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Research Article

Economic Assessment of Yam Production before and After Fuel Subsidy Removal in Okpokwu Local Government Area of Benue State, Nigeria

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ABSTRACT

This study was carried out to examine the economic assessment of yam production before and after fuel subsidy removal in Okpokwu Local Government Area of Benue State. A public opinion survey design was adopted for the study; a multi-stage technique was used to select 120 yam producers. Data for the study were sourced from primary sources with a questionnaire. Descriptive statistics, budgetary analysis and paired sample t-tests were tools for data analysis. Results revealed that the gross margin per annum was estimated at 1, 538,300.00NGN before the removal of the fuel subsidy and 737,125.83NGN. The mean difference of 801,224.00NGN was positive and significant at a 1% level of probability. This result indicates that yam production was a profitable venture in the study area before and after the removal of fuel subsidies. However, the profit before the fuel removal was higher than after the fuel subsidy removal. The result also showed that the major challenges faced by yam producers were high input cost (100.0%), high cost of transportation (86.7%) and removal of fuel subsidy (77.5%). It was concluded that the removal of fuel subsidy reduced the profit-making potential of yam farmers due to an increase in the price of agricultural production inputs, cost of transportation, and cost of labour for weeding and heaps. It was recommended that farmers should be encouraged to form and join agricultural inputs cooperatives to take advantage of economies of scale in the purchase of agricultural production inputs.

Keywords: Assessment; Economic; Fuel; Production; Removal; Subsidy

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INTRODUCTION

Yam (*Dioscorea* species) is an annual root tuber-bearing plants with more than 600 species out of which six are socially and economically important in terms of food, cash and medicine (International Institute for Tropical Agriculture, IITA, 2017). Some of the yam species are water yam (*Dioscorea alata)*, white yam (*Dioscorea rotundata*), yellow yam (*Dioscorea cayanensis)*, Chinese yam (*Dioscorea esculant*) and three-leaf yams (Ike and Inoni, 2016; Olubukola and Bolarin, 2016; Zaknayiba and Tanko, 2017). Yam is a root tuber crop popularly cultivated in the southern and middle belts of Nigeria and used as a major food in the country. Nigeria is by far the world's largest producer of yam, accounting for over 70% of the world's production (Idumah and Wombo. 2019).

According to the Federal Ministry of Agriculture (2022) report, Nigeria produced 50.1 million metric tonnes of yam from 2.3million hectares, representing 76.2 percent of total yam production in Africa (University of

North Florida, UNF, 2022 and Food and Agriculture Organization, FAO, 2022). According to 2022 figures, yam production in Nigeria has nearly doubled since 1985, with Nigeria producing 50.1 million metric tonnes, with a value equivalent of $10.442 million annually (Central Bank of Nigeria, CBN, 2021). In perspective, the world's second and third largest producers of yams, Cote d'Ivoire and Ghana, only produced 12.3 and 10.5 metric tonnes of yam in 2021 respectively. According to the International Institute of Tropical Agriculture, Nigeria accounted for about 70 percent of the world's production, amounting to 17 million tonnes from land area of 2,837,000 hectares under yam cultivation (IITA, 2020).

Yam is a principal source of energy in the diet of many Nigerians. It could be eaten in diverse forms such as boiled, roasted, baked, or fried (Akintunde *et al.,* 2022). Quite a number of starch industries also use yam as an important source of raw materials in their production process Ike and Inoni (2016). Its production activities provide job opportunities and income to both the producers and all those involved in the yam value chain (Onumadu and Eze, 2018).

Fuel subsidy is a government discount on the market price of fossil fuel to make consumers pay less than the prevailing market price of fuel (Ovaga and Okechukwu, 2022). When subsidies are in place, consumers would pay below the market price per litre of the petroleum product. Globally, there are debates about fuel subsidies because of their huge amount and their effect on citizens' welfare and the fiscal health of a nation (Iyobhebhe, 2014).

In Nigeria, fuel subsidies were first introduced in the 1970s as a response to the oil price shock in 1973 (Asare *et al*., 2020). Fuel subsidies were partially removed in 1986. Since then, the fuel subsidies have been in place Omitogun *et al.* (2021). In 2012, the government abruptly removed fuel subsidies (Onumadu and Eze, 2022). The removal led to massive protests which was intended for the government to reinstate the fuel subsidy it had removed. The government subsequently reinstated fuel subsidies in 2012 due to the massive protests (Umeji and Eleanya, 2021). Since then, fuel subsidy payments in Nigeria have grown enormously. In 2022, fuel subsidy reached ₦4 trillion (US$ 6.088 billion) which amounted to 23 percent of the national budget of ₦17.126 trillion (US$ 25.87 billion) in 2022. As a result, Nigeria could no longer sustain fuel subsidy in 2023, and the president in his inaugural speech announced that fuel subsidy is gone. Recent evidence in the Nigerian literature shows a mixed effect of fuel subsidy. Some studies identify some benefits of fuel subsidy and call for transparency in the administration of fuel subsidy while other studies highlight the negative consequences of fuel subsidies and advocate for its removal. Umeji and Eleanya (2021) argue that Nigerian oil wealth has not translated to an improved standard of living despite the introduction of fuel subsidies and that fuel subsidy removal could have severe consequences which can be mitigated by transparency on the part of the government in spending the funds saved from fuel subsidy removal for infrastructural development.

It seems the high cost of production due to the removal of fuel subsidies has led to a decline in the profitability of yam farming. This has made it difficult for farmers to make a living from yam production. The effect of fuel subsidy removal is a significant concern for yam farmers in Okpokwu, Benue State. The effect of fuel subsidy removal on yam production is a complex issue that requires a multifaceted approach. As the campaign for household food security gains momentum all over the world, and some extreme hunger and poverty must be eradicated by the year 2030, yams are some of the food crops whose production has got to be emphasized. Yam is an important food crop for at least 60 million people in West Africa, it is, therefore, necessary to lower its production cost and scale up its production through an efficient use of its production resources.

The farmers will suffer greatly in the face of fuel subsidy removal thereby leading to a serious decline in yam production in the country due to the high cost of farm inputs and the cost of transportation to the urban center to buy the farm inputs (Omotosho, 2020).

A search through the literature shows that limited researches were conducted on the effect of fuel subsidy removal particularly on yam production. It is obvious that there is a potential for the increase in its production and much can be done to derive foreign exchange from its export. Hence there is a need to assess the Economics of yam production before and after fuel subsidy removal. Therefore, this study attempts to; examine the cost and return in yam production before and after fuel subsidy removal, compare the gross margin before and after fuel subsidy removal, and identify the challenges to yam production in the study area. It is pertinent to assess the economics of yam production before and after fuel subsidy removal in Okpokwu Local Government Area of Benue State as it

would review the urgency of the potential threats to profitability of yam production as well as the food security threat posed by fuel subsidy removal in Nigeria. The government and its agencies will find this study useful in formulating policies and directives for the development of yam farming in Okpokwu Local Government Area and Nigeria at large. The Theory of production, Theory of Profit Maximization and Exhaustible resource Theory forms the grand theories for this research work.

MATERIALS AND METHODS

The Study Area

The study was conducted in Okpokwu Local Government Area of Benue State. It is one of the 23 Local Government Areas in Benue State with its headquarters at Okpoga; Okpokwu is one of the oldest and most developed local government areas in Idoma land (Ogbodo, 2016). Geographically, Okpokwu town lies between latitudes 7° and 4′24′′N and longitudes 7° and 51′ 48′′E of the equator (Benue State Ministry of Land and Survey, 2010). Okpokwu Local Government is bounded by Ohimini LGA to the North, Ogbadibo to West, Ado and Otukpo LGA on the East, on the South by Isiuzo LGA of Enugu State and on the North West by Olamaboro LGA of Kogi State.

Okpokwu LGA of Benue State, covers an estimated land area of approximately 731 square kilometers, the LGA's population is estimated at around 176,647 peoples (NPC, 2006) the population is 249,779 peoples at the rate of 2.3% annual population growth (2006→2024) (https://www.citypopulation.de/en/nigeria/admin/benue/NGA007018_okpokwu/), and is divided into 12 council wards. The people of the Okpokwu Local Government area predominantly speak a dialect of Idoma language. Tribes such as Igede, Igala, Igbo, Hausa, Yoruba and other predominant ethnic groups are also found there. The climate is tropical, characterized by a rainy season from April to October and a dry season from November to March. This climate supports various types of agriculture. The main economic activity undertaken is agriculture. The agricultural activities commonly practiced in Okpokwu Local Government Area can be categorized into two namely; annual crops such as yam and livestock farming.

Sample Procedure and Sample Size Selection

The population of this study consists of all yam farmers in Okpokwu Local Government Area of Benue State. Multi-stage random sampling technique was used in the selection of respondents. Firstly, five (5) council wards (Okpoga South, Eke, Okpoga North, Ugbokolo and Ichama ii) out of the 12 council wards from the study area were selected purposively due to high engagement of farmers in yam farming enterprise. The second stage involved selection of one community each from the selected council wards using simple random sampling technique. The final stage involves development of sample size frame for each of the selected community using proportional allocation of 10% (0.1) hence 120 yam farmers were selected using simple random sampling, this is to give every member of the population a fair chance of being selected.

Methods of Data Analysis

Data collected for the study were analysed using descriptive statistics and budgetary analysis.

Analytical Tools

Gross Margin

GM = TR – TVC

Where,

GM is gross margin (Naira)

TR is total revenue (Naira)

TVC is total variable cost (Naira)

Where;

TVC = Total Variable Cost (Naira)

= cost of fertilizer

= cost of rent or land

= cost of planting

= cost of harvesting

= cost of yam sett

= cost of herbicide

TR = output x price

Paired Sample T-test

$$T = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S^2_1}{n_1} + \frac{S^2_2}{n_2}}}$$

Where

$\overline{X_1}$ = mean of the gross margin before fuel subsidy removal (naira)

$\overline{X_2}$ = mean of the gross margin after fuel subsidy removal (naira)

S_1 = Standard deviation of the gross margin before fuel subsidy removal

S_2 = Standard deviation of the gross margin after fuel subsidy removal

n_1 = Total number of yam farmers before fuel subsidy removal

n_2 = Total number of yam farmers after fuel subsidy removal.

RESULTS AND DISCUSSION

Costs and Returns of Yam Farmers before and after Fuel Subsidy Removal

The costs and returns of yam farming before and after fuel subsidy removal in the study area are presented in Table 1. The analysis of costs and returns before fuel subsidy removal shows that the total variable costs of yam production before fuel subsidy removal is ₦631,150.00 which consists of the cost of land rent at 13.43% cost of weeding at 6.90%, the cost of herbicides at 10.64%, cost of heaps 8.12%, cost of fertilizer 9.83%, cost of insecticide 3.47%, cost of harvesting 7.19%, cost of transportation, 5.62% and cost of yam sett 34.80% while the total variable costs of yam production after fuel subsidy removal is ₦365,082.50 which consist the cost of land rent 12.71% cost of weeding 8.39%, cost of herbicides 11.37%, cost of heaps 8.59%, cost of fertilizer 11.37%, cost of insecticide 3.33%, cost of harvesting 7.45%, cost of transportation, 6.31% and cost of yam seeds 31.76%. The total variable cost before the fuel subsidy removal was higher than the total variable cost after the fuel subsidy removal because the hectares of land cultivated by yam farmers were reduced due to an increase in the prices of agricultural production inputs such as herbicides, fertilizer, cost of labour for weeding, heaps making and transportation mean value of the cost of land, cost of weeding, cost of herbicide, cost of heaps, cost of transportation. The results revealed that the cost of yam seeds before the removal of fuel subsidy and after the removal of fuel subsidy accounted for the higher percentage (34.80% and 31.6% respectively) of the total variable cost of yam production for both before and after the removal of fuel subsidy in the study area. The results are in line with the findings of Ironkwe and Ewuziem (2020) who opined that the cost of seed yam constituted the major cost of production of yam in Nigeria due to the scarcity of planting materials. However, the results contradict the findings of Nahanga and Vera (2014) in the study of yam production as a pillar of food security in Logo Local Government Area of Benue, revealed that the costs of ridging and weeding accounted for the major part of total variable costs in yam production. The cost of yam seeds for production before the removal of fuel subsidy is slightly higher than the cost of yam seeds for production after the removal of fuel subsidy due to a reduction in the hectare of land cultivated by yam farmers as the price of production inputs increased after the removal of fuel subsidy. The cost of herbicides increased from 10.64% to 11.19%, cost of fertilizer increased from 9.83% to 11.37%, cost of weeding increased from 6.90% to 8.39%, the cost of heaps making increased from 8.12% to 8.59%, cost of harvesting increased from 5.62% to 6.31% and cost of harvesting increased from 7.19% to 7.45% after the removal of fuel subsidy in the study area. The foregoing indicates yam farmers would have to pay careful attention to the prices of production inputs in other to enhance the potentially realizable profit margin in the yam production business. The total revenue before the removal of the fuel subsidy was estimated at ₦2, 169,500.00, and ₦1, 102,208.30 after the fuel subsidy removal which represents income from sales of yam tubers consumers. The gross margin per annum was estimated at ₦1, 538,300.00 before the removal of the fuel subsidy and ₦737,125.83 after the fuel subsidy removal. This result indicates that yam production was a profitable venture in the study area before and after the removal of fuel subsidies. However, the profit before the fuel removal is higher than the profit after fuel subsidy removal due to a reduction in the hectare of land cultivated by farmers because of the high cost of labour, transportation cost, and agricultural production inputs as the result of fuel subsidy removal. This result is in agreement with the findings of Nahanga and Vera (2014) finding who reported that yam farming is profitable. Also, Reuben and Barau (2012) showed a total revenue of ₦432,594.06 per hectare was obtained from the production of yam in the study area and a Net Farm Income (NFI) of ₦91,876.50, this indicates that the cultivation of yam was a profitable enterprise. Similarly, a study carried out by Akintunde *et al.* (2022) in their study on the economics of yam production and marketing in Taraba State, Nigeria, revealed that yam production is profitable with a Net Return on Investment of ₦1.45.

Test of significant difference between the gross margin of yam farmers before and after Fuel subsidy removal

Table 2 shows that the result of the paired sample t-test between the gross margin of yam farmers before and after fuel subsidy removal is significant at 1% (2-tailed). This implies that the gross margin of yam farmers before the removal of the fuel subsidy is significantly higher than the gross margin of yam farmers after the removal

of the fuel subsidy. The mean difference **N**801224.00 was positive and significant at 1% level of probability. This signified that the removal of fuel subsidy significantly reduced the profit-making potentials of yam production in the study area. The removal of fuel subsidies led to an increase in the cost of production inputs, cost of transportation and cost of labour. The fuel subsidy removal by the Nigerian government may influence yam farmers' purchasing power; potentially leading to a reduction in the hectares of land cultivated which connotes a reduction in profit.

Challenges Faced by Yam Farmers

Table 3 shows the results of challenges faced by yam farmers in the study area. The results revealed that all the yam farmers in Okpokwu Local Government Area were faced with the challenge of the high cost of inputs (100.0%) which ranked 1st. The high cost of inputs could lead to low returns from yam production. Other problems identified in the study area were the problems of the high cost of transportation (86.7%) which ranked 2nd, 77.5.0% of the respondents identified removal of fuel subsidy to be their challenge which ranked 3rd. Also, declining soil fertility was another challenge identified in the study area, which ranked 4th with (62.5%). This finding is in line with the findings of Ariyo *et al.* (2020) in their study on the economics of yam production in Gboyin Local Government of Ekiti State, which revealed that the challenges faced by yam farmers were inadequate capital and high cost of inputs. Also, Akintunde *et al*. (2022) results on the economics of yam production and marketing in Taraba State, Nigeria reveal that the most severe problems affecting yam production were the high cost of transportation (78%), Problems of pricing (77%), price fluctuation (69%), where these ranked 1st, 2nd, and 3rd. The results also revealed that high pest and disease infestation (55.0%) was identified as the 5th challenge faced by yam farmers in the study area. 38.3% were faced with insecurity was ranked 6th. 34.2% were also faced with poor storage as a challenge which ranked 7th. 33.3% were also faced with climate change as a challenge which ranked 8th and lastly inadequate capital was identified as a challenge which ranked 9th (24.2%). The result implies that the high cost of inputs dominated as the challenge faced by yam production in the study area, this is the situation of small-scale farmers in Nigeria.

Table 1. Cost and Return of Farmers Before and After Fuel subsidy removal

Variables	Mean Before (N)	(%) Before	Mean After (N)	(%) After
Cost of land	84750.00	13.43	46416.67	12.71
Cost of weeding	43541.67	6.90	30616.67	8.39
Cost of herbicide	67133.33	10.64	40880.00	11.19
Cost of heaps	51258.33	8.12	31348.33	8.59
Cost of fertilizer	62033.33	9.83	37508.33	10.27
Cost of harvest	45441.67	7.19	27187.50	7.45
Cost of insecticide	21900.00	3.47	12150.00	3.33
Cost of transport	35458.33	5.62	23041.67	6.31
Cost sett	219633.33	34.80	115933.33	31.76
Total variable cost	631150.00	**100.0**	365082.50	**100.0**
Total revenue	2169500.00		1102208.3	
Gross margin	1538300.00		737125.83	

Source: Field survey 2024

Table 2. Test of Difference between the gross margin farmers before and after Fuel subsidy removal Policy

Variables	Mean	Mean difference	Std error mean	t-value	Sig.
GM Before fuel subsidy removal	1538400		129750		
GM After fuel subsidy removal	737125.83	801224	64782.81	9.876	0.000

Source: Field survey 2024. *** Significant at 1%

Table 3. Challenges Faced by Yam Farmers

Variables	Frequency	Percentage	Rank
Subsidy removal	93	77.5	3rd
High inputs cost	120	100.0	1st
Inadequate capital	29	24.2	9th
High cost of transportation	104	86.7	2nd
Insecurity	46	38.3	6th
Poor storage facilities	41	34.2	7th
Declining soil fertility	75	62.5	4th
High pests and disease infestation	66	55.0	5th
Climate change	40	33.3	8th

Source: (Field survey, 2024) *Multiple Response

CONCLUSION

The study concludes that the removal of fuel subsidy reduced the profit-making potential of yam farmers due to an increase in the price of agricultural production inputs, cost of transportation, and cost of labour for weeding and heaps. Even though yam production is profitable before and after the removal of the fuel subsidy, the profit before the removal of the fuel subsidy is significantly higher than the profit after the removal of the fuel subsidy. The study also concludes that yam farmers were faced with the challenge of high input costs, high cost of transportation, and removal of fuel subsidy which led to the reduction of hectares of land cultivated in the study area. Based on the findings, the research recommends that; yam farmers should be encouraged to form/join agricultural inputs cooperatives in other to take advantage of economies of scale in the purchase of agricultural production inputs; this will make the inputs affordable and available at a better cost. Also, information on market opportunities and extension cum advisory services from extension agents can be properly diffused among yam producers if they are in a cooperative society. The government should subsidize means of transportation to rural farmers to ease the cost of transportation and provide financial support to rural farmers.

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