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RESEARCH ARTICLE

Petrol Subsidy Removal and Household Rice Consumption Patterns in Oluyole Local Government Area, Oyo State, Nigeria

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ARTICLE INFO	ABSTRACT
  *Corresponding Author: isaac.oluwatayo@univen.ac.za.	This study assessed the impact of fuel subsidy removal on rice consumption patterns in Oluyole Local Government area of Oyo state, Nigeria. Data were collected through structured questionnaire administered on 120 households. Data were analyzed using descriptive statistics, Likert scale, and multinomial logit regression. The results indicated a 3.5% increase in household expenses across various categories following the reform. The Likert scale employed on household' perceptions before and after the subsidy removal revealed increased prices significantly influenced imported rice purchase. It was found that households consuming imported rice were more affected by the reform compared to those consuming local rice.

INTRODUCTION

According to recent data from Worldometer, elaborated from United Nations sources, Nigeria stands as the most populous country in Africa, with a population exceeding 226 million. This burgeoning population has led to a significant increase in food demand over recent years. Rice plays a crucial role in addressing the country's growing food needs, as it is a primary staple in Nigeria's diet, meeting the essential food security requirement of 2,400 calories per person, as noted by FAO (2000).

Globally, rice is a significant staple food, consumed by approximately 4.8 billion people across 176 countries. Notably, over 2.89 billion people in Asia, more than 150.3 million in the Americas, and over 40 million in Africa rely on rice (IRRI, 2004). In Nigeria, the average annual rice consumption per capita is 24.8 kg, contributing to 9% of the total caloric intake (IRRI, 2001). The versatility of rice, which can be prepared in various forms such as white rice with stew, rice pudding, and rice with onion stew, makes it a staple for both rural and urban populations (Ojogho and Alufohai, 2010).

The escalating demand for rice in Nigeria has outpaced local production significantly. This disparity, which has not been observed in other African countries since the mid-1970s (FAO, 2001), is surprising given Nigeria's fertile lands and favorable agro-climatic conditions. Despite these advantages, the country continues to rely heavily on rice imports from countries such as China and Thailand to meet domestic demand.

Rice consumption has shown a continuous upward trend, increasing from 240 metric tonnes in 1961 to 850 metric tonnes in 1981, 2,757 metric tonnes in 1991, and 4,970 metric tonnes in 2011. Conversely, local rice production has struggled to keep pace with this rising demand, leading to a persistent demand-supply gap. This gap has necessitated a substantial importation of rice, valued

at ₦365 billion, and has resulted in significant revenue losses due to the associated job and income losses (Ayanwale and Amusan, 2012; Bamba et al., 2010).

The increased demand for milled rice has adversely affected local rice production and marketing in Nigeria. The local varieties are less favored compared to imported ones due to higher production costs and inadequate processing infrastructure, resulting in a higher percentage of broken grains and debris. This has led to a significant preference for imported rice among Nigerian consumers.

Food consumption studies are particularly crucial in developing countries where food costs are a substantial portion of household income. Research informs nutritional policies, as highlighted by Dunne and Edkins (2005), who examined the impacts of pricing, income, and taxation policies on food consumption. In Nigeria, food consumption significantly impacts poverty, food security, living standards, and household resources. While carbohydrate-rich foods such as rice, yam, cassava, and maize have become increasingly popular, there has been a slight decline in the consumption of seafood, fresh fruits, and both processed and fresh vegetables (Obayelu et al., 2009). Despite a reduction in undernourishment by over 30% between 1979-1981 and 1996-1998, from 44% to 8% (FAO, 1999), hunger persists with a daily caloric intake of 210 Kcal per person, predominantly from cereals and roots.

Understanding household consumption patterns is essential for improving food security and mitigating poverty, particularly in light of recent economic reforms. The removal of the fuel subsidy, first introduced in 2012 and recently reinstated after significant public opposition, has had profound effects on fuel prices and, consequently, on the prices of goods and services, including food, transportation, education, and healthcare (PUNCH, 2023). This has led to a surge in inflation, with rates exceeding 27% and a sharp depreciation of the naira against the dollar, affecting purchasing power and overall living standards, particularly for the vulnerable, self-employed, and unemployed segments of the population (Premium Times, 2023). This study therefore examined the effect of the fuel subsidy removal on consumption patterns of rice among households in Oluyole LGA of Oyo state, Nigeria.

DATA AND METHODOLOGY

Data source

The information required from the respondents was gathered for this study using primary data. 120 responses were found to be suitable for the study after the cleaning was completed.

Descriptive statistics

Descriptive statistics like frequency, mean, standard deviation, and percentage was used to analyze the socio-economic characteristics, food and nonfood expenditure of the households, and the consumption pattern before and during the reform following Fakayode et al. 2010, Obayelu et al. (2023), and Muyanga et al. (2003). The consumption pattern before and after reform was investigated by using descriptive statistics to measure the change (if any) in the respondents' monthly expenditure share of food and non-food items coupled with food away from home before and during the reform.

The 5-point Likert scale

The Likert scale was used to measure the perception of households about local and imported rice before and during the reform, the perceived effect of the reform on households' consumption of local and imported rice, and lastly, the households' reason for consumption of their preferred rice variety following Willits et al.2016. The Likert scale will range from Strongly Agree (1), Agree (2), Undecided (3), Strongly Disagree (4), and Disagree (5)

Multinomial Logistic Regression Model (MNL)

The variables influencing households' preferences for rice varieties available in the area were identified using the MNL. The three rice types were modeled into MNL and used to create the options that were presented to the households. The alternatives were local rice, imported rice,

and a combination of both. The local rice consumer group was taken as the reference group (base category).

$$Y = \beta_\theta + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon_i$$

Where; Y = consumption choice before and after reform; β_θ = Intercept which is a constant; β_n = Coefficient of explanatory variables X_n ($X_1 ... X_8$); X_1 = Sex of household head (female=1, male=0); X_2 = Age (years); X_3 = Marital status of household head (never married=0, married = 1, separated = 2, divorced = 3, widowed = 4); X_4 = Years of formal education of household head; X_5 = income of the household head; X_6 = Household size (number); X_7 = Total household expenditure before reform—fuel subsidy removal-- in Naira; X_8 = Total household expenditure after reform—fuel subsidy—in Naira.

RESULTS AND DISCUSSION

Rice consumption pattern of households

Table 1 shows that there are differences in rice consumption patterns across households according to their socioeconomic characteristics. It reveals that female-headed households are more likely to consume local rice (73.3%) compared to male-headed households (26.7%), while male-headed households showed greater preference for imported rice (40.4%). Overall, female-headed households consumed the most rice across the sample (64.7%). This suggests a potential gender-based distinction in the types of rice consumed, possibly linked to differences in household preferences or access to resources. The combined rice consumption pattern (both local and imported) shows that 67.3% of female-headed households and 32.7% of male-headed households consumed rice as a major staple.

The analysis of monthly income showed that households with higher income (78,000–93,000 Naira per month) were the largest proportion of rice consumers across all categories, especially for imported rice (53.8%) and combined rice consumption (51%). This could indicate that higher-income households preferred or could afford imported rice, which may be perceived as a premium product. This result is consistent with Fakayode et al. (2010). On the other hand, households in lower-income brackets (15,000–30,000 Naira) were more likely to consume local rice (20%), and their proportion among imported rice consumers was smaller (13.5%). Additionally, the educational attainment of household heads significantly influenced rice consumption patterns. Households with heads who had tertiary education preferred imported rice (84.6%), while those with lower education levels (secondary or no formal education) were more inclined towards local rice consumption, suggesting that education might correlate with preferences or awareness of imported rice quality or status.

Table 1: Profiling Households' Rice Consumption Pattern by Socioeconomic Characteristics

	Major rice varieties consumed			
	Local (n = 15)	Imported (n = 52)	Combined (n = 49)	Total (n = 116)
Sex of household head				
Male	26.7	40.4	32.7	35.3
Female	73.3	59.6	67.3	64.7
Monthly income of household head				
15,000 – 30,000	20.0	13.5	26.5	19.8
31,000 – 46,000	13.3	21.2	10.2	15.5
47,000 – 62,000	6.7	11.5	12.2	11.2
78,000 – 93,000	60.0	53.8	51.0	53.4
Highest educational attainment of household head				
No formal education	13.3	0.0	2.0	2.6
Primary education	0.0	0.0	2.0	0.9

Secondary education	40.0	15.4	20.4	20.7
Tertiary education	46.7	84.6	75.5	75.9
Household size				
1 – 5	86.7	84.6	77.6	81.9
6 – 11	13.3	15.4	22.4	18.1

Figures are percentages

Attributes influencing households' choice of rice varieties

Table 2 presents the attributes that influenced household choices between local and imported rice varieties. It shows that the key drivers of their choices are the lower price associated with local rice and the nutritional attributes it is believed to possess. For imported rice, the majority of households cited cleanliness as the reason for their preference. This finding agrees with those of Okeke *et al.* (2015), who found that majority (50%) of household heads surveyed cited absence of impurities (stones and sand) as a justification for purchasing imported rice.

Table 2: Attributes Considered by Households in Choosing Rice Varieties

Local rice		Imported rice	
Attributes	Percentage (n = 116)	Attributes	Percentage (n = 116)
Price	44.0	Cleanliness	82.8
Nutritional value	49.1	Dryness	72.4
Grain size	33.6	Packaging	81.8
Time spent cooking	38.1	Grain size	74.1

Examining shifts in rice consumption patterns before and after reform

Tables 3 and 4 show the shifts in monthly household expenditures on local and imported rice varieties following the fuel subsidy reform. As observed in Table 3, households with low pre-reform expenditures on local rice (0–5 thousand Naira) generally maintained or slightly increased their spending after the reform. Specifically, 71.6% of households in this bracket continued spending in the same range post-reform, while 25.9% shifted to spending 5.001–10 thousand Naira. Only a small percentage (1.7%) moved into higher expenditure brackets, indicating that most households had remained within their original spending levels on local rice after the reform, possibly due to affordability constraints or preferences for local rice.

Table 3: Shifts in monthly expenditure on local rice variety after fuel subsidy reform

Expenditure before Reform (Thousand Naira)	Expenditure after Reform (Thousand Naira)					
	0 – 5	5.001 – 10	10.001 – 20	20.001 – 30	30.001 – 40	40.001 – 50
0 – 5	71.6	25.9	1.7	0.9	0	0
>5	0	0	0	0	0	0

*Figures are percentages of respondents

In contrast, Table 4 showed more significant shifts in expenditure on imported rice after the fuel subsidy reform. Households that had initially spent 0–5 thousand Naira before the reform displayed a broader distribution across expenditure brackets post-reform, with 26.7% remaining in the same range, while others had increased their spending. Notably, 17.2% moved to the 5.001–10 thousand Naira range, and 5.2% to the 10.001–20 thousand Naira range, indicating a trend of increased spending on imported rice post-reform. Similarly, households with pre-reform expenditures in higher brackets (5–10 and 10–20 thousand Naira) also shifted to higher spending ranges, most likely reflecting an increase in the cost of imported rice. However, the upper

expenditure brackets (20–50 thousand Naira) remained largely unoccupied, suggesting that most households had still kept their spending relatively low despite the shifts.

Table 4: Shifts in monthly expenditure on imported rice variety after fuel subsidy reform

Expenditure before Reform (Thousand Naira)	Expenditure after Reform (Thousand Naira)					
	0 – 5	5.001 – 10	10.001 – 20	20.001 – 30	30.001 – 40	40.001 – 50
0 – 5	26.7	17.2	5.2	0.0	0.0	0.0
5 – 10	17.2	21.6	3.4	0.0	0.0	0.0
10 – 20	1.7	5.2	0.0	0.9	0.0	0.0
20 – 30	0.0	0.0	0.0	0.0	0.0	0.0
30 – 40	0.0	0.0	0.0	0.0	0.0	0.0
40 – 50	0.0	0.9	0.0	0.0	0.0	0.0

Examining the determinants of rice consumption choice before and after the reform

Tables 5 and 6 show the determinants of rice consumption among households both before and after the fuel subsidy reform. In the pre-reform period, education and the primary occupation of the household head were key determinants of rice consumption across all varieties. Specifically, higher education levels of the household head had a significant positive effect on both overall rice consumption (p = 0.04) and imported rice consumption (p = 0.01). Households where the head had a primary occupation outside agriculture were also more likely to consume both all varieties of rice (p = 0.02) and imported rice (p = 0.003). Household size had a significant negative impact on imported rice consumption (p = 0.03), suggesting that larger households may have preferred local rice due to cost considerations. Meanwhile, monthly income had only a marginal influence on imported rice consumption pre-reform (p = 0.07), indicating that income played a less prominent role in determining rice consumption patterns before the policy change.

Post-reform, the determinants of rice consumption exhibited some shifts. Education of the household head remained a significant factor for both overall rice consumption (p = 0.03) and imported rice consumption (p = 0.04), underscoring the continued importance of education in influencing dietary choices. The primary occupation of the household head also stayed significant for overall rice consumption (p = 0.03) and was highly significant for imported rice consumption (p = 0.01). Significantly, total household expenditure became a significant factor influencing imported rice consumption post-reform (p = 0.07), indicating that changes in household spending patterns, likely due to the reform, had a stronger effect on the ability to purchase imported rice. Overall, these findings suggested that while education and occupation remained critical determinants of rice consumption, household financial dynamics became more pronounced post-reform, particularly in influencing the consumption of imported rice.

Table 5: Determinants of Rice Consumption among Households (Pre-reform)

Variables	Rice consumption pre-reform (all varieties)				Imported rice consumption pre-reform			
	Coefficient	Standard error	p-value	Marginal effects	Coefficient	Standard error	p-value	Marginal effects
Monthly income	0.0001	0.0001	0.37	-0.00002	0.0003	0.0002	0.07*	0.00003 68
Age of head	0.363	0.373	0.33	0.101538 6	-0.117	0.418	0.78	-0.085056
Sex of head	-0.614	0.796	0.44	0.016579 3	-0.916	0.824	0.27	-0.081004
Education of head	0.654	0.325	0.04**	-0.085013	1.374	0.561	0.01***	0.166744 2
Household size	-2.53	2.29	0.27	0.339661 8	-5.379	2.498	0.03**	-0.657702

	Coefficient	Standard error	p-value	Marginal effects	Coefficient	Standard error	p-value	Marginal effects
Marital status of head	-0.406	0.637	0.52	-0.108097	0.099	0.673	0.15	0.088656
Primary occupation of head	0.553	0.237	0.02**	-0.003487	0.757	0.251	0.003**	0.059298
Total household expenditure	0.00003	0.00003	0.347	-6.72E-06	0.00008	0.00003	0.02**	0.0000111
Constant	-3.565	2.424	0.141		-8.08	3.356	0.02	
Log-likelihood	-96.5							
Likelihood ratio	0.003							
Chi-square	113							

*Note: * = significant at 10%, ** = significant at 5% and *** = significant at 1%*

Table 6: Determinants of Rice Consumption among Households (Post-reform)

	Rice consumption post-reform (all varieties)				Imported rice consumption post-reform			
	Coefficient	Standard error	p-value	Marginal effects	Coefficient	Standard Error	p-value	Marginal effects
Monthly income	0	0	0.66	2.42E-06	0.00002	0.00003	0.96	3.41E-06
Age of head	0.041	0.043	0.34	0.009342	0.003	0.047	0.95	-0.00682
Sex of head	-0.236	0.799	0.77	0.073941	-0.799	0.814	0.33	-0.13068
Education of head	0.706	0.323	0.03**	-0.0393	1.087	0.527	0.04**	0.108856
Household size	0.209	0.182	0.25	0.037982	0.054	0.188	0.77	0.038519
Marital status of head	-0.293	0.619	0.64	-0.09868	0.212	0.618	0.73	0.098362
Primary occupation of head	0.45	0.212	0.03**	-0.00924	0.575	0.221	0.01***	0.043933
Total household expenditure	0.00001	0.00001	0.2	-6.34E-06	-5E-05	0.00003	0.07*	-5.05E-06
Constant	-4.181	2.714	0.12		-4.485	3.332	0.18	
Log-likelihood	-99.7							
Likelihood ratio	29.84							
Chi-square	0.02							

*Note: * = significant at 10%, ** = significant at 5% and *** = significant at 1%*

Examining the perceived effects of the reform on local and imported rice consuming households

As shown in table 7, the reform did not have significant effects on the local rice-consuming households as majority disagreed with all the perception statements. This could be because local rice is a minority variety amongst the households. The reverse was the case with the imported rice-consuming households as majority agreed with all the perception statement highlighted. The

most significant effects experienced by the imported rice-consuming households are a reduction in quantity consumed and price becoming a limiting factor in the purchase of imported rice.

Table 7: Perceived Effect of Fuel Subsidy Reform on Households Rice Consumption

Responses of Consumers of Local Rice Variety			Responses of Consumers of Imported Rice Variety		
Perception statement	Agreed	Disagreed	Perception Statement	Agreed	Disagreed
The reform led to a shift from local to imported rice	25.3	63.8	The reform led to a shift from imported to local rice	35.3	50.9
The reform led to a substitution of local rice with other staples	23	76.1	The reform led to a substitution of imported rice with other staples	52.2	48.3
The reform led to a reduction in non-food expenses due to high cost of local rice	11.8	90.8	The reform led to a reduction in non-food expenses due to high cost of imported rice	41	63.2
Price became a limiting factor in the purchase of local rice following the reform	29.3	66.4	Price became a limiting factor in the purchase of imported rice following the reform	66.4	34.6
The reform led to a reduction in the quantity of local rice consumed due to price increase	43.1	51	The reform led to a reduction in the quantity of imported rice consumed due to price increase	63.5	41.5

CONCLUSION

The study showed that the reform had a negative effect on households' consumption, especially their local and imported rice consumption. However, the impact had more intensity in their imported rice consumption. Ultimately, a higher cost of living resulting in a lower quality of life was the resultant effect of the reform on households in Oluyole local government. Based on the findings from the study, it is recommended that policies aimed at mitigating the impact of fuel subsidy removal on household expenditure should be prioritized. This could involve targeted support for low and middle-income households through social security or income-generating programs to cushion the effects of the increased cost of living as a result of the fuel subsidy removal. In addition, policymakers should consider implementing measures to support local rice

production and promote its consumption among households. This would improve its competitiveness against the imported varieties.

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