agricultural production. Fuel plays a critical role in agricultural logistics, powering the transportation of inputs like fertilizer, herbicides, improved seeds, etc and delivery of produce to markets (https://noiler.net/impact-of-fuel-subsidy-removal-on-nigerias-agricultural-sector/). The fuel subsidy removal in 2023 triggered mixed reactions. While it was expected to improve Nigeria's fiscal health by reducing subsidy-related expenditures, the immediate impact included a sharp increase in fuel prices. This increase raised transportation and production costs, leading to inflationary pressures. For the agricultural sector, which is heavily reliant on fuel, these price hikes created challenges, particularly for rural farmers who face higher costs of agricultural production inputs. These changes could reduce agricultural productivity, exacerbate food insecurity, and increase poverty in rural areas (Nigeria Economic Summit Group, 2023). The Nigerian government attempted to mitigate these effects through targeted cash transfers and social programs aimed at supporting vulnerable populations, alongside investments in public infrastructure (Premium Times, 2023).

Rural farmers in Kwande Local Government Area, like many others, continue to face rising operational costs, which could negatively affect food production. The removal of the subsidy is particularly challenging for smallholder farmers who have limited financial resilience as the removal of fuel subsidies in Nigeria has negatively impacted food security among rural farmers (Adikwu, Ochimana & Ikegh, 2024). This situation may lead to a decline in agricultural output, increased food prices, and heightened rural poverty, thus deepening food insecurity in the region.

The removal of fuel subsidies in Nigeria has been a contentious policy with far-reaching implications across the economy, especially for rural farmers in Kwande. The elimination of subsidies has led to a sharp rise in fuel prices, thus increasing the cost of production. Farmers in Kwande now face higher expenses for operating machinery, transporting goods, and purchasing farming inputs such as fertilizers and pesticides. These increases in costs may force farmers to scale back their operations, potentially reducing agricultural output, which is essential for both local food supply and economic stability.

In rural Nigeria, high transportation costs make it difficult for farmers to move their produce to urban centers, contributing to food shortages in cities. Furthermore, the removal of fuel subsidies

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has intensified challenges faced by smallholder farmers, leading to decreased land cultivation and a shift towards less investment-intensive crops. This has further aggravated food insecurity, particularly in Nigeria (Vanguard, 2024). The study seeks to: ascertain the hectares of land cultivated by rural farmers before and after subsidy removal; compare the hectare of land cultivated before and after the removal of fuel subsidy and examine the influence of subsidy removal on agricultural production in the study area. It becomes necessary to examine the effects of fuel subsidy removal on rural farmers production in Kwande Benue State, as it would reveal the impact of the fuel subsidy removal on agricultural production and the economic conditions of rural farmers. The Theory of Production and Cost-Pass-Through theory forms the grand theories for this research work.
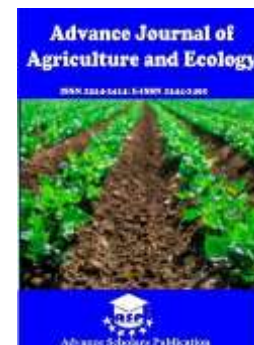
METHODOLOGY

The Study Area

The study was conducted in Kwande Local Government Area, Benue State, Nigeria. Kwande Local Government Area is one of the 23 LGAs in Benue State with its administrative headquarters are in Adikpo town. The area lies between longitude 9° 28' 13" E and latitude 6° 48' 4" N of the equator with estimated population of about 248,697 (NPC, 2006) the population is 351,658 peoples at the rate of 2.3% annual population growth (2006→2024). Kwande LGA has land area of 2,891 km²; it has fifteen council wards, good climatic conditions and rich in agricultural opportunities with the mean temperature ranging from 31° to 38°C. Kwande LGA has a tropical wet and dry or savanna climate with annual rainfall between 1000mm and 1500mm. As a result of its mountainous nature and proximity to the Cameroonian range of mountains, Kwande Local Government usually has cold weather which makes it very conducive to traders and investors. The local government also has very big rivers which usually take care of agricultural and industrial needs. The major occupation of the people in study area is farming due to the fertile land and conducive climatic conditions which support various types of agricultural activities. Farming activities include both crop cultivation and livestock rearing. The major crop cultivated in Kwande LGA is cassava, rice, yam, soybean, mango, groundnuts and sweet potatoes.

Sample Procedure and Sample Size Selection

The population of the study comprises of all rural farmers in Kwande Local Government Area, of Benue State. Sample sizes of 100 rural farmers were selected using multi-stage sampling techniques. The first stage involved a purposive selection of eight (8) council wards (Adikpo Township, Usar, Mbayoo, Live I, Live II, Moon, Mbaikyor and Yaav) out of the fifteen (15) council wards due to their high involvement in agricultural activities. The second stage involves selection of one community each from the selected council wards using simple random sampling. The final stage involved the development of same sizes from the selected community and using a proportion allocation of

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5% (0.05). Hence a total number of 100 respondents were selected for the study.

Methods of Data Analysis

The data was collected mainly from primary source. Data collected for the study were analyzed using both descriptive statistics such as frequency, mean and percentages and inferential statistics.

Analytical Tools

Ordinary least square regression model

The ordinary least square regression was used to examine the influence of fuel subsidy removal on rural farmers production outputs, specified as bellow

Linear

$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 .... B_nX_n + e_i$

Semi – log

$Y = B_0 + B_1logX_1 + B_2logX_2 + B_3logX_3 .... B_nlogX_n + e_i$

Double- log

$LogY = B_0 + B_1logX_1 + B_2+logX_2 + B_3logX_3 .... B_nlogX_n + e_i$

Exponential

$LogY = logB_0 + B_1logX_1 + B_2+logX_2 + B_3logX_3 .... B_nlogX_n + e_i$

Where Y = production output of 3 major crops (tons) cultivated by rural farmers

X_1 = Age (years)

X_2 = Fuel price (Very high = 3, High = 2, Low = 1)

X_3 = Farm size after subsidy (hectares)

X_4 = Fuel subsidy removal (very high = 3, high = 2, Low = 1)

X_5 = High cost of transportation (very high = 3, high = 2, Low = 1)

X_6 = High cost of inputs (Very high = 3, high = 2, low = 1)

X_7 = Annual Income (₦)

X_8 = Farming experience (years)

X_9 = Educational level (years)

X_{10} = High cost of fertilizer (very high = 3, high = 2, Low = 1)

X_{11} = Labour cost (₦)

e_i = error term

Four functional forms (linear, semi-log, double log and exponential) were used to analyzed the data and lead equation was selected for the analysis. The criteria for the selection of the lead equation were based on:

The value of coefficient of determination R^2, Significance of *F* value where appropriate, and number of significant independent variables according to apriori expectation.

Paired Sample T-test

$$T = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Where;

$\overline{X}_1$ = mean of the farm size cultivated before fuel subsidy removal (hectare)

$\overline{X}_2$ = mean of the farm size cultivated after fuel subsidy removal (after)

S_1 = Standard deviation of the farm size cultivated before fuel subsidy removal

S_2 = Standard deviation of the farm size cultivated after fuel subsidy removal

n_1 = Total number of rural farmers before fuel subsidy removal

n_2 = Total number of rural farmers after fuel subsidy removal.

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RESULTS AND DISCUSSION
Hectares of Land Cultivated Before and After Subsidy Removal

Table 1 presents the descriptive statistics on the hectares of land cultivated by farmers before and after the removal of the fuel subsidy. The results revealed that minimum farm size cultivated before and after the removal of fuel subsidy was 2 hectares, while the maximum farm size cultivated by rural farmers before the removal of fuel subsidy was 5 hectares while after the removal of fuel subsidy the maximum farm size cultivated by rural farmers was 4 hectares. The average area of land cultivated before the subsidy removal was 3.95 hectares, while the average area of land cultivated by rural farmers after the removal of fuel subsidy was 3.06 hectares. This implies that the hectares of farm land cultivated by rural farmers before the removal of fuel subsidy are higher than the hectares cultivated after the removal of fuel subsidy. The slight decrease in the average hectares of land cultivated after the subsidy removal suggests that the subsidy may have had a negative impact on land cultivation due to increase in the cost of agricultural inputs as the results of fuel subsidy removal. The result is in line with the findings of Adikwu, Ochimana & Babafemi, (2025), in their study on economic assessment of yam production before and after fuel subsidy removal in Okpokwu Local Government Area of Benue State concluded that the profit from yam production before the fuel removal is higher than the profit after fuel subsidy removal due to reduction in the hectare of land cultivated by farmers because of the high cost of labour, transportation cost and agricultural production inputs cost as the result of fuel subsidy removal. The result is also in agreement with the findings of Eneji & Cajethan (2024) in their research influence of oil subsidy removal on farmers' access to inputs and agricultural production in Northern Cross River State Nigeria revealed that the removal of fuel subsidy has negatively influenced on agricultural production. The influence includes increase in transportation cost, increase in the cost of purchasing farm inputs, increase in the cost of labour and reduction in farm size. Eneji & Cajethan (2024) further noted that farmers have reduced the size of their farm due to high cost of inputs and labour.

Table 1 Hectares of Land Cultivated before and after subsidy removal in the study area

Variable				N	Minimum	Maximum	Mean	Std. Deviation
Hectares Removal	Cultivated	Before	Subsidy	100	2	5	3.95	0.584
Hectares Removal	Cultivated	After	Subsidy	100	2	4	3.06	0.592

Source: Field survey, 2024.

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Test of significant difference between the hectares of land cultivated by rural farmers before and after Fuel subsidy removal

Table 2 showed that, the result of paired sample t-test between the hectares of land cultivated by rural farmers before and after fuel subsidy removal is significant at 1% (2-tailed). This implies that the hectares of land cultivated before the removal of fuel subsidy is significantly higher than the hectares of land cultivated after the removal of fuel subsidy. The mean difference 0.89 hectare was positive and significant at 1% level of probability. This signified that the removal of fuel subsidy significantly reduced the farm size (hectares) cultivated by rural farmers in the study area. The removal of fuel subsidy led to the increase in the cost of production inputs, cost of transportation and cost of labour. The fuel subsidy removal by the Nigeria government may influence rural farmers' purchasing power; potentially leading to reduction in the hectares of land cultivated. Eneji & Cajethan (2024) noted that farmers have reduced the size of their farm due to high cost of inputs and labour.

Table 2: Test of Difference between the hectares of land cultivated by rural farmers before and after Fuel subsidy removal Policy

Variables	Mean	Mean difference	Std error mean	t-value	Sig.
Hectares before fuel subsidy removal	3.95		0.034		
Hectares after fuel subsidy removal	3.06	0.89		9.876	0.000

Source: Field survey 2024. *** Significant at 1%

Influence of fuel subsidy removal on agricultural production output in the study area.

The results in Table 3 present multiple regression analysis examining the influence of fuel subsidy removal on agricultural production output (three major crops cultivated) by rural farmers in the study area. Double-log model (with superscript e) was selected as the lead equation because it had the highest coefficient of determination (R^2) and the conformation of the significant coefficients to expectation. The R^2 value of 0.740 implied that 74.0 % of variation in the dependent variable (production output) is explained by the changes in the independent variables included in the model. This also implies that the model has a good fit and can be relied upon to explain the influence of fuel subsidy removal on agricultural production output in the study area. F-statistics (41.673) was significant at 1 % level of probability; signifying that the removal of fuel subsidy significantly influences agricultural production output in the study. The following variables were significant; fuel price (-0.106), farm size (0.349), fuel subsidy removal (-0.008), high cost of production inputs (-0.292), annual income (0.476), farming experience (0.033) and cost of labour (-0.050).

The coefficient of fuel price (-0.106) was negative and statistically significant at (P<0.05) level of probability to agricultural production outputs. This implies that a unit increase in the price of fuel decreases agricultural production outputs in the study area. It therefore, means that the removal of fuel subsidy negatively influenced agricultural production. The regression co-efficient of farm size (0.349) was positive and significant to agricultural production output at
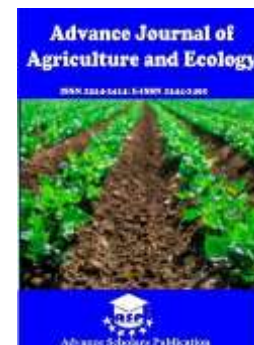
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(P<0.01). Signifying that a unit increase in the farm size cultivated increases agricultural production outputs while holding other variables constant. This is expected as increase in the hectares cultivated with proper agronomic practices increases the production outputs. Similarly, annual income (0.476) was positive and significant at (P<0.01) level of probability to output from agricultural activities in the study area. This implies that a unit increase in the rural farmers annual income increases the production outputs while holding other variables constant. Higher annual income connotes higher capital availability for more investment, the higher the volume of investment the higher the outputs. This is expected as more income availability to rural farmer could likely increase the farm size of the farmers which could also results to more outputs and sales profit. This is in agreement with the findings of Ameh and Sang, (2022) in their study on determinants of loan acquisition and utilization among smallholder rice producers in Lagos State, found that farmers with access to credit resources cultivate an average of 1.8 hectares, whereas those without credit support manage only 0.9 hectares. Fuel subsidy removal (-0.008) was negative and significant to agricultural production output while holding other variables constant at 1%. This implies that the removal of fuel subsidy decreases the production outputs of rural farmers as the removal of subsidy increases the cost of agricultural production inputs. Similarly, cost of production inputs (-0.292) was negative and statistically significant at (P<0.01) level of probability to agricultural production outputs. This implies that a unit increase in the cost of agricultural production inputs decreases agricultural production outputs in the study area while holding other variables constant. The increase in the cost of production inputs could likely reduce the hectares cultivated by rural farmers because increase in the cost of production could reduce the purchasing power of rural farmers. The result is also in agreement with the findings of Eneji & Cajethan (2024) in their research influence of oil subsidy removal on farmers' access to inputs and agricultural production in Northern Cross River State Nigeria revealed that the removal of fuel subsidy has negatively influenced on agricultural production. The influence includes increase in transportation cost, increase in the cost of purchasing farm inputs, increase in the cost of labour. Eneji & Cajethan (2024) further noted that farmers' outputs have reduced as a result of high cost of production, some farmers quitted farming due to high cost of production inputs, farmers outputs reduced as a result of high cost of production, farmers now find it difficult to use farm machines due to high cost of fuel and fuel subsidy removal resulted in shortage of food supply. Adikwu, *et al.*, (2024) concluded that rural farmer's food security is negatively and significantly influenced by the removal of fuel subsidies, which leads to a high cost of agricultural production inputs, a high cost of transportation, and an increase in food stuff prices.

Rural farmers experience in production (0.033) was positive and significant to agricultural production output at (P<0.05). Implying that an increase in rural farmers experience in production increases agricultural production outputs while holding other variables constant. Sennuga, *et al.*, (2024) in their research on impact of fuel subsidy removal on agricultural production among smallholder farmers in Niger State observed that gender, agricultural experience and level of education have significant effects on the availability of

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agricultural products. Labour cost (-2.677) was negative and statistically significant at (P<0.01) level of probability to agricultural production outputs. This implies that as the cost of hired labour increase, agricultural production outputs decrease in the study area while holding other variables constant. This could be so as increase in the cost of hired labour decrease the disposable income of rural farmers. Insufficient income can reduce the hectares cultivated; reduction in farm size connotes reduction in production outputs. Sennuga, *et al.*, (2024) in their research on impact of fuel subsidy removal on agricultural production among smallholder farmers in Niger State concluded that the removal of fuel subsidy negatively impacted agricultural activities leading to challenges such as increased transportation costs, inadequate vehicles for transporting produce to market due to high fuel costs and poor sales.

Table 3:   Influence of fuel subsidy removal on agricultural production output in the study area

Variable	Linear	Semi-log	Double-log^e	Exponential
Age	0.017 (0.901)	-1.302E-5 (0.996)	-0.034 (0.681)	1.199 (0.792)
Price of fuel	-2.011 (0.217)	-0.043 (0.172)	-0.106 (0.051) * **	-3.862 (0.639)
Farm Size	-0.016 (0.928)	-0.002 (0.468)	0.349 (0.000) *	18.065 (0.000) *
Fuel Subsidy Removal	-0.683 (0.859)	0.003 (0.965)	-0.008 (0.005) *	-4.421 (0.388)
Cost of Transport	-1.294 (0.520)	-0.034 (0.080) ***	0.050 (0.591)	3.685 (0.481)
Cost of Inputs	-4.857 (0.026) **	-0.080 (0.059) ***	-0.292 (0.000) *	-17.302 (0.000) *
Annual farm income	9.817E-6 (0.000) *	1.868E-7 (0.000) *	0.476 (0.000) *	23.969 (0.000) *
Experience	0.200 (0.258)	0.005 (0.151)	0.033 (0.037) **	1.305 (0.050) ***
Education	0.050 (0.729)	0.000 (0.887)	0.008 (0.500)	0.640 (0.352)
Cost of fertilizer	1.229 (0.315)	0.031 (0.187)	0.008 (0.934)	-1.912 (0.712)
Cost of labour	-1.225E-5 (0.362)	-2.306E-7 (0.376)	-0.050 (0.039) **	-2.411 (0.196)
Constant	40.014 (0.003) *	3.663 (0.000) *	-2.677 (0.005) *	-285.776 (0.000) *
F-statistics	27.011	23.808	41.673	38.927
P>/F/	0.000	0.000	0.000	0.00
R^2	0.474	0.491	0.740	0.531

Source: Field Survey, 2024

*Significance at 1%

**Significance at 5%

***Significance at 10%

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CONCLUSION AND RECOMMENDATION

The study concludes that rural farmer's agricultural production outputs were negatively and significantly influenced by the Federal Government removal of fuel subsidy. The study also concludes that the removal of fuel subsidy significantly reduced the hectares of land cultivated by rural farmers because the removal of fuel subsidy led to high cost of production inputs. The study further concludes that cost of labour due to removal of fuel subsidy negatively impacted agricultural production outputs. Based on the findings the research recommends that; government should subsidize agricultural production inputs to enable rural farmers afford production inputs at subsidized rate. Also, rural farmers should be encouraged to join agricultural cooperative societies in order to enjoy economies of scales in the purchase of agricultural production inputs.

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