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Effects of Fuel Subsidy Removal on Price of Selected Agricultural Products on Delta State, Nigeria

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Abstract

This study examines the effects of removing government fuel subsidies on the prices of selected agricultural commodities, specifically plantain and palm oil, in Delta State, Nigeria. It responds to growing concerns about the implications of subsidy removal for economic stability, agricultural production, marketing costs, and household welfare. A multistage sampling technique was employed to select 270 respondents comprising producers and consumers across the commodities studied. Primary data were collected using structured questionnaires and analyzed using descriptive statistics, paired sample t-test, and multiple regression analysis. The findings revealed that most respondents were female, married, economically active, possessed at least secondary education, and resided in rural communities. Regression results indicated that transportation costs, fuel price levels, and input costs significantly influenced commodity prices, with palm oil being the most affected, followed by garri, while plantain was the least affected. Paired sample t-test results showed statistically significant increases in prices of all commodities following subsidy removal. Key constraints identified include rising transportation costs, increased input prices, reduced household disposable income, and inflationary pressures. The study confirms that subsidy removal has adverse effects on agriculture through increased production costs, higher food prices, and declining household welfare. It recommends targeted palliatives, input subsidies, and improved transportation infrastructure to mitigate these effects and enhance food security and economic stability. These findings underscore the urgency for policy interventions that balance fiscal reforms with social protection measures, ensuring that vulnerable populations, rural farmers and income households, are shielded from the disproportionate burdens of fuel subsidy removal in Nigeria.

Introduction

Nigeria, recognized as the largest oil exporter within the Organization of the Petroleum Exporting Countries (OPEC), is endowed with significant oil reserves that have generated billions of dollars for the Nigerian government over the past year. Despite this enormous revenue, the supply of refined crude oil products in the country has sharply decreased due to a host of challenges, including inefficiency, corruption, mismanagement, and excessive subsidies (Ibanga, 2011; Balouga, 2012). The oil sector has not only influenced Nigeria's economic policy but is also regarded as the lifeblood of the Nigerian economy (Adekyo, 2021).

Originally put in place during the military era to ease the burden on the masses, fuel subsidies keep consumer prices of goods and services below market rates. But eventually, these subsidies were no longer viable, which resulted in problems like smuggling, corruption, and financial limitations (Omoniji, 2012). Despite the enormous amount spent on fuel subsidies, the majority of Nigeria did not benefit much from them because successive administrations embezzled and diverted funds from important infrastructure projects (Onanuga, 2012). The abrupt announcement in 2012 that fuel subsidies would no longer be provided highlighted the need for a change in economic policies with the goal of rerouting funds to other areas for long-term development (Onanuga, 2012). As a result, eliminating fuel subsidies is a delicate topic that frequently causes social unrest and unstable economies (Sheeran, 2015). Nigeria's plan to do away with fuel subsidies entirely needs to be carefully considered.

The removal of fuel subsidies has far – reaching implications, affecting various sectors like transportation, agriculture and overall economic development. The increased cost of fuel may narrow profit margin of the farmers as a result of a rise in production costs for farmers. This in turn could lead to a decline in agricultural productivity and income level of farming

households. However, higher fuel prices may also affect transportation cost making it more expensive for farmers to transport their produce to the market, ultimately impacting their ability to earn a fair income. The removal of fuel subsidies may also have broader socio-economic impact. It could worsen the already existing income inequality as low income farming households struggle to cope with the increased fuel prices, wealthier individuals may be less affected. Additionally, the removal of fuel subsidies may also lead to increased poverty level among farming households as they face difficulties in meeting their basic needs due to the higher cost of fuel.

Studies have shown alot subsidy removal leads to increased transport costs and fares, impacting agricultural and non – agricultural commodities (Olaniyi, 2016). In the same vein, the agricultural sector, was once the backbone of Nigeria's economy has suffered neglect amid the dominance of the oil industry Aguetal., 2018). The withdrawal of subsidies also presents challenges such as inflation, reduced household income and reduced competitiveness (Adenikinju 2009; Bazilian; Onyeji, 2012 and Ocheri, 2015). Meludu, *et al* (2023) in their research in the south – Eastern of Nigeria on the influence of fuel subsidy removal on price of food commodities, observed that fuel subsidy removal have a significant influence on the price of commodities. Abdulahi, *et al* (2024) a carried out a study on the Effects of Fuel Subsidy Removal on Micro, Small and Medium Enterprises (MSMEs) in North East Nigeria also observed that fuel subsidy removal brought about rise in price of commodities. Many other studies on subsidy removal have been carried but none of these studies actually focus on how fuel subsidy removal impact the livelihood capital that is how fuel subsidy removal affect the income, savings and the farm size of the small farming households.

Spending on vital sectors like healthcare and education may decline as household budgets become more tight. Higher fuel prices have an effect on the labor market as well because they may result in fewer job openings or layoffs, which would leave workers with uncertain incomes and financial stress. Since the elimination of subsidies may increase food prices and have a detrimental impact on the welfare of vulnerable households, worries about food security, poverty, and income inequality may also surface (Wazakari and Tammi, 2024).

Eliminating subsidies in the agriculture sector poses serious problems that could have a major impact on sustainability and productivity, especially for smallholder livestock farmers. To maintain the productivity of their livestock, smallholder farmers in Nigeria rely significantly on government subsidies for necessary inputs like feed and veterinary care (Okeke, 2018). The sudden elimination of these subsidies could have a significant impact on the profitability of livestock farming, affecting not only the income levels of farmers but also the availability and costs of livestock products in local marketplaces (Amadi and Obi, 2019) [12]. Additionally, prior research has shown that the removal of financial assistance raises expenses, limits access to essential services, and increases susceptibility to market fluctuations, which forces farmers to either reduce the size of their businesses or leave the sector entirely (Lawal & Adekunle, 2020) [22]. Nevertheless, the fuel subsidy was removed. However, the performance of small and medium-sized businesses has been adversely affected by the constant rise in transportation costs, shifts in consumer preferences,

and increases in input prices. This has resulted in a persistent increase in the price of goods and services and an impact on income distribution. People's suffering from poverty and hunger has increased as a result. Many families can barely afford three square meals due to the rise in consumer goods prices.

Considering Nigeria's heavy reliance on oil, oil price shocks have significant macro-economic effects on the economy, affecting prices, exchange rates, government revenues, and more (Adeniyi, *et al* 2011; Akinlo, 2012). The removal of fuel subsidies further exacerbates these effects, leading to increased fiscal planning discrepancies, inflation, income disparity (Umar and Umar, 2013; Siddigetal, 2015).

Despite Nigeria's huge oil wealth that runs into billions of dollars and the abundant natural resources, the country still faces numerous challenges that hinder its socio – economic development. With the tenth – largest proven crude oil reserves globally and substantial natural gas reserves, Nigeria should be positioned for economic prosperity.

Nigeria's excessive reliance on oil earnings and its inability to properly manage and diversify its economy are the main causes of the issue. The nation's infrastructure is still lacking, its industries are not competitive, and its people live in poverty despite decades of oil wealth (Adekoya, 2021). The elimination of fuel subsidies emphasizes even more how Nigeria's socioeconomic problems require extensive reforms and sustainable development plans. Hence, the need for this study.

Objective of the Study
The broad objective of the study is to examine the effects of fuel subsidy removal on price of the selected agricultural product in Delta State. The specific objectives are to:
1. Determine the socioeconomics characteristics of the respondent.
2. Compare the price of the selected agricultural product before and after subsidy removal.
3. Estimate the effects of subsidy removal on the price of the selected agricultural product.
4. Identify constraints faced by the small farming household as a result of subsidy removal in Delta state.

Hypotheses of the Study
H_0 = There is no significant difference between the price of the selected agricultural commodity before and after subsidy removal.

Research Methodology
Area of the Study
In Nigeria's Delta State, the study was carried out. The research location was chosen because a significant section of the local population makes their living from palm oil-related companies. On August 27, 1991, the state was formed from the former Bendel State. It has borders with the Bight of Benin to the west, which makes up around 160 kilometers of the state's coastline, Bayelsa State to the south, Edo State to the north, and Anambra and Rivers States to the east. Among the 25 local government units of the state are Asaba, the capital, which is located on the northeastern boundary of the state along the River Niger, and Warri, which is the economic hub on the southwest coast. With more over 5.6 million residents as of 2016, Delta is the 23rd largest in terms of area and the twelfth most populated. Geographically, the state is divided between Central African

mangroves along its southwest coast and Nigerian lowland forests in the majority of its interior, with a tiny portion of Niger Delta swamp forests in the state's extreme south. Its estimated land size is 1,722 km2, and it is located between latitudes 502859.7 N and longitude 5044.04.60 E. It is located in the mangrove swamp forest of Delta State, which receives between 2500 and 2800 millimeters of rain on average each year. The region's economy depends on the production of crops like vegetables, plantains, and maize.

Sampling Techniques
The target population for the study is the consumer and producers of the garri, palm oil, and plantain in Delta State. 270 respondents scooped from the target population using a multistage sampling procedure. The first stage involved random selection of three (3) Local Government Areas (LGAs) from each agricultural zone. The second stage involved random selection of four (3) communities from each of the three Local Governments selected while the third stage involved random selection of four (10) households in each community in the Local Government.

Data Collection
Primary data were used for the study. Structured questionnaire was be used to collect the data based on the intended objectives from consumers and producers of garri, palm oil and plantain. Information on the prices of garri, palm oil and plantain will be collected from national bureau of statistics (NBS). Therefore, the questionnaire consists of sections with each section targeting an objective.

Analytical Techniques
Descriptive statistics such as percentage, mean, frequency, variance etc was used to achieve the objective 1, objective 2 will be achieved using T-test was used and multiple regression will be used to achieve objective 3 while the extent to which each constraint affects consumer was measured using 4 point Likert - type scale (4=strongly agree, 3= agree, 2=strongly disagree and 1=disagree).

Model Specification

$$Pcm = f(X1, X2, X,3 - - - - - - -, X8) -$$

The functional form is expressed in the implicit forms as:
Linear form

$$Pcm = b0 + b1X1 + b2\ X2 + b3X3 - - - - - - - + b4X4) + e - - - - - - - - - - - - - - - \quad (3)$$

Semi-log form

$$Y = b0 + b1lnX1 + b2lnX2 + b3ln\ X,3 - - - - - - - + b4X4) + e - - - - - - - - - - - \quad (4)$$

Double-log form

$$lnY = b0 + b1lnX1 + b2lnX2 + b3ln\ X,3 - - - - - - - + b4X4) + e - - - - - - - - - \quad (5)$$

Exponential form

$$Y = b0 + b1X1 + b2\ X2 + b3X3 - - - - - - - + b4X4) + e - - - - - - - - - - - - - - - \quad (6)$$

Where;
Y = Price of agricultural commodity (Naira)
X1 = Subsidy (dummy yes=1, No=0)
X2 = Transportation cost (Naira)
X3 = Cost of input (Naira)
X4 = Price of PMS (Naira)
e = Error term

Results and Discussion
Socioeconomic Characteristics of Garri Respondents
Gender
According to the gender breakdown of the respondents in the Garri consumer and producers, 61.29% of them are women. Men make up 38.70%. This majority emphasizes how crucial women are to the marketing and processing of garri. Since women are in charge of food preparation and selling, garri processing is typically viewed as a female occupation in many Nigerian communities. This result is in line with cultural norms that favor women in small-scale food manufacturing, handling, and selling. Because women in rural and semi-urban areas frequently engage in small-scale trading to sustain their homes, their involvement is partly motivated by economic need. Similar findings were reported by Marcello *et al*. (2019) [31], who pointed out that because of their active activities in feeding their families and selling in markets, women make up a sizable share of agricultural commodities dealers in Nigeria.

Age
The majority of Garri respondents are between the ages of 30 and 59, with an average age of 46, according to their age distribution. This implies that the majority of garri trading and processing is done by middle-aged people. They possess the physical prowess and expertise required for these taxing jobs. Individuals in this age range are typically more conscious of market conditions and economic shifts, and they frequently make a substantial contribution to household income. The average age suggests a mature group with expertise in identifying market trends and managing difficulties such as changes in gasoline prices. Additionally, respondents between the ages of 40 and 50 exhibit higher levels of resilience and flexibility to price fluctuations, according to Adebayo and Yusuf (2018) [24].

Marital Status
According to an analysis of respondents' marital status, 42% of individuals participating in garri activities are married, followed by 28% who are divorced, 18% who are single, and 12% who are widowed. Given the greater proportion of married people, it stands to reason that people in married relationships are more likely to exchange food commodities in order to support their households. Married people tend to run larger households, which raises their food needs and necessitates a reliable source of income. It is consequently a calculated decision for their livelihood that they participate

in garri sales, a meal that is consumed on a daily basis. This is consistent with the findings of Onyeneke *et al*. (2020) [35], who discovered that marital status has a major impact on household food spending and purchases.

Years of Experience

With an average of nine years of experience, the majority of Garri responders have significant industry knowledge. This degree of experience implies that the responders are competent and informed in the marketing and processing of garri. In general, seasoned traders are better able to manage market turbulence, comprehend pricing dynamics, and make wise decisions when the economy is changing, such as when fuel subsidies are eliminated. Their knowledge of how costs have changed both before and after the elimination of subsidies is especially helpful. According to Adewuyi (2021) [25], seasoned agricultural traders are also more cognizant of market trends and cost variances.

Household size

Seven persons make up the typical household size among Garri respondents, with 70% stating that their households have seven to nine members. In rural and semi-urban areas, where extended family living arrangements are frequent, this is indicative of the prevalence of large households. Larger households are particularly susceptible to price rises for food since they require more food and rely more on reasonably priced staples like garri. These households' purchasing power and general well-being are directly impacted when transportation expenses increase as a result of the elimination of fuel subsidies. In a similar vein, the National Bureau of Statistics (2022) [32] observed that when commodity prices rise, larger households are more vulnerable to food insecurity.

Educational Level

According to the respondents' educational backgrounds, 42% of them had completed secondary school, while the remaining respondents had either completed primary, tertiary, or no formal education at all. The majority of respondents have the fundamental literacy and math skills needed for budgeting, pricing comparisons, and market calculations, according to the prevalence of secondary education. They can better comprehend and react to economic developments like inflation and policy changes thanks to this degree of education. According to Eze and Chukwu (2018) [28], education improves traders' comprehension of market swings and their capacity to use useful coping mechanisms.

Access to Credit

Garri respondents have limited access to credit; only 43% have credit, while 57% report having no credit at all. They frequently rely on personal savings or unofficial borrowing due to their lack of access to financial support, which restricts their capacity to grow their firm, make bulk purchases, or withstand economic shocks. Businesses that are unable to obtain finance are more likely to reduce their operations or increase consumer prices. This is in line with Ojo and Olayemi (2019) [34], who emphasized how important credit access is for traders to manage market shocks.

Source of Credit

Credit Sources With 66% of respondents having access to credit, cooperative societies are the most prevalent source. 14% come from microfinance organizations, and 20% come from friends and family. Because they are easily accessible, offer cheap credit rates, and demand minimal collateral, cooperative societies are favored. Akintola (2020) [26], who highlighted the function of cooperatives in bolstering rural economic activity through flexible lending alternatives, supports their significance as financial safety nets.

Table 4.1: Socioeconomic Characteristics of the Respondents (Garri)

Variables	Frequency	Percentage	Mean/Mode
Gender			
Male	19	38.70	Female
Female	31	61.29	
Age			
20-29	5	10	
30-39	11	22	
40-49	18	36	46 years
50-59	7	14	
60-69	6	12	
70-79	3	6	
Marital Status			
Single	9	18	
Married	21	42	Married
Divorce	14	28	
Widow	6	12	
Years of Experience			
1-10	38	76	
11-20	2	4	9 years
21-30	7	14	
31-40	1	2	
Household size			
1-3	5	10	
4-6	10	20	7 years
7-9	35	70	
Educational level			
No formal	10	20	
Primary	12	24	Secondary school
Secondary	21	42	
Tertiary	7	14	
Access			
Yes	22	43	No access
No	28	57	
Source of credit			
Cooperative society	33	66	
Microfinance	7	14	Cooperative society
Friends and family	14	20	

Socioeconomic Characteristics of Palm Oil Respondents Gender

With 66% of respondents, women predominate in the trading and processing of palm oil, compared to 34% of men. This majority of women reflects their historical involvement in managing household food, selling, and extracting palm oil. Because palm oil trade is flexible, profitable, and culturally acceptable, women frequently participate in it. They can manage their household responsibilities and income-generating activities thanks to this flexibility. According to the FAO (2021) [30], women make up a sizable portion of the workforce in Sub-Saharan Africa's food processing and marketing industries.

Age

The participants' average age of 47 indicates that middle-aged adults are at the top of the palm oil value chain. The majority of responders are in the 30- to 59-year-old age range, indicating a skilled and effective workforce. This age group has the physical stamina to perform labor-intensive tasks like processing palm oil, as well as the expertise to deal with financial difficulties. People in their economic prime are the primary drivers of agricultural value chains, according to Ogunniyi and Kehinde (2020) [33].

Marital Status

The bulk of responders to the survey on palm oil—64 percent—are married. The necessity to pay for household expenses like food and child care is perhaps the reason for their high numbers. These respondents' participation in the processing or trade of palm oil helps them control changes in food prices and stable household income. Prior research indicates that market participation and food purchases are highly influenced by marital status (Onyeneke *et al.*, 2020) [35].

Years of Experience

With an average of nine years of experience, respondents demonstrated a high level of proficiency in marketing, packing, and processing. Because of this experience, traders are able to predict seasonal fluctuations in the price of palm oil and modify their strategies accordingly. Particularly once fuel subsidies are eliminated, seasoned traders are typically more conscious of how transportation expenses impact the price of palm oil as a whole. Additionally, Adewuyi (2021) [25] linked improved market predicting abilities to trading experience.

Household size

Respondents who consume palm oil typically support large families, with an average household size of seven people. Larger households tend to consume more food and frequently use a lot of palm oil for cooking. Because of this dependence, palm oil is essential to their nutrition. The wellbeing of households is immediately impacted by any price increases brought on by shifts in transportation costs. This is corroborated by NBS (2022) [32], which demonstrates that during economic downturns, larger households experience higher levels of food insecurity.

Educational Level

The majority of those surveyed about palm oil (46%) had completed secondary school. This demonstrates their functional literacy and their ability to understand pricing changes, market dynamics, and the effects of governmental policies. They can better plan and react to cost changes, like changing suppliers or modifying retail prices, with the aid of education. In a similar vein, Eze and Chukwu (2018) [28] observed that merchants' market responsiveness is enhanced by education.

Access to Credit

Sixty percent of respondents said they were unable to obtain credit. Their capacity to purchase palm oil or nuts in large quantities, make equipment investments, or handle market disruptions is hampered by this lack of funding. People without access to financing are especially susceptible to the impact of growing transportation costs on the palm oil industry. According to Ojo and Olayemi (2019) [34], lowering the adverse effects of economic reforms requires having access to financing.

Source of Credit

Sixty-four percent of individuals who obtained credit did so via cooperative organizations. Cooperatives are reputable, neighborhood-based businesses that depend on social collateral and offer flexible borrowing conditions. They are crucial in helping palm oil merchants who don't have easy access to official financial systems. Similar findings in rural finance study were emphasized by Akintola (2020) [26].

Table 4.2: Socioeconomic Characteristics of the Respondents (Palm Oil)

Variables	Frequency	Percentage	Mean/Mode
Gender			
Male	17	34	Female
Female	33	66	
Age			
20-29	7	14	47 years
30-39	10	20	
40-49	20	40	
50-59	7	14	
60-69	5	10	
70-79	1	2	
Marital Status			
Single	7	14	Married
Married	32	64	
Divorce	7	14	
Widow	4	8	
Years of Experience			
1-10	32	64	9 years
11-20	9	18	
21-30	6	12	
31-40	3	6	
Household size			
1-3	5	10	7 years
4-6	12	24	
7-9	33	66	
Educational level			
No formal	9	18	Secondary school
Primary	11	22	
Secondary	23	46	
Tertiary	7	14	
Access			
Yes	20	40	No access
No	30	60	
Source of credit			
Cooperative society	32	64	Cooperative society
Microfinance	6	12	
Friends and family	12	24	

Socioeconomic Characteristics of Plantain Respondents
Gender

With 56% of respondents being women and 44% being men, women predominate in the trading and distribution of plantains. They are essential to the plantain value chain since they are used in the peeling, roasting, frying, and selling of plantains. Their involvement is associated with direct advantages for households, flexible hours, and minimal initial costs. This condition is indicative of a larger trend in Nigeria, where women predominate in small-scale manufacturing and food vending (FAO, 2021) [30].

Age

Compared to workers in garri and palm oil, plantain respondents are comparatively younger, with an average age of 45 years. The majority of responders are in the age range of 30 years to 59 years. The agility and resilience required for plantain selling, which frequently entails travel, handling perishable commodities, and quick reactions to market changes, are demonstrated by this age distribution. Those in this age group are the most economically productive, claim Adebayo and Yusuf (2018) [24].

Marital Status

In the plantain group, 42% of respondents are married, followed by 28% divorced, 18% single, and 12% widowed. Plantain trade is a common way for married people to augment their household income and guarantee a steady supply of food. The high incidence of participation among married people emphasizes the plantain's economic importance as a product and a family necessity. Marital status has a considerable impact on food spending and livelihood choices, according to Onyeneke *et al*. (2020) [35].

Years of Experience

Respondents with an average of nine years of experience in the plantain business show consistent engagement in the processing and marketing of plantains. Expert traders have devised strategies to manage transportation issues, price swings, and perishability, particularly in the wake of subsidy reductions. Their ability to handle market risks is enhanced by the skills they have acquired. Adewuyi (2021) [25], who contends that experience improves traders' flexibility in response to price fluctuations, supports this point of view.

Household size

The average household size reported by Plantain respondents is seven individuals, with the majority lying between seven and nine. Larger households strain food expenditures and raise dependency ratios. Plantains are an essential part of household diets since they are a popular commodity that may be eaten either fresh or processed. As a result, growing plantain prices associated with higher market and transportation expenses have a substantial effect on households. NBS (2022) [32] found that larger households are more likely to experience food insecurity, which is consistent with this conclusion.

Educational Level

Secondary education is the most prevalent educational level among plantain respondents (38%), followed by primary and tertiary education. Essential skills for market participation, such as basic bookkeeping, price negotiation, and comprehension of governmental economic developments, are taught in secondary education. Respondents with some formal education are more likely to adopt flexible marketing strategies. These results corroborate the findings of Eze and Chukwu (2018) [28], who discovered that education improves market efficiency and facilitates decision-making.

Access to Credit

Compared to other commodities, plantains have slightly greater access to credit, with 48% having it and 52% not. However, a sizable portion still lack official financial assistance, which limits their capacity to deal with the inherent perishability of plantains. Their ability to invest in better storage options or make larger purchases is restricted by a lack of credit. This is in line with the findings of Ojo and Olayemi (2019) [34], who emphasize the value of credit in risk management for agriculture.

Source of Credit

Out of the 48% who obtained loans, 24% did it through microfinance banks, 58% through cooperative organizations, and 18% through friends and family. This demonstrates a dependence on community-based loan programs, which have low collateral requirements and flexible repayment choices. Cooperatives play a crucial role in plantain trade, which is consistent with Akintola's (2020) [26] emphasis on their impact on financial inclusion in rural areas.

Table 4.3: Socioeconomic Characteristics of the Respondents (Plantain)

Variables	Frequency	Percentage	Mean/Mode
Gender			
Male	22	44	Female
Female	28	56	
Age			
20-29	4	10	
30-39	10	20	
40-49	15	30	45 years
50-59	12	24	
60-69	8	16	
70-79	1	2	
Marital Status			
Single	9	18	
Married	21	42	Married
Divorce	14	28	
Widow	6	12	
Years of Experience			
1-10	40	80	
11-20	6	12	9 years
21-30	2	4	
31-40	2	4	
Household size			
1-3	5	10	
4-6	13	26	7 years
7-9	32	64	
Educational level			
No formal	11	22	
Primary	12	24	Secondary school
Secondary	19	38	
Tertiary	8	16	
Access			
Yes	24	48	No access
No	26	52	
Source of credit			
Cooperative society	29	58	
Microfinance	12	24	Cooperative society
Friends and family	9	18	

Effects of Subsidy Removal on the Prices of Garri

The table below displays the results of a regression analysis of the variables influencing agricultural commodity prices. Due to the large number of independent variables, significant F-value, and high magnitude of R2, the linear function of the regression was regarded as the lead equation. The coefficient of multiple determinations (R^2) was 0.634, meaning that the independent variable in the model explained roughly 63.40% of the total variation in the dependent variable. This suggests that the predictors work

together to affect garri prices in the research area. Because garri production heavily depends on energy sources like gasoline and diesel for frying and milling, the multiple regression result showed that, at the 1% level of significance, the removal of fuel subsidies showed a negative relationship with the prices of agricultural commodities. This suggests that the removal of fuel subsidies raises the price of garri. Transporters charge higher fees to deliver goods to the market, and processors spend more on energy when fuel prices rise. These additional expenses are passed on to the final customer in the form of higher prices.

At the 1% level of significance, the cost of transportation and the price of garri have a positive relationship. This indicates increase in price of garri as the cost of transportation increase. The cost of input and premium motor spirit (PMS) are both significant and positive at the 5% and 1% levels of significance, respectively. This suggests that as input and PMS prices rise, so do marketing and production costs because PMS is crucial to both production and marketing activities. This finding is consistent with that of Adenegan and Adeoye (2019), who also discovered that the removal of subsidies raises the cost of food and transportation.

Table 4: Effects of subsidy removal on the price of garri

Model	Coef	Std. Error	t	Sig
(Constant	3088.773	2534.753	2.219	.0129
Subsidy	115.539	270.480	-4.427	.001*
TP	4.575	2.679	5.708	.000*
INPUT	1.946E-5	.000	2.246	.051*
PMS	2.469	2.522	3.979	.033**
R-squared	0.634			
Adjusted R	0.571			
F	27.377			

a Dependent Variable: price garri

Effects of Subsidy Removal on Prices of Plantain

The results of the regression study of the factors that affects the prices of plantain is shown in Table below. Linear function of the regression model was chosen as the lead equation due to the high magnitude of R2, significant of F-value and large numbers of independent variables. The coefficient of multiple determinations R2 was 0.594, meaning that the independent variable in the model explained roughly 59.40% of the total variation in the dependent variable (plantain price), with the remaining 40.6% coming from error that the model did not account for. The overall model indicates that the predictors have an impact on the dependent variable (plantain price), and it is statistically significant (F=33.261, P<0.05).

With the exception of subsidy removal, which exhibits a negative relationship with the dependent variable (plantain price), the regression analysis showed that input, transportation costs, and subsidy removal are significant at 1% (p<0.05) and have a positive relationship with the dependent variable. This suggests that the price of plantains will rise if fuel subsidies are eliminated. At the 5% level of significance, however, the price of motor premium spirit (PMS) exhibits a strong and favorable correlation with the dependent variable.

Table 5: Effects of Subsidy Removal on Prices of Plantain

Model	Coef	Std. Error	t	Sig
(Constant	3088.773	2534.753	2.219	.002
Subsidy	-115.539	270.480	-3.427	.010*
TP	4.575	2.679	2.708	.005*
INPUT1	.946E-5	.000	4.246	.007*
PMS	2.469	2.522	5.979	.053**
R-squared	0.594			
Adjusted R	0.531			
F	33.261			

a Dependent Variable: price of plantain

Effects of Subsidy Removal on the Prices of Palm Oil

The table below displays the results of the regression analysis of the variables influencing the price of palm oil. Due to the large number of independent variables, significant F-value, and high magnitude of R2, the linear function of the regression was regarded as the lead equation. The independent variable in the model accounted for approximately 71% of the total variation in the dependent variable (net profit) of the palm oil marketers, with the remaining 29% coming from error not included in the model, according to the coefficient of multiple determination R2 of 0.710. The model as a whole is statistically significant (F = 25.021, P < 0.0005), demonstrating that these predictors influence the value of palm oil. The predictors include, subsidizing the cost of transportation as well as subsidizing the cost of production with the price of petrol or gasoline; where all the prices represent a positive impact on the palm oil price, except for subsidizing the price of petrol or gasoline which reflects a negative impact on palm oil prices. Therefore, while subsequently uplifting subsidies would increase palm oil prices themselves, all other prices impacted by the removal of subsidies would negatively affect palm oil prices, leading to subsequent increases in palm oil prices themselves.

Table 6: Effects of Subsidy Removal on the Prices of Palm Oil

Model	Coef	Std. Error	T	Sig
(Constant	1381.000	18.864	73.208	.000
Subsidy	-4.619	4.481	-3.160	.000*
TP	.009	.110	-2.013	.009*
INPUT1	2.983E-5	.000	-.100	.005*
PMS	0.59	.036	2.259	.000*
R-squared	0.710			
Adjusted R	0.692			
F	25.021			

a Dependent Variable: price of palm oil

Palm oil appears to have been the commodity that experienced the most significant levels of price sensitivity from both subsidy removals and mad PMS. The two other commodities have a greater degree of price sensitivity to the cost of transportation as a consequence of their respective bulkiness and perishability leading to exposure to logistical difficulties associated with fuel subsidy removal. This finding coincides with the findings reported in Ebewore *et al* (2025) i.e. that transportation costs are the primary contributor to price variations of garri, while Ifejirike (2023) identified transportation costs as contributing to costs associated with marketing plantain. All three commodities

were affected by the subsidy removals, but to varying degrees with palm oil and garri experiencing the highest levels of price sensitivity, while plantain experienced a moderate level of price sensitivity.

Comparing Price of the Selected Agricultural Produce Before and After Subsidy

Results from the paired sample T-test for Garri, plantain, and palm oil pre and post subsidy removal have been provided in the table below. The T-test looks for statistically significant differences between prices for each of these commodities before and after subsidy removal.

The results indicated: **garri Price**: The average difference between prices for yam before and after the subsidy was -2146.20, indicating a lower price for yam before the removal of the subsidy compared to after. The T-statistic for yam was -2.927 with a p-value of .005, indicating there was a statistically significant increase in yam prices after subsidy removal.

Plantain Price: The average difference in price between plantains before and after the subsidy removal was -1120.000, showing that there was a lower price for plantains

prior to subsidy removal. The T-statistic for plantains was -9.392 with a p-value of .000, which indicates a significant increase in plantain prices after subsidy removal.

The average difference in the cost for palm oil was identified as -2235.00, suggesting prices for palm oil were less prior to subsidy removal. Following subsidy removal, there was a significant rise in the price of plantains based on the t-statistic of -18.204 and associated p-value of .000.

Among the three selected commodities, palm oil was the most influenced by the removal of the fuel subsidy (mean difference of N2235.00), closely followed by garri. This is a result of both palm oil and garri needing energy to produce and process (fuel is needed to mill and transport), while plantains are typically consumed fresh. These results align with the findings of Adewuyi and Adebayo, (2020) who also reported that removal of subsidy in Nigeria disproportionately increases prices in agro-processing sectors, as opposed to raw food commodities. This observation is consistent with other authors' (Ayanwale *et al*, 2017; FAO, 2019) assertion that palm oil has greater price variability than any other commodity due to removal of the fuel subsidy.

Table 7: Comparing Price of the Selected Agricultural Produce Before and After Subsidy

Paired Sample

		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig (2 tailed)
		Mean	Std. Deviation	Std Error Mean	Lower	Upper			
Part 1	Price of garri before subsidy removal – price after subsidy removal	-2146.20000	5399.74725	763.63958	-3769.59119	-700.40881	-2.927	49	.005
Part 2	Price of plantain before subsidy removal – price of plantain after subsidy removal	-1120.00000	843.22026	119.24935	-1359.64055	-880.35945	-9.392	49	.000
Part 2	Price of palm oil before subsidy removal – price of palm oil after subsidy removal	-2235.00000	446.23275	62.96542	-1272.73975	-1019.66625	-18.204	49	.000

Constraints associated with fuel subsidy removal

Results show that President Ahmed Tinubu's removal of subsidies has created significant issues for consumers of agricultural products. Overwhelmingly, consumers feel that the high transportation costs caused by the subsidy removal are one of the most serious issues, with a mean score of 3.5 and above the cut-off of 2.5. This is due to the fact that transportation relies on fuel to operate, and therefore, when the price of fuel increases, it creates a ripple effect on all transportation costs, including the cost of delivering agricultural products to consumers in distant markets. This conclusion is consistent with other studies, such as that of Omola (2013), which found that increased transportation costs affect agricultural pricing as well.

Additionally, the high-cost of agricultural inputs and increased-price of agricultural produce due to inflation were also identified as significant problems with mean scores of 3.02 and 3.4 respectively, both above the 2.5 cut-off imposed by removing fuel subsidies due to inflation. This is caused by the fact that as the price of oil increases, the price-

related costs associated with marketing and producing agricultural products also increase. As found in a study by Udon and Akpan (2014) on Nigeria, the removal of agricultural fuel subsidies results in reduced agricultural productivity. Farmers will continue to pay these high operating costs and farmers' will continue to compensate for high input costs by passing these costs onto final consumers. As indicated by a mean score of 2.80 — slightly above average — consumers' purchasing ability will also decline as an additional ongoing constraint on their ability to consume what they did in the past due to no increase in income. Similar findings have also been established by Obi (2019); who also estimated fuel subsidy elimination will have a further limitation on the purchasing capacity of those in the lowest-income and middle-income groups; thereby leading to food insecurity. Additionally, Adeniran and Sadiq (2018) established results indicating the multiplier effects fuel subsidy removal will have on the economy; whereby higher fuel prices will impact agricultural input prices, commodity prices, and finally consumer welfare.

Table 8: Constraint associated with fuel subsidy removal

Constraint	Strongly agree	Agree	Disagree	Strongly disagree	Total score	Weighted Mean	Remark
High cost of transportation	94	38	11	7	519	3.5	Constraint
High cost of input	72	28	31	19	453	3.02	Constraint
Increase in price of agricultural commodity	85	34	24	17	507	3.4	Constraint
Reduce purchasing power	65	28	27	30	428	2.8	Constraint

Conclusion

This research has investigated how the removal of fuel subsidies has affected the prices of selected agricultural products, such as garri, palm oil and plantain. The research objectives were accomplished through both descriptive statistics (percentages, means and modes) and inferential statistics (regression analysis). Respondents' demographics showed that most respondents were married and female at their most productive age (47) and held a secondary school education. The results of the regression analysis indicate that the removal of fuel subsidies had an impact on the prices of the agricultural products studied. Price of palm oil, garri and plantains is greatly affected by how much input costs, how much transportation costs, and the price of petrol (PMS). However, because production and processing of palm oil and garri require a significant amount of energy resources, the removal of fuel subsidies affected them more than all other selected agricultural commodities. The study showed that the elimination of the fuel subsidy impacted consumers in a number of areas, including increased transportation costs, higher input costs, reduced consumer purchasing power, and increased agricultural commodity prices. Comparative analysis revealed a substantial difference in the price of agricultural products prior to and following the removal of subsidies.

Recommendations

1. The government should subsidize transportation by providing buses and trucks that move agricultural produce from the rural to urban area where the produced are highly demanded.
2. Railways should be constructed to link cities and regions together this will ease the transportation of goods from one region to another.
3. Agricultural input subsidy should be provided and be made available to the farmers this reduce the cost of production which will in turn reduce the prices of agricultural commodity and improve the livelihood of the farmers.

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