

Farmers' Perception of the Impact of Presidential Fertilizer Initiative Programme (2016-2022) on Crop Production in Wukari, Taraba State, Nigeria

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ABSTRACT

This research investigated farmers' perception of the impact of Presidential Fertilizer Initiative (PFI) programme (2016 - 2022) on crop production in Wukari, Nigeria. A multi-stage sampling procedure was employed to contact 160 farmers for the study. A well-structured questionnaire was used for data collection and investigated using both descriptive and inferential statistics such as mean score rating and binary logit regression. The result indicates that about (56.9%) of the farmers were males aged between 38 - 47 years (43.1%) with about 0 - 10 years of farming experience (40%). The majority (61.3%) had between 00 - 02 hectares (42.5%) area of farm land. They were aware that PFI provided more than 100,000 direct and indirect jobs throughout the fertilizer value chain (3.14) and was a public-private partnership (3.05). The outcome of the binary logit regression indicated that factors such as age, marital status, farming experience, farm size, quantity of fertilizer distributed, annual income, fertilizer price and fertilizer use rate all had a positive coefficient and significant participation in the PFI programme. The farmers perceived that the PFI programme enhanced crop yield and productivity (3.98). We recommend that the government should sustain this programme to enhance fertilizer supply and improve agricultural production.

Keywords: Perception, Presidential, Fertilizer, Initiative

Introduction

The Nigerian population is fast increasing at a rate which is forecasted to be twice the size of the 2006 population by 2030; In addition, the country has been challenged by a yearly deterioration of soil nutrients, and consequently threatening its capability to keep-up with the modest improvements attained from latest growth in agriculture [1,2]. Soil dreadful conditions because of unfavourable practices in agriculture; deforestation, soil erosion, and dangerous conditions of climate such as flood occurrence and drought are on the rise as far as their magnitude and frequency are concerned [3]. These issues if not addressed pose a great threat to the nation's sustainable food security given that land expansion is limited.

Therefore, the sector of agriculture has a mandate to produce enough food both for an ever-increasing rural-urban population and for exportation [4]. It is paramount to formulate policies to tackle food insecurity and rural poverty through fertilizer, improved seeds, and intensification of other inputs. According to Tikon et al. every successive government in Nigeria has formulated policies geared towards increased fertilizer usage among small scale farmers [9].

Numerous policy instruments on input subsidy such as the procurement of fertilizer and supply mechanisms, taxes and import costs, and indigenous manufacturing of fertilizer, were used in different magnitudes and forms during various systems of government. For instance, since the culmination of the military rule in Nigeria, various governments had

adopted different mechanisms and policies. Those were to give guidance to the economy, different institutions, private and public sectors, and the citizens especially the small-scale farmers in order to enhance fertilizer usage, boost agricultural production and enhance food security. Just like others, the government of President Muhammadu Buhari in 2015 focused on building her agricultural policies based on the successes of the Growth Enhancement Support Scheme (GESS), a division of the Agricultural Transformation Agenda (ATA) and thus, the Agricultural Policy Promotion (APP) framework was birthed. In 2016, he initiated the Presidential Fertilizer Initiative (PFI) programme. The core objective of this programme was to boost the supply/distribution system of fertilizers to farmers across the country. This attracted partnerships from within and outside the country, prominent among them was the Fertilizer Producers and Suppliers of Nigeria, (FEPSAN) and Office Chérifien des Phosphates (OCP) partnership/agreement on December 2016. The Nigeria's President and the King of Morocco signed this agreement which aim was for OCP to start supplying fertilizer ingredients, and phosphate to Nigeria at a reduced price to assist the local blending of NPK fertilizer. By signing the agreement, it was therefore essential for actors to know the factors that drive its implementation and the combination of such to achieve the government's desired specific objectives. This includes government participation in fertilizer market for effective supply and passage of fertilizers to farmers at a subsidized rate specifically to the rural areas where subsistence/smallholder farmers are predominant [10,11].

Developing appropriate responses to the PFI programme requires awareness, perception and understanding of fertilizer policies by the farmers. This involves the cooperation of farmers for the successful implementation of the policy. Farmers always favour any sustainable policy perceived to be beneficial to them in terms of crop production and net farm income [12]. This policy, if well managed and implemented, would greatly encourage farmers' fertilizer usage and boost agricultural productivity. Several fertilizer policy studies have been carried out in Nigeria and they include: Tikon et al. who studied 'fertilizer policy of 2010-2015 and changes in farmers' fertilizer use and revenue in Taraba state' [9]. Ibukun et al, 'impact of fertilizer policy on cereal production' and Balana et al, 'a historical review of fertilizer policies in Nigeria' [10,13].

However, inadequate or no research was carried out to determine farmers' awareness level of fertilizer policies and their perceived impact on crop production in Nigeria. Hence, the need for this study which aims to evaluate farmers' perception of the impact of the PFI on crop production in Wukari, Taraba State, Nigeria. Unambiguously, the study aims to; determine the farmers' level of awareness of the Presidential Fertilizer Initiative, ascertain factors affecting farmers' participation in the Presidential Fertilizer Initiative and their perceptions of the impact of PFI on the production of crop in the study area.

Methodology

This study was carried out in Taraba State, precisely in the Wukari Local Government Area (LGA) (Figure 1). It is 4,308 km² in size, situated 152 meters above sea level between latitude 7°52'17.00"N, and longitude 9°46'40.30"E. In the north, it shares borders with Gassol LGA, in the east with Donga LGA, in the

south with Benue State while in the west with Nasarawa State and Ibi LGA. According to the National Population Commission, an estimated 318,400 people are living in the LGA [14].

The vegetation of Wukari LGA is within the Southern guinea savannah zone. It exhibits periodic patterns and it is mostly of savannah trees with large red heart (*Hymeno cardia*) as the dominant species providing some degree of shade. In addition are shrubs and grasses such as Speargrass (*Imperata cylindrica*), Guinea grass (*Panicum maximum*), Pignut (*Hyptis suaveolens*), Morning glory (*Ipomoea carnea*), Bahama grass (*Cynodon dactylon*), Wiregrass (*Eleusine indica*), Spiderwort (*Commelina benghalensis*), sedge flower (*Cyperus difformis*), Lemon verbena (*Lippia dubai*) etc. Hard wood (*Isobertia*) and savannah woodland which constitutes the forest plantation of the area are also limited. Other species include: Eucalyptus (*Eucalyptus camaldulensis*), Neem tree (*Azadirachta indica*), Gmelina (*Gmelina arborea*), Mango (*Mangifera indica*), Locust tree (*Parkia filicoidea*), Cashew (*Canarium occidentale*) and Guava (*Psidium guajava*) etc [15].

The mean annual rainfall falls between 1000mm - 1500mm. The two distinct seasons are wet season (from April to October) and dry season (from November to March). The average maximum temperature is mainly around April (40°C) while the average minimum temperature is between December and February (20°C) [16]. The primary economic activities in the area include: farming, livestock rearing, and trade. The LGA comprises of ten (10) wards; Ayyi, Akwana, Chonku, Bantaje, Jibu, Hospital, Puje, Kente, Tsokundi and Rafin Kada. The Jukun people constitute the majority of the inhabitants.

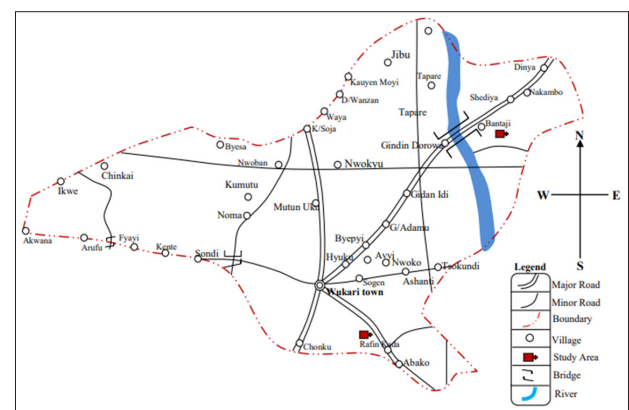


Figure 1: Map of Wukari local government area showing the study area [17].

Using a multi-stage sampling method, farmers were selected for the study. Out of 10 wards in the local government area, five (5); Bantaje, Kente, Puje, Rafin-kada, and Jibu were purposively selected because of the high implementation rate of the PFI in those areas. The second stage, four (4) villages from each of the selected wards was randomly selected, totalling 20 villages. Finally, eight (8) farmers were randomly selected from each of the 20 villages, making 160 respondents for the study. A carefully constructed questionnaire was administered to the respondents to collect data for the study.

Descriptive statistics such as a 4-point mean score rating and inferential statistics such as the Binary logit regression were used

to analyse data. A similar approach was adopted by Onyekuru and Apeh, Tikon et al and Apeh, Ukwuaba and Apeh, to determine factors influencing farmers' participation or adoption of an innovation [18-20]. The mean score is a rating scale used to indicate whether the respondent agrees or disagrees with a collection of statements about some person, attitude, an event or object [21]. Thus represented by the formula:

$$X = \frac{\sum x}{N} \quad (1)$$

Where X = mean score (MS)

$\sum$ = sign of summation

N = no of respondents

x = no of the nominal value for each category of response (4 = extremely aware (EA), 3 = Aware (A), 2 = fairly aware (FA) and 1 = not aware (NA))

$$X = \frac{4+3+2+1}{4} = 2.5$$

Therefore, with a mean cut-off point of 2.5, accept if the MS $\geq$ 2.5 and reject if the MS $<$ 2.5.

The Binary logit regression model adopted was specified as thus:

$$Y_i = \beta_0 + \sum_{j=1}^k \beta_j X_{ij} + \mu_i \quad (2)$$

Where:

Y = PFI participation (yes = 1, no = 0)

X_1 = Age (in years)

X_2 = Sex (1 = male, 2 = female)

X_3 = Farm Size (hectare)

X_4 = Annual Income (Naira)

X_5 = Educational levels (number of years spent in school)

X_6 = Household size (number of people in a household)

X_7 = Subsidy cost of fertilizer

X_8 = Price of fertilizer

X_9 = Usage rate of fertilizer

X_{10} = Quantity of fertilizer distributed

β_0 = Constant

β_1 - β_{10} = regression coefficients

e = error term

Results and Discussion

Farmers Socioeconomic Characteristics

Table 1 shows the results of the farmers' demographic variables. It indicates that about (56.9%) of the farmers were males aged between 38 - 47 years (43.1%) with about 0 - 10 years farming experience (40%) and mostly married (55%). About (38.8%) attained secondary education and earned an annual income of 10,000 - 50,000 naira (66.9%). This agrees with the findings of Tikon et al., (2023) that farmers' education in Nigeria is significantly high and can drive positive changes in their farming [18]. This is because literacy improves the farmers' ability to internalize farming information [22].

Majority (61.3%) of the respondents had between 01 - 05 members in their households and a farm size of about 00 - 02 hectares (42.5%). This is in tandem with the findings of Anyiam, et al, Apeh and Nwaiwu et al. that farmers in Nigeria cultivated

on small-sized farms measuring between 0.1 - 5 hectares [19,23,24].

Table 1: Farmers' socioeconomic characteristics

Variables	Percentage (n=160)
Age (years)	
18 - 27	0.069
28 - 37	0.231
38 - 47	0.431
48 - 57	0.169
58 and above	0.100
Gender	
Male	0.569
Female	0.431
Marital status	
Married	0.550
Single	0.088
Others	0.362
Education (years in school)	
No formal education	0.075
Primary education	0.231
Secondary education	0.388
Tertiary education	0.306
HH size	
01 - 05	0.613
06 - 10	0.244
11 - 15	0.106
16 and above	0.037
Farming experience	
00 - 10	0.400
11 - 20	0.231
21 - 30	0.175
31 - 40	0.106
41 and above	0.088
Farm size (in hectares)	
00 - 02	0.425
03 - 05	0.288
06 - 08	0.156
09 and above	0.131
Annual income ('000 Naira)	
10.000 - 050	0.669
50.001 - 100	0.200
100.001 - 150	0.075
150.001 - 200	0.044
200.001 and above	0.013

Source: Field Survey, 2022

Level of awareness of Presidential Fertilizer Initiative among crop farmers

The results in Table 2 reveal that farmers were aware that PFI; provided jobs for more than 100,000 direct and indirect employees throughout the fertilizer value chain (MS = 3.14) and was a public-private partnership (MS = 3.05). It aided the indigenous manufacture and supply of quality fertilizer at a cheap price (MS = 2.78), was not a credit scheme (MS = 2.78) and was not a subsidy scheme (MS = 2.75). It helped increase considerable annual subsidy and FX savings via import substitution (MS = 2.60) and revived and created 52 indigenous blending plants covering 19 states and across the 6 geopolitical zones (MS = 2.58)

Table 2: Level of awareness of Presidential Fertilizer Initiative among crop farmers

S/N	Parameter	MS	Rank
1	The program has revived and created 52 indigenous blending plants covering 19 states and across the 6 geopolitical zones	2.58*	6 th
2	It aided the indigenous manufacture and supply of quality fertilizer at a cheap price	2.78*	3 rd
3	Delivered about 3 metric tons (around 60 million 50kg bags) of NPK (20:10:10) fertilizer	2.04	9 th
4	It provided jobs for more than 100,000 direct and indirect employees throughout the fertilizer value chain	3.14*	1 st
5	It helped increase considerable annual subsidy and FX savings via import substitution	2.60*	5 th
6	PFI sold the finished product(fertilizer) at 5,5000 per bag	2.15	7 th
7	PFI is not a subsidy scheme	2.75*	4 th
8	PFI is not a credit scheme	2.78*	3 rd
9	PFI is a public-private partnership	3.05*	2 nd
10	Improving food security as a consequence of the expected increase in production of food	2.09	8 th

Source: Field survey, 2022; * accept if MS $\geq$ 2.5

Factors influencing farmers' participation in the Presidential Fertilizer Initiative

The study employed binary logit to evaluate factors affecting farmers' participation in the PFI programme in Wukari, Taraba state, Nigeria. The model results from Table 3 show the model comprised of 12 variables but only 9 of them were significant. The details of the regression show that the value of the coefficient of determination (R²) of the regression was 0.78, which implied that the regressors present in the model can explain the 78% of variation in the dependent variable. A higher R² value causes the model to be more explanatory and thus better fits the sample. The constant indicates that the overall model is statistically significant at a 1% level.

Table 3: Binary logit Regression on factors influencing farmers' participation in the PFI programme

Variable	B	Std. Error
Constant	2.083***	0.694
Age (in years)	0.057*	0.141
Gender	0.401	0.421
Marital status	0.070*	0.011
Farm size	0.174**	0.093
Annual income	0.113***	0.197
Educational levels	0.421	0.432
Households size	-0.019	0.225
Farming experience	0.530**	0.128
Fertilizer subsidy	0.167*	0.257
Fertilizer price	0.206***	0.170
Fertilizer use rate	0.526***	0.170
Fertilizer quantity distributed	0.203**	0.157
No of obs = 160	No of obs = 160	No of obs = 160
R ² = 0.780	R ² = 0.780	R ² = 0.780
Adjusted R ² = 0.700	Adjusted R ² = 0.700	Adjusted R ² = 0.700
Durbin-Watson = 1.00	Durbin-Watson = 1.00	Durbin-Watson = 1.00
No of obs = 160 R ² = 0.780 Adjusted R ² = 0.700 Durbin-Watson = 1.00		

Source: Field survey, 2022

Age and marital status had coefficients that were positive and statistically significant at 10% level. This implies that an extra year or change in marital status by the farmers will enhance their participation in the PFI programme. Farming experience, farm size and quantity of fertilizer distributed also had positive coefficients but were at a 5% level of statistical significance. This implies that an increase in farming experience, size and the quantities of fertilizer distributed will induce farmers' participation in the PFI programme. In addition, annual income, fertilizer price and fertilizer use rate were significant at a 1% level. They had positive coefficients which suggest that an increase in farmers' annual income, fertilizer price and its use rate increases their participation in the PFI programme.

Farmers' perception of the Impact of the PFI programme on crop production

Table 4: Perception of farmers on the impact of PFI programme on crop production

Variable	MS	Rank
Enhances crop yield and productivity	3.98	1 st
Improves food security	2.80	3 rd
Reduces crop failure tendencies	2.53	4 th
Increases soil fertility and nutrient reserves	3.01	2 nd

Source: Field survey, 2022

Table 4 reveals the result of farmers' perception of the impact of PFI programme on crop production. It indicates that the

programme helps to enhance crop yield and productivity (3.98), improve food security (2.80), reduce crop failure tendencies (2.53) and increase soil fertility and nutrient reserves (3.01). The reason for their views is not farfetched, as studies have shown that fertilizer application enhanced crop yields and sustained soil fertility [9,10,13,25].

Conclusion

The study investigated farmers' perception of the impact of Presidential Fertilizer Initiative programme (2015 - 2022) on crop production in Wukari, Nigeria. The results indicate that male farmers aged between 38 - 47 years with about 0 - 10 years of farming experience constituted the majority. Most of the respondents were married with about 01 - 05 members per household and a farmer size of about 00 - 02 hectares [26].

The farmers were aware that PFI created jobs across the fertilizer value chain, aided local production as well as supply of quality fertilizer at a cheap price and helped to accrue considerable annual subsidies and FX savings via import substitution. Age and marital status were significant and positively influenced participation in the PFI programme at a 10% level of significance while farming experience, farm size and quantity of fertilizer distributed also had a positive influence at a 5% level significance and annual income, fertilizer price and its use rate were significant at a 1% level. The farmers therefore, perceived that the PFI programme helps to enhance crop yield and productivity, improve food security, and reduce crop failure tendencies, increase soil fertility, and nutrient reserves. Consequently due to these research findings, it was therefore recommended that the government should sustain this programme to enhance fertilizer supply and increase agricultural production. Moreover, the stakeholders in the private sector should work closely with the government to proffer solutions to the constraints of fertilizer supply and usage to enhance crop productivity in Nigeria.

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