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Fuel Subsidy Removal and Household Livelihood Outcomes in Katsina State, Nigeria (2023–2025)

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Abstract

The removal of the petroleum subsidy in Nigeria in 2023 represented a major economic policy change with implications for household income, expenditure, employment, food security and access to essential services. This study assessed the relationship between fuel subsidy removal and household livelihood in Katsina State, Nigeria, between 2023 and 2025. A mixed-method descriptive survey design was adopted, involving 500 household respondents, five key informant interview participants and five focus group discussion participants. Data were collected using a structured questionnaire, a semi-structured interview guide and a focus group discussion guide. The questionnaire was validated by three experts and pilot-tested among 30 respondents, producing Cronbach's alpha coefficients ranging from .72 to .86 across its sections. Quantitative data were analysed using descriptive statistics, simple linear regression, one-way analysis of variance and independent-samples t-test, while qualitative data were analysed thematically. The results showed statistically significant relationships between fuel subsidy removal and household income and expenditure ($R^2 = .836$, $F(1, 498) = 2537.874$, $p < .001$), employment and livelihood opportunities ($R^2 = .864$, $F(1, 498) = 3154.140$, $p < .001$), food security and household welfare ($R^2 = .477$, $F(1, 498) = 455.052$, $p < .001$), and access to education and healthcare ($R^2 = .287$, $F(1, 498) = 200.582$, $p < .001$). Differences across occupational groups were not statistically significant, $F(4, 495) = 1.276$, $p = .278$, while the rural–urban comparison was also not statistically significant, $t(498) = .551$, $p = .582$. Qualitative findings identified household expenditure pressures, livelihood adjustments, food and essential-service trade-offs, reliance on informal social-support networks, and concerns about the adequacy and accessibility of formal interventions. The study concludes that fuel subsidy removal was significantly associated with important dimensions of household livelihood among the surveyed households. It recommends transparent and targeted social protection, support for small-scale livelihood activities, food-security interventions, and measures to protect access to education and healthcare during major economic reforms.

Keywords: Fuel subsidy removal; household livelihood; household expenditure; employment opportunities; food security; social protection; Katsina State; Nigeria.

Introduction

Fuel subsidy reform has remained an important issue in economic policy debates, particularly in oil-producing countries where governments use public resources to influence the prices of petroleum products. Subsidies are often defended as a means of reducing the cost of living and protecting consumers from fluctuations in energy prices. However, they may also impose substantial fiscal costs, distort market signals and reduce the resources available for other public priorities. Coady et al. (2015) explain that energy subsidies have significant fiscal, economic and environmental implications, while Coady et al. (2015) also demonstrate that the

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distribution of fuel subsidy benefits is not necessarily equitable, as higher-income households may capture a substantial proportion of the benefits. These competing considerations make subsidy reform a complex policy issue, particularly where a large proportion of the population depends on petroleum-related transport and energy services.

Nigeria's decision to remove the petrol subsidy in May 2023 formed part of a broader economic reform programme intended to address fiscal pressures and improve macroeconomic management. The World Bank (2023) identified subsidy removal and foreign-exchange reform as major policy changes with the potential to improve fiscal space and support economic adjustment. Nevertheless, the immediate consequences of such reforms depend on how increased petroleum prices are transmitted through transportation, production, distribution and household consumption. The World Bank emphasised that compensatory transfers would be important in protecting vulnerable households from the initial price effects of the reform, particularly where increased living costs could lead families to withdraw children from school or delay visits to health facilities (World Bank, 2023). The IMF (2024) similarly highlighted the need for effective social protection and timely support during Nigeria's economic adjustment.

The relationship between fuel prices and household livelihood extends beyond the direct cost of purchasing petrol. Transportation is an important input in the movement of agricultural produce, food distribution, market transactions, commuting and access to public services. Increased transport costs may therefore affect the prices of essential commodities and the operating expenses of businesses. For households, the resulting pressure may appear in the form of higher food expenditure, reduced disposable income, lower savings and difficulty meeting essential needs. Okereke et al. (2024) observed that Nigeria's dependence on petrol exposes households, particularly those with lower incomes, to welfare losses when prices rise following subsidy reform. Simpson et al. (2024) also noted that the welfare consequences of reform require careful consideration because lower-income and rural households may be particularly vulnerable to increased energy and transport costs.

The economic implications of subsidy removal should therefore be examined through a multidimensional understanding of livelihood. Chambers and Conway (1992) describe livelihood in terms of people's capabilities, assets and activities through which they secure a means of living. The sustainable livelihoods approach recognises that household welfare depends on more than income; it also involves access to productive resources, education, health, social relationships and the capacity to withstand economic shocks. The Department for International Development (DFID, 1999) further explains that livelihood security is influenced by vulnerability, assets, institutional structures and livelihood strategies. These ideas are relevant to households experiencing sudden changes in the cost of transportation and essential goods because their ability to adjust depends on the resources available to them.

In Nigeria, the consequences of rising living costs have become a concern for household welfare, especially where income does not increase at the same pace as prices. The National Bureau of Statistics (NBS, 2024a) provides household-level evidence through the General Household Survey-Panel, which examines income-generating activities, welfare and socioeconomic outcomes over time. The World Bank (2022) also identifies poverty, labour-market conditions and social protection as important dimensions of Nigeria's development challenges. These conditions provide a wider context for examining how households respond to economic

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reforms, although they do not independently establish the effect of subsidy removal in any particular state.

Food security is one of the important dimensions through which economic shocks can affect household livelihood. When transportation and distribution costs increase, food prices may also rise, depending on production conditions, market structures, exchange-rate movements, insecurity and other supply-side factors. Abang et al. (2024) examined the relationship between fuel subsidy removal, insecurity and food inflation in Nigeria and reported that these factors were relevant to food-price pressures. Onogbosele and Adejoh (2024) also examined the relationship between fuel subsidy payments and food inflation, identifying the role of fuel prices and agricultural productivity in food-price movements. The wider implications of food insecurity are reflected in the global assessment by the Food and Agriculture Organization of the United Nations, the International Fund for Agricultural Development, UNICEF, the World Food Programme and the World Health Organization (FAO et al., 2024), which emphasises the continuing challenge of ensuring access to nutritious and affordable food.

Household employment and livelihood activities may also be affected when petroleum prices increase. Farmers may face higher costs of transporting produce and obtaining agricultural inputs, while traders may experience increased logistics expenses. Artisans and small-business operators may encounter higher operating costs, particularly where their activities depend on fuel-powered equipment or transport services. Transport operators are directly exposed to changes in fuel prices, while salaried workers may experience a reduction in real disposable income where commuting and household expenses rise. The NBS (2023) Labour Force Survey provides important context on the structure of employment in Nigeria, including the high proportion of workers engaged in informal employment and self-employment. These employment arrangements may limit the ability of workers to absorb sudden increases in operating costs or living expenses.
Empirical research has also shown that household responses to economic shocks are not always uniform. Animashaun and Wossink (2024), examining household responses during Nigeria's 2009–2015 oil crisis, demonstrate that consumption and livelihood adjustments may differ according to household location, consumption patterns and labour-supply decisions. Datti (2024) found that increased household spending after subsidy removal was associated with transportation, food, medical and energy expenses in selected urban areas of north-western Nigeria. The findings of these studies reinforce the importance of examining household-level experiences rather than relying exclusively on national macroeconomic indicators. The relationship between fuel subsidy removal and access to education and healthcare is equally important. Where households face increased expenditure on transportation and basic commodities, they may have fewer resources available for school-related costs, medical treatment and preventive healthcare. The World Bank (2023) specifically warned that inadequate compensation could encourage coping strategies with long-term consequences, including reduced school attendance and delayed healthcare. The IMF (2025) also noted that, despite improvements in some macroeconomic indicators following reforms, inflation, food insecurity and poverty remained important concerns. Such evidence underscores the need to assess not only the fiscal implications of reform but also its consequences for human development and household welfare.

Social relationships may provide some protection when households experience economic hardship. Family support, cooperative societies, rotating savings arrangements and women's groups can provide access to small loans, shared resources and temporary assistance. Coleman

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(1988) explains that social capital is embedded in relationships and social structures that facilitate action. However, informal networks may become less effective when many households within the same community experience similar economic pressures. Becker's (1964) human-capital perspective also provides a useful basis for considering why reduced access to education and healthcare may have consequences beyond immediate consumption, as these services contribute to individuals' future productive capacity.

Previous studies have examined subsidy reform, poverty, household welfare and food-price changes in Nigeria. Gamette and Oteng (2024) reviewed research on fuel subsidy removal in oil-producing economies and identified transportation costs as an important channel through which subsidy reform may influence poverty. Okorie and Wesseh (2024) examined welfare and environmental outcomes under alternative policy arrangements, showing the importance of accompanying reforms with appropriate policy measures. Okereke et al. (2024) focused on the distributional implications of Nigeria's reform and the potential role of redistributive measures in cushioning household welfare losses. Although these studies provide valuable national and comparative insights, the experiences of households in Katsina State require specific examination because livelihood activities, household resources and access to services vary across locations.

Katsina State has households engaged in farming, trading, civil service employment, artisan work and transportation. These occupations have different relationships with transport, energy and market costs. Rural and urban households may also experience economic pressures through different channels. Rural households may face challenges associated with transporting agricultural produce and accessing services, while urban households may experience higher commuting and distribution costs. However, the extent to which these differences translate into statistically distinct household experiences requires empirical examination rather than assumption.

The present study therefore assesses the relationship between fuel subsidy removal and household livelihood in Katsina State between 2023 and 2025. It examines household income and expenditure, employment and livelihood opportunities, food security and household welfare, and access to education and healthcare. It further investigates whether household income and expenditure patterns differ across occupational groups and whether reported experiences differ between rural and urban households. By combining quantitative survey results with qualitative accounts, the study contributes location-specific evidence to discussions about the social implications of economic reform. The study is guided by the sustainable livelihoods perspective and recognises that the observed household experiences occurred within a wider economic environment influenced by inflation, exchange-rate movements, food-price changes and other factors.

Methodology

The study adopted a mixed-method descriptive survey design to examine the relationship between fuel subsidy removal and household livelihood in Katsina State, Nigeria. The quantitative component provided information for statistical analysis of household income and expenditure, employment and livelihood opportunities, food security and welfare, and access to education and healthcare. The qualitative component provided additional information on household experiences, coping strategies and perceptions of institutional support. The use of both approaches was considered appropriate because mixed-method research enables the integration of numerical

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patterns with participants' explanations of social and economic experiences (Creswell & Plano Clark, 2018; Creswell & Creswell, 2018).

The study was conducted in Katsina State, in north-western Nigeria. The state comprises 34 Local Government Areas grouped into Katsina, Daura and Funtua senatorial districts. The population adopted in the thesis for sample-size determination was 1,457,000 households. Using Yamane's (1967) formula at a precision level of .05 produced a minimum sample of approximately 400 households. The final quantitative dataset used for analysis contained 500 respondents. A stratified sampling approach was adopted to provide representation across the three senatorial districts and rural and urban settings. The final dataset comprised 188 rural respondents and 312 urban respondents. The occupational categories represented were farmers, traders, civil servants, artisans and transporters. Five participants were selected for key informant interviews, while five participated in a focus group discussion. The qualitative participants included individuals with experience in farming, trading, civil service, transportation, household management and education. Data were collected using a structured questionnaire, a semi-structured key informant interview guide and a focus group discussion guide. The questionnaire contained eight demographic items and 23 substantive items covering the study variables. The response categories were Strongly Agree, Agree, Disagree, Strongly Disagree and Not Applicable. The key informant interview guide contained eight questions, while the focus group discussion guide contained ten questions. Three experts assessed the instruments for face and content validity. A pilot test involving 30 respondents was conducted in Kankia Local Government Area, and Cronbach's alpha coefficients ranged from .72 to .86 across the questionnaire sections. Cronbach's (1951) coefficient alpha provides a measure of internal consistency, while Tavakol and Dennick (2011) caution that its interpretation should consider the nature and purpose of the measurement scale.

The data collection exercise lasted six weeks and was supported by five trained research assistants fluent in Hausa and English. Quantitative information was obtained through questionnaire administration, while qualitative information was obtained through interviews and group discussion. Participation was voluntary, respondents were informed about the academic purpose of the research, and confidentiality was maintained. The study documentation did not provide an ethics approval reference number; therefore, none is reported in this article.

Quantitative data were analysed using SPSS Version 23.0. Frequencies and percentages were used to describe respondents' characteristics. Four simple linear regression models were estimated to examine the relationships between fuel subsidy removal and the four household livelihood dimensions. One-way analysis of variance was used to test differences in household income and expenditure patterns across occupational groups, while an independent-samples t-test was used to compare rural and urban respondents. Statistical decisions were made at the .05 level of significance. Qualitative data were analysed thematically through familiarisation, coding, grouping of related codes and development of themes, following the general principles of thematic analysis discussed by Braun and Clarke (2021). The quantitative and qualitative findings were integrated during interpretation to identify areas of convergence and provide context for the statistical results.

Because the study was based on a nonexperimental survey, the regression results are interpreted as statistical relationships between the measured variables rather than conclusive proof that subsidy removal alone caused the reported household outcomes. Other economic

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developments during the study period, including inflation, exchange-rate changes, food-price movements and local market conditions, may also have influenced household welfare.

Results

Demographic and Socioeconomic Characteristics of Respondents

The study contained 500 respondents. The occupational distribution showed that civil servants represented the largest group, with 129 respondents (25.8%), followed by traders with 106 (21.2%), artisans with 104 (20.8%), farmers with 85 (17.0%) and transporters with 76 (15.2%). In terms of residence, 312 respondents (62.4%) were from urban areas, while 188 (37.6%) were from rural areas. The income distribution showed that 256 respondents (51.2%) reported monthly household income between ₦50,000 and ₦100,000, while 122 (24.4%) reported income between ₦20,000 and ₦50,000. Only 29 respondents (5.8%) reported monthly household income above ₦150,000. The income distribution indicates that most respondents were concentrated within the ₦20,000–₦100,000 monthly household-income categories. This is important when interpreting the findings because households within these income ranges may have limited flexibility when transportation, food and other essential expenses increase. The World Bank (2022) identifies poverty and limited household resources as persistent development concerns in Nigeria. The NBS General Household Survey-Panel also provides evidence of the importance of examining household income-generating activities and welfare at household level (NBS, 2024a). The occupational distribution in the present study further shows that respondents were engaged in activities with different levels of exposure to transport and energy costs.

Relationship between Fuel Subsidy Removal and Household Income and Expenditure

The first regression model examined the relationship between fuel subsidy removal and household income and expenditure. The model produced a correlation coefficient of $R = .914$ and a coefficient of determination of $R^2 = .836$. The result indicates a strong statistical relationship between the two composite measures, with the model accounting for 83.6% of the variance in the household income-and-expenditure measure. The regression model was statistically significant, $F(1, 498) = 2537.874$, $p < .001$. The null hypothesis of no significant relationship was therefore rejected.

Table 1. Summary of regression results for the four household livelihood dimensions

Dependent variable	R	R Square	F	df	Sig.
Household income and expenditure	.914	.836	2537.874	1, 498	<.001
Employment and livelihood opportunities	.929	.864	3154.140	1, 498	<.001
Food security and household welfare	.691	.477	455.052	1, 498	<.001
Access to education and healthcare	.536	.287	200.582	1, 498	<.001

Source: author's analysis, 2026

The result in Table 1 above suggests that the fuel subsidy removal measure was strongly associated with the household income-and-expenditure measure among the surveyed households.

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The high coefficient of determination indicates that the model accounted for a substantial proportion of the observed variation in the outcome measure. It should not, however, be interpreted as proof that subsidy removal alone caused 83.6% of changes in household income or expenditure. The study did not use an experimental or longitudinal causal design, and other economic conditions may also have influenced the outcome.

The finding is consistent with the broader evidence that petroleum-price changes can affect household budgets through transportation and the prices of goods and services. Okereke et al. (2024) found that the removal of fuel subsidies in Nigeria has important welfare implications, particularly for lower-income households that depend on petrol-related transport and services. Datti (2024) similarly reported that transportation, food, medical and energy expenses were important components of household spending following subsidy removal in selected north-western urban areas. The findings also relate to the analysis by Animashaun and Wossink (2024), which demonstrates that household expenditure patterns respond to wider oil-price shocks and that coping responses vary according to household circumstances. The qualitative accounts support this interpretation. Participants described increased pressure on household budgets and the need to rearrange spending priorities. Some accounts indicated that households had reduced non-essential expenditure, changed transportation arrangements or redirected money previously allocated to other needs. These experiences illustrate how increased living costs may affect the financial resources available for household consumption. The findings are also consistent with the sustainable livelihoods perspective, which treats financial resources as one of several assets required to maintain household livelihood security (Chambers & Conway, 1992; DFID, 1999).

Relationship between Fuel Subsidy Removal and Employment and Livelihood Opportunities

The second regression model examined the relationship between fuel subsidy removal and employment and livelihood opportunities. The model produced $R = .929$ and $R^2 = .864$, indicating a strong statistical relationship between the measured variables. The model accounted for 86.4% of the variance in the employment-and-livelihood-opportunities measure. The regression result was statistically significant, $F(1, 498) = 3154.140$, $p < .001$. The null hypothesis was therefore rejected. The result indicates a strong association between the fuel subsidy removal measure and the employment-and-livelihood-opportunities measure. This relationship is important because the occupational activities represented in the study depend, to varying degrees, on transportation, energy and the movement of goods. Farmers may incur higher costs when transporting produce and agricultural inputs, traders may face increased logistics expenses, and artisans may experience higher operating costs. Transport operators are directly exposed to fuel-price changes, while civil servants and other salaried workers may face increased commuting expenses.

The qualitative findings identified livelihood adjustments, multiple income activities and work-related disruptions. Participants described the difficulty of maintaining previous business activities when operating costs increased. Some accounts indicated that households sought additional sources of income or changed their livelihood arrangements to meet basic needs. These experiences suggest that economic adjustment may extend beyond household consumption to the organisation and sustainability of income-generating activities.

The finding is consistent with the NBS (2023) labour-force evidence showing the importance of self-employment and informal work in Nigeria. Workers in informal activities may have limited access to employment protection and may be required to absorb increases in operating

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costs themselves. Gamette and Oteng (2024) also identify transportation costs as an important pathway through which fuel subsidy removal can affect livelihoods and poverty. The results are therefore consistent with the argument that economic reforms should be accompanied by measures that protect productive activities and support households whose income depends on small-scale businesses and informal employment.

Relationship between Fuel Subsidy Removal and Food Security and Household Welfare

The third regression model examined the relationship between fuel subsidy removal and food security and household welfare. The model produced $R = .691$ and $R^2 = .477$, indicating that 47.7% of the variance in the food-security-and-welfare measure was statistically accounted for by the model. The ANOVA result showed that the regression model was statistically significant, $F(1, 498) = 455.052$, $p < .001$. The null hypothesis was therefore rejected.

The result indicates a statistically significant relationship between the fuel subsidy removal measure and the food-security-and-welfare measure. The R^2 value was lower than those obtained for household income and expenditure and employment and livelihood opportunities. This suggests that other factors may also explain a substantial proportion of the variation in food security and welfare. Such factors may include household income, food production, insecurity, exchange-rate movements, market supply conditions and seasonal price changes. The qualitative accounts identified food-related adjustments, including reducing meal frequency, changing the types of food purchased and substituting more expensive food items with less costly alternatives. Some participants also reported the sale of livestock or other assets and the use of borrowing to meet household needs. These accounts provide contextual evidence of coping practices, although they should not be interpreted as estimates of how frequently such practices occurred across all 500 households.

The finding is consistent with Abang et al. (2024), who examined fuel subsidy removal, insecurity and food inflation in Nigeria and reported a significant relationship between these factors and food-price pressures. Onogbosele and Adejoh (2024) also identified the relationship between fuel subsidy payments, petroleum prices and food inflation. The FAO et al. (2024) report highlights the continuing global challenge of food insecurity and the importance of financing interventions that improve access to adequate and nutritious food. The findings of the present study therefore reinforce the need to consider food affordability as a central component of household welfare during periods of economic adjustment.

Relationship between Fuel Subsidy Removal and Access to Education and Healthcare

The fourth regression model examined the relationship between fuel subsidy removal and household access to education and healthcare. The model produced $R = .536$ and $R^2 = .287$, indicating that 28.7% of the variance in the access-to-education-and-healthcare measure was statistically accounted for by the model. The regression result was statistically significant, $F(1, 498) = 200.582$, $p < .001$. The null hypothesis was therefore rejected. The result indicates a significant relationship between the fuel subsidy removal measure and household access to education and healthcare. Although the model accounted for a smaller proportion of the variance than the other three models, it identifies an important dimension of livelihood. Education and healthcare expenses compete with food, transportation and other household needs for limited resources. When the cost of meeting basic needs increases, households may have difficulty

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maintaining expenditure on school-related requirements and medical treatment. The qualitative accounts provide further context. Participants reported that some households delayed visits to health facilities, relied on self-medication or traditional remedies, and experienced difficulty meeting education-related expenses. Other accounts referred to children missing school or becoming involved in income-generating activities. These observations are reported experiences from the qualitative participants and should not be treated as evidence that such outcomes occurred in every household.

The finding is consistent with the World Bank's (2023) warning that inadequate compensatory support following subsidy removal could encourage households to delay healthcare or reduce children's school attendance. It is also relevant to the IMF's (2024) emphasis on targeted social protection during economic adjustment. From a human-capital perspective, access to education and healthcare contributes to the capabilities through which individuals participate productively in society (Becker, 1964). The results therefore highlight the importance of protecting essential services when households experience increased living costs.

Differences in Household Income and Expenditure Patterns across Occupational Groups

The study examined whether household income and expenditure patterns differed significantly among farmers, traders, civil servants, artisans and transporters. The descriptive results showed some variation in the group means. Farmers recorded a mean of 11.377, traders 11.340, civil servants 10.442, artisans 11.192 and transporters 10.855. However, the one-way ANOVA result was not statistically significant, $F(4, 495) = 1.276$, $p = .278$. The null hypothesis was therefore not rejected.

Table 2. Differences in household income and expenditure patterns across occupational groups

Occupational group	N	Mean	Standard deviation
Farmers	85	11.377	3.805
Traders	106	11.340	3.832
Civil servants	129	10.442	3.653
Artisans	104	11.192	3.558
Transporters	76	10.855	3.661
Total	500	11.010	3.704

Source: author's analysis, 2026

The absence of a statistically significant difference suggests that the observed variations in the group means were not sufficiently large to establish distinct occupational-group differences at the .05 significance level. This does not mean that all occupations experienced identical circumstances. Rather, the analysis did not find sufficient statistical evidence of differences in the measured income-and-expenditure outcome across the five groups.

The qualitative findings suggest that the mechanisms through which households experienced economic pressure varied by occupation, even though the statistical comparison did not identify significant differences in the overall group measure. Farmers described pressures associated with agricultural inputs and produce transportation, traders referred to the cost of moving goods, and transport operators were directly exposed to fuel costs. Civil servants and other household earners faced increased household and commuting expenses. This distinction between different pathways and the absence of a statistically significant difference in the overall measure is important.

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The result may be understood in the context of wider economic shocks that affect several sectors simultaneously. Animashaun and Wossink (2024) show that household responses to oil-price shocks may vary according to household circumstances, while the wider reform analysis by Okereke et al. (2024) demonstrates that subsidy removal can generate welfare consequences across income groups. The present finding therefore suggests that occupational differences should not be assumed solely from the nature of the work; they require separate statistical evidence.

3.7 Differences between Rural and Urban Households

The independent-samples t-test examined whether the measured impact of fuel subsidy removal differed significantly between rural and urban households. Rural respondents recorded a mean score of 11.128 (SD = 3.701), while urban respondents recorded a mean of 10.939 (SD = 3.710). The test showed no statistically significant difference, $t(498) = .551$, $p = .582$. The null hypothesis was therefore not rejected. The result indicates that the difference between rural and urban respondents was not statistically significant. Although rural respondents recorded a slightly higher mean score, the observed difference was not sufficient to establish a statistically distinct outcome. This finding suggests that the measured household experience was not significantly differentiated by residential location within the study sample.

The qualitative accounts provide a possible explanation for this result. Rural and urban households may experience economic pressures through different channels, but both are connected to the wider economy through transportation, food markets and access to essential services. Rural households may experience increased costs associated with moving agricultural produce and accessing services, while urban households may face higher commuting and distribution expenses. These differences in the pathways of exposure do not necessarily produce statistically different overall scores. The result should be interpreted as applying to the sample and the measured composite variable rather than as proof that rural and urban households have identical living conditions. The World Bank (2022) and NBS (2024a) emphasise the importance of examining household welfare across different locations and socioeconomic conditions. The findings of the present study suggest that mitigation measures should be accessible to both rural and urban households rather than being designed on the assumption that one group is unaffected.

Qualitative Findings and Integration with the Quantitative Results

The key informant interviews and focus group discussion provided additional information about household experiences. The five key informants represented farming, trading, civil service, commercial transportation and a woman-headed low-income household. The five focus group participants included a farmer, trader, artisan, housewife and student. The analysis identified recurring accounts of increased living costs, livelihood adjustments, reduced food consumption, difficulties meeting education and healthcare expenses, informal social support and dissatisfaction with formal interventions.

The first theme concerned widespread pressure on household expenditure. Participants described increased transportation costs and the difficulty of maintaining previous spending patterns. These accounts are consistent with the quantitative result showing a strong relationship between fuel subsidy removal and household income and expenditure. They also reflect the findings of Okereke et al. (2024) and Datti (2024), which identify household welfare and expenditure as important dimensions of the subsidy-removal experience.

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The second theme concerned livelihood adjustment and work disruption. Participants described changes in business activities and the need to seek additional sources of income. The accounts suggest that increased operating expenses can affect both the ability to maintain existing work and the amount of income available for household use. This provides contextual support for the significant regression relationship involving employment and livelihood opportunities. It also relates to the importance of informal employment and self-employment in Nigeria's labour market (NBS, 2023).

The third theme concerned food and essential-service trade-offs. Participants described reducing food consumption, changing food choices and experiencing difficulties meeting education and healthcare expenses. These accounts provide a human context for the regression findings on food security and access to essential services. The experiences also illustrate the risks identified by the World Bank (2023), which warned that households without adequate compensation may adopt coping strategies that affect school attendance and healthcare utilisation.

The fourth theme concerned informal social solidarity. Participants referred to family assistance, cooperative societies, women's groups and shared savings arrangements as sources of temporary support. These relationships can provide resources when formal support is limited, consistent with Coleman's (1988) explanation of social capital as a resource embedded in social relationships. However, the accounts also suggest that informal assistance may not be sufficient to address widespread economic pressure affecting several households within the same community.

The fifth theme concerned perceptions of formal interventions. Participants expressed concerns about the adequacy, accessibility and perceived fairness of government support. These findings should be interpreted as participants' reported perceptions rather than independently verified evidence of the performance or conduct of particular government programmes. Nevertheless, they indicate that the design and implementation of social protection are important to public confidence and household welfare. The IMF (2024) and Okereke et al. (2024) similarly emphasise the importance of effective compensatory measures in reducing the adverse welfare consequences of subsidy reform.

Taken together, the quantitative and qualitative findings show that fuel subsidy removal was significantly associated with four measured dimensions of household livelihood, while the study did not identify statistically significant differences across occupational groups or between rural and urban respondents. The qualitative evidence provides context for the different ways households experienced and responded to economic pressure. It also highlights the role of informal social support and concerns about formal interventions. These findings should be interpreted within the limits of the study design and the wider economic conditions prevailing during 2023–2025.

Implications of the Findings for Household Livelihood and Economic Reform

The findings have implications for the design and implementation of economic reforms in Nigeria. First, the significant relationships identified across the four livelihood dimensions indicate that evaluating subsidy reform only through fiscal savings or changes in petroleum prices provides an incomplete picture of its consequences. Household income, employment, food security and access to essential services should also be considered. This position is consistent with research showing that the welfare consequences of subsidy reform depend on how price changes are

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distributed across income groups and how governments use the resources released by reform (Arze del Granado et al., 2012; Coady et al., 2015a, 2015b).

Second, the findings highlight the importance of social protection that reaches households experiencing economic pressure. The experience of earlier subsidy reforms in Nigeria demonstrates that announcing compensatory programmes is not sufficient unless implementation, funding and access are reliable. The IMF (2013) and Inchauste and Victor (2017) emphasise that successful subsidy reform requires clear communication, credible institutional arrangements and measures to protect vulnerable groups. Nigeria's earlier experience with the Subsidy Reinvestment and Empowerment Programme also illustrates the importance of linking reform savings to visible and accountable social investments (IMF, 2022).

Third, livelihood support should recognise the diversity of household resources and coping strategies. Ellis (2000) and Scoones (1998) explain that rural livelihoods are diversified and depend on the interaction of assets, institutions and activities. Moser's (1998) asset-vulnerability framework similarly draws attention to the resources households use to withstand economic stress. These perspectives support the need for interventions that protect household assets and productive activities rather than relying exclusively on short-term consumption assistance. Sen's (1999) capability approach further reinforces the importance of protecting people's practical opportunities to access education, healthcare and economic participation.

Finally, the absence of statistically significant differences across occupational groups and between rural and urban households suggests that support should not be restricted to a narrow occupational or geographical category. However, the qualitative findings indicate that the pathways through which households experience economic pressure may differ. Interventions should therefore combine broad eligibility with locally responsive delivery. This approach is consistent with the argument that subsidy reform requires both macroeconomic discipline and a credible social-protection framework (Okereke et al., 2024; Simpson et al., 2024).

Conclusion

This study assessed the relationship between fuel subsidy removal and household livelihood in Katsina State, Nigeria, between 2023 and 2025. The findings showed statistically significant relationships between fuel subsidy removal and household income and expenditure, employment and livelihood opportunities, food security and household welfare, and access to education and healthcare. The strongest model relationship was recorded for employment and livelihood opportunities, followed by household income and expenditure. Food security and household welfare, as well as access to education and healthcare, also showed statistically significant relationships.

The study further found no statistically significant difference in household income and expenditure patterns across the five occupational groups examined. Similarly, the comparison between rural and urban respondents did not reveal a statistically significant difference. These results indicate that the measured experiences were not significantly differentiated by occupation or residential location within the study sample. The qualitative findings added context by identifying household expenditure pressure, livelihood adjustments, food and essential-service trade-offs, informal social support and concerns about formal interventions. The study concludes that fuel subsidy removal was significantly associated with important dimensions of household livelihood among the surveyed households. However, because the research adopted a

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nonexperimental survey design, the results do not establish that subsidy removal alone caused all the observed outcomes. Inflation, exchange-rate changes, food-price movements and other economic conditions may also have influenced household experiences. The findings nevertheless demonstrate the importance of incorporating household welfare and livelihood protection into the planning and implementation of major economic reforms.

The study recommends as follows:

1. The Katsina State Government, in collaboration with relevant federal agencies, should maintain an updated register of vulnerable households and use transparent eligibility criteria to identify families requiring temporary assistance. Support should prioritise low-income households, households headed by women, persons with disabilities and families with limited or irregular earnings. Beneficiary selection and payment records should be subject to independent monitoring.
2. The state government and local government authorities should work with transport unions and private operators to develop affordable transport arrangements on major rural and urban routes. Public transport support should be directed towards routes used by workers, traders, students and patients, with transparent fare-monitoring arrangements to reduce excessive charges.
3. Relevant state agencies and development-finance institutions should provide accessible, low-interest working-capital facilities to small traders, artisans, transport operators and other informal-sector workers. Loan conditions should be realistic, and repayment arrangements should reflect the irregular income patterns of small businesses. Business-support programmes should also include basic financial management and enterprise development training.
4. state Ministry of Agriculture and relevant agricultural development agencies should strengthen access to agricultural inputs, extension services, produce aggregation and market-linkage facilities. Where feasible, farmer cooperatives should be supported to organise shared transportation of produce and bulk purchase of inputs. Such arrangements can reduce individual transport expenses and improve farmers' access to markets.
5. Government and development partners should strengthen targeted food-security interventions for vulnerable households. These may include support for community-based food distribution, school feeding where appropriate, nutrition education, improved storage and local food-supply systems. Food assistance should be designed to complement, rather than undermine, local agricultural production and market activities.
6. Education authorities should strengthen existing support for children from economically vulnerable households through targeted assistance with essential school requirements. Schools and local education authorities should monitor attendance patterns and identify learners at risk of irregular attendance because of household financial pressure. Support should be implemented without publicly exposing or stigmatising beneficiary families.
7. Relevant health authorities should strengthen access to essential primary healthcare services, particularly for low-income households. Community-level health outreach, affordable essential medicines and referral arrangements should be improved. Health facilities should also monitor reported delays in care-seeking and identify practical ways to reduce transport and service-access barriers.
8. Cooperative societies, women's associations, community savings groups and other local support organisations should be encouraged to provide responsible savings, emergency assistance and livelihood support. Government and development partners can strengthen these

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structures through training and transparent small-grant arrangements, while ensuring that participation remains voluntary.

9. Government agencies responsible for economic-reform interventions should publish clear information about programme objectives, eligibility requirements, beneficiary-selection procedures, funding and implementation progress. Accessible complaint and feedback mechanisms should be established so that households can report exclusion, payment delays and other implementation difficulties.
10. Relevant state planning and statistics agencies should periodically monitor household income, expenditure, food consumption, employment, school attendance and healthcare access. Monitoring should distinguish rural and urban communities and different livelihood groups, even where this study did not identify statistically significant differences. The information should be used to adjust support programmes as economic conditions change.
11. Government should communicate clearly how resources released through subsidy reform are allocated to public transportation, health, education, agriculture and social protection. Regular publication of expenditure and implementation reports would help strengthen public accountability and demonstrate the relationship between economic reform and improvements in public welfare.
12. Future studies should follow households over time and incorporate household income, consumption expenditure, food prices, transport costs and access to public services. Longitudinal data would help distinguish changes associated with subsidy removal from the effects of inflation, exchange-rate movements, insecurity and other economic conditions.

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