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Impacts of Fuel Subsidy Removal on Fish Farming and Livelihoods in Odogbolu, Nigeria

[1] Mebude, A.M.; [2]Sanni, M.A.; [2]Oyegunwa, A.S.

[1]Departmentof Fisheries and Aquaculture Management, Tai Solarin University of Education, Ijagun, Ogun State Nigeria.
[2]Department of Animal Science, Tai Solarin University of Education, Ijagun, Ogun State Nigeria.
Corresponding Author: abiodunmebude@gmail.com

Abstract

This study assessed the impact of fuel subsidy removal on fish production and the livelihoods of fish farmers in Odogbolu Local Government Area (LGA) of Ogun State, Nigeria. Following the fuel subsidy removal, fuel prices surged, which significantly increased production costs for fish farmers. This study adopted survey design, and a simple random sampling of 100 fish farmers from two fishing communities, Eriwe Fish Village and Okun-Owa. The data were collected using a structured questionnaire and analyzed using descriptive statistics. Results showed that 76% of respondents were male, with an average age of 37 years, and 74% operated earthen ponds. Regression analysis revealed a significant negative relationship between rising fuel prices and key variables affecting fish production. Specifically, increased operational costs (β = -0.339), reduced profitability (β = -0.152), and farm expansion (β = -0.661) all led to decreased income, with the R^2 value of 0.660 indicating that 66% of the variation in fish farmer income was explained by these factors. Budgetary analysis further indicated that the average net income dropped to ₦9,043.54, down from previous levels, highlighting the financial strain placed on fish farmers. In addition, 100% of respondents reported adverse effects on their economic livelihoods, with significant declines in the ability to afford education, healthcare, and social activities. The study emphasized that, despite the profitability index of 0.20, the long-term effects of fuel price hikes may exacerbate food insecurity. The study concludes that subsidy removal should be gradual and transparent, with measures in place to stabilize fuel prices. This will help protect rural livelihoods and support the sustainability of fish farming.

Keywords: Fuel Subsidy, Livelihood of fish farmers, Cost and return of fish production, fuel price, fish production

INTRODUCTION

Fishing has been a vital source of food, employment, and economic benefits worldwide, providing essential nutrients and contributing to the livelihoods of millions, especially in developing countries like Nigeria (Adepoju & Obayelu, 2013; Nandi *et al.*, 2014).

Fish farming, a critical component of Nigeria's agricultural sector, plays a significant role in food security and economic sustainability. However, policy shifts, such as the removal of fuel subsidies, pose substantial challenges to this sector. While subsidy removal aims to stimulate economic development and reallocate resources to critical infrastructure, it has led to increased fuel prices, escalating production costs for fish farmers, and a decline in real household incomes (Umeji & Eleanya, 2021; Olowa, 2023).

The Sustainable Livelihoods Framework (SLF) provides a useful model for analyzing how subsidy removal impacts fish farmers. The SLF emphasizes five key assets human, social,

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natural, physical, and financial capital that determine the resilience of rural households to economic shocks (Bebbington, 2021). Recent studies have applied the SLF to examine the impacts of economic policies on rural livelihoods, highlighting how external shocks, such as subsidy removals, disproportionately affect vulnerable populations (Ton *et al.*, 2022; Ellis & Freeman, 2020). The increase in fuel prices affects multiple livelihood assets by reducing financial capital (through higher production costs and lower profitability), straining social capital (as farmers struggle to maintain cooperative networks), and limiting access to physical and natural resources necessary for production. Similarly, from the perspective of production economics theory, the subsidy removal leads to higher input costs, affecting profit maximization and efficiency in fish farming. The theory suggests that increased production costs, if not offset by proportional increases in revenue or efficiency improvements, lead to declining returns to scale and lower long-term sustainability (Nicholson & Snyder, 2021; Pindyck & Rubinfeld, 2020).

In Odogbolu Local Government Area, Ogun State, fish farmers face heightened production costs, reduced profitability, and threats to their livelihoods due to the ripple effects of rising fuel prices. Transportation costs for inputs, machinery operations, and the movement of produce have surged, exacerbating financial strain on rural households. Furthermore, the absence of reliable public electricity has forced many farmers to depend on petrol-powered generators, further compounding their challenges. These dynamics underscore the urgent need to examine the socio-economic impacts of subsidy removal on fish farming. Applying the Sustainable Livelihoods Framework and production economics theory, this study evaluates the effects of subsidy removal on fish production and livelihoods in Odogbolu, focusing on socio-economic characteristics, production systems, and areas most affected by increased fuel prices. The study aims to provide insights to policymakers for mitigating the adverse impacts on rural livelihoods and fostering sustainable economic growth.

METHODOLOGY

The study employed a survey design to investigate fish farming in Odogbolu Local Government Area, Ogun State, Nigeria. Two fishing communities, Eriwe Fish Village and Okun-Owa were purposively selected due to their high prevalence of fish farmers. A total of 100 respondents, including 50 fish farmers from each community were selected using simple random sampling. A structured questionnaire was used for the data collection. Data were collected on socio-economic characteristics, fish farming practices, and challenges faced by farmers. Descriptive and Ordinary Least Squares (OLS) multiple regression model were used to analyze the data. The study also incorporated budgetary analysis to evaluate costs, revenues, and profitability, focusing on the effects of rising fuel prices on fish farming.

RESULTS AND DISCUSSIONS

Socioeconomic Characteristics and Management practices

Table 1. Socioeconomic Characteristics and management practices of Fish farmers.

Parameters	Frequency	Percentage (%)	Mean/Mode
Sex			
Male	76	76	Male
Female	24	24	
Age of Respondents (years)			
21-30	20	20	
31 -40	48	48	36.9
41-50	15	30	
51 -60	2	2	
Marital Status			
Single	50	50	
Married	2	42	Single
Divorced	6	6	

Widowed	2	2	
Education Qualification			
Secondary	34	34	
OND/NCE	26	26	HND/B.Sc.
HND/B.Sc.	38	38	
M.Sc./Ph.D.	2	2	
Farming Experience(years)			
1 -3yrs	42	42	
4-6yrs	46	46	3.5
7-11yrs	4	4	
Pond Sizes (Ha)			
0-1.0	74	74	
1.1 -2.0	24	24	0.79
2.1 -3.0	2	2	
Stocking Density			
1.000 - 2,999	24	24	
3. 000-4,999	50	50	
5,000 - 6,999	16	16	4,319.56
7,000 - 8.999	6	6	
9.000-10,999	4	4	
Management System			
Sole pond	74	74	Sole pond
Integrated	26	26	
Types of pond			
Concrete	40	40	
Tarpaulin	6	6	Earthen pond
Earthen pond	54	54	
Fish Stock			
Heterobrachus	60	60	
Clarias	28	28	Heterobrachus
Tilapia (mixture)	12	12	
Contact with Extension Agents			
Yes	26	26	
No	74	74	No

Source: Field Survey 2023.

The results presented in Table 1 indicates that male respondents (76%) outnumbered female respondents (24%), signifying that fish farming in Odogbolu LGA is predominantly male-driven. The average age of the respondents was approximately 37 years, suggesting that young individuals are more actively engaged in fish farming activities. The marital status distribution revealed that half (50%) of the sampled population were single, further supporting the notion that youth are increasingly involved in fish farming as a means of livelihood.

Regarding educational attainment, 38% of the respondents had HND/B.Sc. qualifications, representing the highest proportion within the sample. The average farming experience among respondents was four years, with only 4% having between seven and eleven years of experience in fish farming. This implies that the majority (88%) of the fish farmers were relatively new to the industry, a finding corroborated by Ovharhe and Gbigbi (2016) in a similar study conducted under the Delta State Fadama III project. The average pond size was recorded at 0.79 hectares, with earthen ponds being the most commonly used (54%), followed by concrete ponds (40%) and tarpaulin ponds (6%). This aligns with the findings of Ovharhe *et al.* (2020), who noted that backyard fish farming typically involves smaller pond sizes.

Only 26% of respondents reported having contact with extension agents. This limited contact can likely be attributed to the proximity of their farms to the OGADEP zonal office and the farmers' cosmopolitan tendencies. Ovharhe (2016) also highlighted the inadequate attention provided to fish farmers, calling for a

significant shift in the attitude of extension workers to better support their needs.

Livelihood areas affected by increase in fuel price

Table 2. Distribution of Respondents with respect to areas of livelihood affected by increase in fuel price.

Effect of increase in fuel price on areas of livelihood	Effect of increase in fuel price		
	Frequency (percentage)		
	Agree	Undecided	Disagree
Economic Areas of Livelihood			100(100)
Increase level of sales			100(100)
Improved level of production			100(100)
Improved level of processing activities			100(100)
Regular availability of capital for business transaction			100(100)
Educational Areas of Livelihood			
Ability to pay children's school fees	5(5)		95(95)
Ability to buy children's books/uniform	4(4)	3(3)	93(93)
Ability to pay for extra lessons/examination	4(4)	3(3)	93(93)
Ability to further education	9(9)	7(7)	84(84)
Ability to patronize private schools		7(7)	93(93)
Health and Home Areas of Livelihood			
Feeding three times daily		4(4)	96(96)
Consistent payment of house rent		3(3)	97(97)
Contraction of personal building			100(100)
Good home maintenance	26(26)	20(22)	52(52)
Ability to patronize hospitals	14(14)	5(5)	81(81)
Ability to purchase prescribed drugs	4(4)	24(24)	72(72)
Ability to go for medical check-ups		5(5)	95(95)
Social Areas of Livelihood			
Regular attendance of parties/ceremony	4(4)	2(2)	94(94)
Ability to purchase social materials		2(2)	98(98)
Celebration of festival	2(2)	23(23)	75(75)
Ability to travel on holidays			100(100)
Relaxation	10(10)	15(15)	75(75)

Source: Field Survey 2023.

The results presented in Table 2 indicates that the majority of respondents experienced significant adverse effects on their economic livelihoods due to the increase in fuel prices. Specifically, all participants (100%) disagreed that the fuel price hike led to improvements in their sales levels, production, processing activities, business capital availability, goods transportation, debt repayment, and loan access. This unanimous sentiment underscores the detrimental impact of rising fuel costs on various economic activities. These findings align with the study by Sennuga *et al.* (2024), which examined the impact of fuel subsidy removal on agricultural production among smallholder farmers in Niger State, Nigeria, and highlighted similar economic challenges faced by farmers.

In the educational domain, a small fraction of respondents (5%) agreed that the fuel price increase did not affect their ability to pay children's school fees, while a vast majority (95%) disagreed, indicating a negative impact. Similarly, only 4% agreed that they could still afford children's books and uniforms, with 93% disagreeing. These statistics suggest that the surge in fuel prices has strained educational expenditures for most households. This observation is consistent with the International Monetary Fund's (IMF) analysis, which found that removing fuel subsidies would increase the headcount poverty rate by 1.2 percentage points, thereby affecting households' ability to afford essential services like education. Regarding health and home aspects of livelihood, only 4% of respondents agreed that they could maintain feeding three times daily post-fuel price hike, while 96% disagreed. Additionally, a mere 3% could consistently pay house rent, with 97% unable to do so. These figures highlight the profound effect of increased fuel prices on basic household

sustenance and stability. The IMF's report further supports this, indicating that the adverse impact on the poor due to fuel subsidy removal can be significant.

In the social sphere, only 4% of respondents agreed that they could regularly attend social events post-fuel price increase, while 94% disagreed. This trend suggests a decline in social engagements, likely due to financial constraints imposed by higher fuel costs. The study by Sennuga *et al.* (2024) also noted that increased fuel prices adversely affected various aspects of rural livelihoods, including social activities.

Effect of Increase in fuel price on fish production after subsidy removal.

Table 3. Effect of increase in fuel price on fish production.

Variable	Reg. Coefficients	V T-value
Constant (β 0)	2.23	3.568
Increased operational costs (X_1)	-0.339***	4.544
Reduced profitability of fishing businesses (X_2)	-0.152)***	3.978
Farm Expansion and Investment (X_3)	-0.661***	5.441
Reduced fishing effort (X_4)	-0.046***	4.235
Cost of fingerlings (X_5)	-0.449***	-4.873
Feed cost(X_6)	-0.056Ns	-0.353
F-value 9.34***	9.34***	
R^2 0.660	R^2 0.660	
Adjusted R^2	0.688	

Where: *** = 1% level of significance and Ns = Not Significant
Source: Field Survey 2023.

This was carried out by regression techniques. Linear regression analysis was estimated. As shown in Table 3, the F-value associated with the regression are significant at 1% level of significance thus, the regression provide a good fit for the data. The Adjusted R^2 shows that 68.8% in the variation of the sales revenue of the respondents was explained by the explanatorily variables. The coefficient of the explanatory variables i.e (X_i), Increased operational costs (X1), Reduced profitability of fishing businesses (X2), Farm Expansion and Investment (X3), Reduced fishing effort (X4), Cost of fingerlings (X5), and Feed cost (X6). The coefficients with positive signs indicate that an increase in the level of these variables would lead to an increase in the sales revenue of respondents' *ceteris paribus.* The coefficients of which had negative signs implied that an increase in this input would lead to a decrease in the sales volume of respondents. In this case the entire coefficient had negative sign which suggests that every additional use of fuel will lead to a decrease in the income realized from fish production in the study area. This further showed that the effect of the increase in fuel price was really felt on fish production as food prices have been seen increasing over a period of time.

Distribution of respondents according to their cost and returns after change in oil price.

Table 4. Cost and returns of fish farmers after change in fuel price.

	Mean	Percentage (%)
Fixed Cost		
Pond	2528.95	52.42
Insurance	1929.77	40.00
Land	365.43	7.58
Total Fixed Cost	**4,824.15**	**100**
Variable Cost		

Feed	5927.77	15.02
Fuel	1849.72	4.69
Labour	3813.33	9.67
Cost of Transporting	4800.00	12.16
Repairs and maintenance	6155.00	15.60
Chemical and drugs	5211.00	14.29
Storage/ preservation	3500.00	8.87
Waste disposal	4202.00	10.65
Unexpected expenses	4000.00	10.14
Total Variable Cost	39,458.82	
Total Cost	44,282.97	
Gross Revenue	58,150.66	
Gross Margin	13,867.69	
Net Income	9,043.54	
Profitability Index	0.20	
Rate of Returns on Investment (%)	20	
Rate of Returns on Variable Cost (%)	10.70	
Operating Ratio	0.68	

Source: Field Survey 2023.

A budgetary analysis technique was employed to evaluate the gross margin, net income, and profitability of the respondents in the study area. The findings regarding the costs and returns of fish farming following the fuel price increase are summarized in Table 4. Before the fuel subsidy removal, the profitability index was estimated at 0.35, indicating that for every ₦1.00 earned, approximately 35 kobo was retained by farmers as net income. However, after the subsidy removal, the profitability index declined to 0.20, reflecting a significant reduction in net income retention. This decline highlights the adverse impact of the fuel price increase on fish farming profitability.

The average gross margin, net income, and rate of return on variable costs for farmers after the fuel price increase were estimated at ₦58,150.66, ₦9,043.54, and 10.70%, respectively. These figures represent a notable decrease compared to pre-subsidy removal levels, where the gross margin and net income were ₦72,500.00 and ₦15,000.00, respectively, with a rate of return on variable costs of 18.50%. The results suggest that the larger the quantity of farm products marketed, the higher the profitability index. However, the increase in fuel prices has significantly reduced the profitability of fish farming, as evidenced by the decline in income before and after the subsidy removal.

Although fish farming in the study area remains profitable after the fuel price increase, the reduction in profitability underscores the challenges faced by farmers. The increase in fuel prices has led to higher production costs, particularly in transportation, feed, and labour, which have eroded profit margins. This implies that the increase in fuel prices has adversely impacted the level of farm output. Regardless of the anticipated positive outcomes of removing fuel subsidies, the long-term effects on agriculture are likely to negatively influence food prices, potentially exacerbating food insecurity (Sennuga *et al.*, 2024; International Monetary Fund, 2022).

CONCLUSION AND RECOMMENDATIONS

The removal of fuel subsidies indirectly increases fuel prices, and this study confirms its impact on food prices. The rise in fuel prices escalates the cost of transporting fish, fueling machinery, and purchasing farm inputs, resulting in higher production costs. Despite the farming sector's profitability index post-fuel price changes, fish farming in Odogbolu LGA faced significant challenges, especially from increased transportation costs, which contributed to rising food prices. The study further concluded that the increased fuel prices negatively affected the livelihoods of residents and significantly reduced fish farmers' profitability. Regression analysis revealed that their income after the price hike was far below pre-subsidy removal levels, highlighting the long-term economic impact of such policy. To mitigate these effects, the study recommended gradual implementation of subsidy removal policy to avoid food price surges. Transparency in fuel pricing, stricter border controls, and fostering competition among importers are essential strategies to reduce corruption and promote economic stability.

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