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The Effect of Fuel Subsidy Removal on the Maize Farmers in Kashere Ward, Akko Local Government Area of Gombe State, Nigeria

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ABSTRACT

Fuel is crucial for agricultural logistics, facilitating the transport of inputs and produce. The recent removal of fuel subsidies has raised transportation costs, shrinking farmers' profit margins and potentially increasing food prices for consumers. The research findings can help policymakers develop socio-economically beneficial policies for all farmers, not just those growing maize. This study examined the impact of fuel subsidy removal on maize production in Kashere ward, Akko Local Government Area of Gombe State. The specific objectives were to identify the socio-economic characteristics of maize farmers, assess which farming activities were affected by the subsidy removal, evaluate its effect on maize output, and identify the constraints faced by farmers in the area. Data were collected from 294 farmers using a structured questionnaire and analyzed through descriptive and T-test statistics. The findings revealed that 81.23% of the respondents were male, with an average age of 33. Approximately 83.28% were married, 89.76% had at least a primary education, and 43.54% were members of farmers' cooperatives. Key farming activities negatively impacted by the subsidy removal included purchasing inputs (54.08%), transportation (96.26%), hiring labor (88.10%), and profits from sales (86.05%). The analysis showed a t-value with a p-value of 0.0000, indicating a significant effect of subsidy removal on maize output at the 1% level (P<0.01). Farmers primarily faced the constraint of high fertilizer costs, with 96.60% reporting this issue. Other challenges included diseases and pests (13.95%), low yields (22.79%), inadequate rainfall (21.43%), poor storage (28.57%), and lack of credit (35.37%). The study recommends that the government implement measures such as price controls to mitigate inflation and enhance public transportation to alleviate the impacts of subsidy removal. Additionally, there should be improved monitoring and strengthening of the existing fertilizer subsidy to prevent leakages and ensure timely access for farmers.

INTRODUCTION

Nigeria has over the years been programmed to depend on subsidized fuel. Aside from food, fuel is the second most used product in the country as the source of energy (Ani, Onoja andHumbe, 2021). Alternative energy sources in Nigeria are significantly underdeveloped, leading to frequent electricity outages. Many households rely on kerosene or petrol for daily needs. Farmers, small businesses, and vehicles depend on affordable fuel for their operations. The Nigerian government's recent decision to remove fuel subsidies could have major implications for maize producers and others reliant on cheap fuel. While the government aims to redirect subsidy funds toward essential

infrastructure, it may not fully understand the immediate and long-term economic impacts of this policy (Bala, 2023).

Maize is crucial to Nigeria's economy due to its significance in both commerce and nutrition. As a staple crop, it ranks among the top food grains produced in the country. According to NAERLS (2020), maize is the most widely cultivated crop in Nigeria, covering over 12.4 million hectares. In 2019, Africa produced approximately 90 million metric tons of maize, with Nigeria contributing about 11 million metric tons, making it the continent's second-largest producer after South Africa, which produced 16 million metric tons (PricewaterhouseCoopers Nigeria, 2021). In Nigeria, maize is primarily grown by smallholder farmers on marginal, often degraded land in humid tropical regions. These farmers cultivate small, fragmented plots, mainly to feed their families and sell any surplus for income. The smallholder sector is essential for the livelihoods of a large rural population.

One major challenge of removing fuel subsidies is the potential increase in socio-economic inequality, as higher fuel prices could raise the costs of farming inputs and products. Ude (2023) highlights that, while eliminating subsidies may offer long-term benefits, it could strain the financial resources of already marginalized households and farmers. Nigeria's economic structure complicates this issue, as the state of the country's refineries and reliance on imported oil increase the risk of rising fuel prices. Balancing the promotion of domestic refining and managing consumer costs is crucial, especially since subsidy removal might worsen the difficulties faced by the agricultural and oil sectors (Ude, 2023).

The removal of fuel subsidies is a controversial policy that has significant implications for maize producers in Gombe, where maize is a vital staple and key livelihood source for many. This change is likely to raise costs for inputs like fertilizers and pesticides, increasing production expenses for farmers. As maize farmers constitute a large part of the agricultural workforce in the region, these higher costs could hinder their ability to sustain production levels, leading to reduced maize output and escalate food insecurity. The increased costs might also discourage the use of essential inputs, negatively affecting crop productivity and quality, which can decrease farmers' incomes due to lower crop yields.

The situation is further complicated by the interconnected economic, agricultural, political, environmental, and social factors at play. The 2023 removal of fuel subsidies presents a multifaceted challenge that impacts economic viability, agricultural sustainability, social equity, and political stability. With rising production costs, Gombe's maize producers may find it difficult to compete with subsidized maize from neighboring countries, potentially losing market share.This context prompted a study on the effect of fuel subsidy removal on maize farmers in Kashere ward, Akko LGA.

The specific objectives were to:

i. describe the socio-economic characteristics of farmers in the study area;

ii. examine the maize-farming activities affected by fuel subsidy removal in the study area;

iii. determine the effect of fuel subsidy removal on the output of maize farmers in the study area, and

iv. identify the constraints faced by maize farmers in the study area.

METHODOLOGY

Akko LGA is one of the eleven local government areas in Gombe State, with Kumo serving as its administrative center. It is the most populous LGA and ranks second in land area after Dukku LGA. Geographically, Akko LGA is located between 9° 48′ 18″ and 10° 23′ 56″ North latitude and 10° 41′ 04″ and 11° 32′ 20″ East longitude (Abubakar *et al.,* 2024). According to the National Population Commission (2006), the population of Akko Local Government was recorded at 337,853, with a projected population of 668,018 for 2023, based on an annual growth rate of 4.01%.

The area covers approximately 2,631 km² and experiences a two-season climate, consisting of a rainy season and a dry season. From 1977 to 2008, the number of rainy days varied between 29 and 53, spanning from April to October, with an average annual rainfall of 962.55 mm. Temperatures typically reach an average high of 36.2°C from March to October, while cooler temperatures of around 19.7°C are observed from December to February. Relative humidity mirrors this trend, peaking at 94% in August and dropping below 10% during the harmattan months from December to February (Jibril *et al.,* 2019). Approximately 80% of the population engages in agriculture, primarily subsistence farming. Key crops grown in the LGA include maize, millet, corn, beans, soybeans, sesame, cotton, groundnuts, and various vegetables such as tomatoes, peppers, and okra (Abubakar *et al.,* 2024). The predominant ethnic groups in the area are the Fulani, Tangale, Tera, and Hausa, with farming and business as their main occupations.

The study employed multi-stage sampling techniques. In the first stage, Kashere ward was purposively chosen due to its large population of maize farmers and my residency there. In the second stage, five villages were selectively identified, each having a significant number of maize farmers. From an initial sample frame of 635 maize-farming households as provided by the Gombe State Agricultural Development Project, a total of 294 respondents were randomly selected using the Taro Yamane sample size formula as used by Onwuaroh, Yusuf, Yusuf, & Akpu, (2017).

$$n = \frac{N}{1 + N(e)2}$$

Where:
N = sample size (total sample size)
N = population size (total sample frame)
e = level of significance (set at 0.05 for this study)
To determine further the proportion of the respondents (sample size of the frame) Yamane (1967) sampling method for determining respondents was used, i.e

$$\text{Sample size of village} = \frac{\text{sample frame of village x total sample size of all villages}}{\text{Total sample frame of villages}}$$

Table 1: Population and sample size of the study area

LGA	Ward	Village	**Sample Frame	Sample size
Akko.	Kashere	Santuraki	135	63
		Tunbiri	156	72
		Bubabani	104	48
		Anguwan Tafida	115	53
		Malam Waziri	125	58
Total		5 villages	635	294

**Source: Agricultural Development Project, (2024)

Analytical Technique

Descriptive and inferential statistics were used to analyze the objectives of the study.

This involved the use of frequency count, percentage, and mean to analyze objectives i, ii, & iv, while the paired sample T-test was used to achieve objective iii of the study.

The T-test formula is given below:

$$t = \sqrt{\frac{n-1}{n\Sigma D^2 \left(\frac{}{(\Sigma D)^2}\right) - 1}}$$

Where: t = t score

n = sample size

D = difference in income of the maize farmers in 2022 and 2023 when fuel subsidy was removed

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of Respondents

This section examines the social and economic characteristics of the respondents, focusing on factors such as age, gender, educational level, marital status, primary occupation, and years of farming experience. As shown in Table 2, the majority of respondents (81.23%) were male, with females making up 18.77%, indicating a male predominance in maize farming. Additionally, 33.67% of respondents were aged 16-26, while 33.33% were aged 27-37, suggesting that 67% of the respondents fell within the 16-37 age range. The average age of the respondents was 33 years. These findings are consistent with Onwuaroh, Tata, Chiroma & Mohammed (2021), which noted a similar male dominance in maize farming and an average age of 36 for maize farmers.

The table also revealed that 89.76% of respondents had at least a primary education, aligning with Onwuaroh et al. (2021), which reported that 93.15% of maize farmers achieved a minimum of primary education. Regarding marital status, Table 2 indicated that a significant majority (83.28%) of the farmers were married, suggesting that married individuals tend to focus more on maize farming. This observation is consistent with findings from Umar *et al.* (2014), which also highlighted that most farmers were married. Approximately 70% of respondents identified farming as their primary occupation, and 56.46% were members of cooperatives. Membership in a cooperative provides farmers with access to credit and essential knowledge to enhance maize production.

Table 2. Socio-economic characteristics of the respondents (n=294)

Variables	Frequency.	Percentage	Mean
Sex			
Male	238	81.23	
Female	55	18.77	
Total	293	100.00	
Age			
16-26	99	33.67	
27-37	98	33.33	33
38-48	66	22.45	
49-59	21	7.14	
60-70	10	3.40	
Total	294	100.00	
Education			
Non-formal education	30	10.24	
primary education	123	41.98	
Secondary education	116	39.59	
Tertiary education	24	8.19	
Total	293	100.00	
Marital Status			
Single	49	16.72	
Married	244	83.28	
Total	175	100.00	
Occupation			
Farming	206	70.07	
Business	64	21.77	
Civil servant	7	2.38	
Student	17	5.78	
Total	294	100.00	
Cooperative			
No	166	56.46	
Yes	128	43.54	
Total	294	100.00	

Source: Field survey, 2023

Farming Activities Affected by Removal of Fuel Subsidy

Table 3 shows that farming activities have been adversely impacted by the removal of fuel subsidies. Approximately 54.08% of respondents reported that acquiring farm inputs has become more challenging, while 96.26% noted difficulties with transportation. Additionally, 88.10% indicated that hiring labor has become more expensive, and 86.05% stated that their overall profits have decreased. These results are consistent with the findings of Durotoye, Usman, & Nigeria Context Analysis Team (NCAT) (2024), which indicated that following the removal of fuel subsidies in Nigeria, the average cost of food items in Northeast Nigeria rose by 53%, farm inputs

increased by 71%, wages for farm laborers surged by 149%, and transportation costs climbed by 137%. This study is further supported by Rimamsitse (2023), who highlighted that the elimination of fuel subsidies would lead to increased hardships due to rising transportation and farm input costs, ultimately reducing agricultural production. Sennuga *et al.* (2024) found that eliminating fuel subsidies adversely affected agricultural activities in the region. Their research highlighted challenges such as rising transportation costs, insufficient vehicles for transporting produce to market due to high fuel prices, and decreased sales. These findings further support the conclusions of this study.

Table 3: Farming activities negatively affected (n=294)

Farming Activities Negatively Affected by Fuel Subsidy Removal	**Frequency**	**Percent**
Purchase of farm inputs	159	54.08
Transport	283	96.26
Hiring Labour	259	88.10
Profit	253	86.05
Total	****954**	**324.49**

Source; field survey (2023)

**=Multiple response

Effect of Fuel Subsidy Removal on Output of Maize Farmers

Table 4 displays the results of the paired sample T-test performed using the Stata software package. In 2022, the average maize yield per farmer was 24.36 bags (each weighing 100 kg), while in 2023, it dropped to 19.95 bags. Although there is a noticeable difference in mean output between the two years, the statistical significance of this difference is assessed through the t-score and corresponding p-value. As shown in Table 4, the p-value is 0.0000, indicating significance at the 1% level (P<0.01). This indicates a statistically significant decline in maize output from 2022 to 2023, suggesting that the removal of the fuel subsidy adversely affected maize farmers' yields. Sennuga *et al.* (2024) found that the removal of fuel subsidies adversely affected agriculture, a conclusion that aligns with the current study's findings. Additionally, Meludu *et al.* (2023) noted that high input costs negatively impact agricultural production, thereby compromising food security.

Table 4: T-test output showing the effect of fuel subsidy removal on the output of maize farmers

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Output~2022	294	24.36735	.833859	14.2977	22.72623	26.00846
output~2023	294	19.95918	.8162656	13.99604	18.3527	21.56567
diff	294	4.408163	.6812362	11.68077	3.067427	5.7489

mean(diff) = mean(total output 2022 – total output for 2023) t = 6.4708
Ho: mean(diff) = 0 degrees of freedom = 293

Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha: mean(diff) > 0
Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

Source: Field survey (2023)

Beyond recognizing the statistically significant difference between the mean maize outputs for 2022 and 2023, it is crucial to assess the magnitude of this effect. The effect size between the two means was evaluated using Cohen's d and the point-biserial correlation coefficient, with benchmarks for interpretation as follows: Cohen's d (.2 = small effect, .5 = medium effect, .8 = large effect) and the point-biserial correlation coefficient (.1 = small effect, .3 = medium effect, .5 = large effect). As shown in Table 5, Cohen's d is estimated at .3115822, and the point-biserial correlation coefficient is .1541904. Based on these benchmarks, the effect size between the two means is concluded to be small. It can be concluded that the removal of fuel subsidies impacted maize farmers' output, albeit to a minor extent. This finding is consistent with the research of Sennuga *et al.* (2024), Meludu *et al.* (2023), and Rimamsitse (2023).

Table 5: Effect size based on mean comparison

Effect Size	Estimate	[95% Conf. Interval]	
Cohen's d	.3115822	.1488148	.4740867
Point-Biserial r	.1541904	.0743281	.2310241

Source: Field survey (2023)

Constraints Encountered by Maize Farm

The high cost of fertilizer as seen in Table 6 was revealed to be the major constraint facing maize farmers. Other constraints include unavailability of credit (35.37%), poor storage (28.57%), low yield (22.79%), diseases and pests (13.95%), then lastly inadequate rainfall (21.43%).

This is supported by the study of Onwuaroh*et al.* (2021) which revealed fertilizer to be the major constraint facing maize farmers in Gombe state.

Table 6: Constraints in maize production

Constraints in Maize Production	Frequency	Percent (%)	Rank
High Cost of Fertilizer	284	96.60	1
Diseases and Pest	41	13.95	6
Low Yield	67	22.79	4
Inadequate Rainfall	63	21.43	5
Poor Storage	84	28.57	3
Unavailability of Credit	104	35.37	2
Total	****643**	**218.91**	

Source: Field survey (2023) **=Multiple response

CONCLUSION AND RECOMMENDATIONS

Agricultural activities like the purchase of input, hiring of labor, transportation, and profit from sales of output were affected by the removal of fuel subsidies. If the fuel subsidy removal is not properly addressed,more farmers will be discouraged from farming, and food production in Nigeria will be greatly reduced.The output of the farmers was significantly affected as revealed in the study. This could further impoverish the farmers and increase the level of hunger in the state.

Effective monitoring and improvement of the current fertilizer subsidy program are crucial to prevent leakages and ensure timely distribution to farmers. The government should also review the situation and provide compensation to those farmers adversely affected, helping to mitigate their

losses. Furthermore, initiatives should be launched to address the challenges arising from the removal of the fuel subsidy, along with measures to alleviate the hardships faced by farmers.

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