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Full Length Research

Influence of Fertilizer Voucher Programme (FVP) on the Production of Smallholder Farmers in Taraba State, Nigeria

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This paper discusses the Influence of (FVP) on the Production of Smallholder Farmers in Taraba State, Nigeria. Most agricultural outputs come from smallholder farms which are characterized as resource poor and rain fed agriculture using very low levels of fertilizer on less than 2.0 ha farm size . The level of fertilizer used per cultivated hectare is 8.4 kg/ha which is far lower than the 200kg/ha recommended by Food and Agriculture Organisation (FAO).Specifically, the study sought to: ascertain farmers' level of production as a result of implementation FVP; examine the differences in the quantity of fertilizer allotted to farmers across the years in FVP; assess the satisfaction of farmers participating in the FVP; and determine major challenges in the implementation of the FVP in Taraba State. The results show that during participation in FVP the respondents have an average of 359 bags (50kg) of main crops output of maize, rice, sorghum and cassava (t- value = 13.14; P= 0.00) as against average of 196 bags (50kg) before participation in the FVP of the main crops. Testing the null hypothesis (Ho_1:), which states there is no significant difference in the quantity of total output of produce during the farmers involvement and before was rejected and the alternative (Ha:) accepted. The study further shows that there is no significant difference in the number of fertilizer allocation among the farmers in the 4 years of the implementation of FVP. Thus, the null hypothesis (Ho_2) of no significant difference in the quantity of fertilizer allotted to farmers across the years was accepted, while the alternative hypothesis (Ha) was rejected accordingly. The study recommends that the number of bags of fertilizer per participating farmer should be increased to between 5 - 8 bags per season as against the 2-4 bags in the FVP. This would make farmers to increase output, income and food security of Nigeria.

Keywords: Fertilizer Voucher Programme (FVP), Production, Smallholder Farmers

INTRODUCTION

Agriculture employs about 70 percent of Nigeria's population. Most agricultural outputs come from smallholder farms (typically less than 2.0 ha), which are characterized as resource poor and rain fed agriculture using very low levels of fertilizer. The level of fertilizer used per cultivated hectare is 8.4 kg/ha; although it is above the regional average of 7.5 kg/ha, it is considered low relative to other developing regions of the world and is far lower than the 200kg/ha recommended by Food and Agriculture Organisation (FAO)(Liverpool-Tasie, Auchan, and Banful, 2010).Food production per capita in Africa has grown too slowly, well behind rates seen in Asia and Latin America. This has resulted in rising imports of cereals and other staples, and more people who are hungry and undernourished. Yields of staples among small holder farmers per hectare have not risen at all in the region; largely because smallholders farmers have not applied manufactured fertilizer in sufficient amounts to take advantage of improved varieties. Farmers have not done so because inputs have been too costly and they have been too poor, with little or no access to

credit. Hence, in order to resolve the impasse, it is necessary to subsidize the costs of inputs thereby creating a virtuous circle of higher yields, higher incomes, more food and less hunger and poverty (Bunde et al., 2014).

Prior to 2009, the private sector distribution of fertilizer was hindered due to the fact that, fertilizer was being procured and distributed through the Taraba State government. This practice was common throughout Nigeria and this has resulted in various levels of Nigerian governments being the primary suppliers of fertilizer to the Nigerian farmers instead of private dealers; an unsustainable business strategy, (International Fertilizer Development Center (IFDC), 2013a). In 2006, the leadership of Africa, in the context of the Comprehensive Africa Agriculture Development Programme (CAADP) through the Abuja Declaration resolved to improve the usage of fertilizer as a means to achieving the region's green revolution objectives. As a follow up, the federal government of Nigeria (FGN) decided to disengage from direct procurement of fertilizer in favour of promoting private sector participation. Corresponding to this commitment, the FGN piloted a fertilizer voucher system in selected Nigerian states as an alternative way of administering the fertilizer subsidy (Liverpool-Tasie, Auchan, and Banful, 2010).

In 2010, the FGN announced that it would completely withdraw from fertilizer procurement in support of the expansion of the private agro-dealer network. To facilitate a smooth transition and to ensure that fertilizer reaches the target beneficiaries, the FGN and some state governments began experimenting with a voucher programme in 2009. Essentially, the government policy switched the focus of the programme from subsidizing procurement to supporting farmers to be able to purchase fertilizer. As this was a new policy, government initially introduced the programme as a pilot voucher programme in two states, Kano and Taraba in 2009/2010.

Fertilizer consumption in Nigeria is low; this is despite the Nigerian government's longstanding and prominent engagement in procuring and distributing fertilizer at subsidized rates since the early 1970s. Although the fertilizer subsidy programmes absorb a large proportion of the national budget, the impact of the programmes on agricultural productivity has been mixed at best and the programmes have not created sustained increases in fertilizer consumption (Banful and Olayide, 2010). The government-led procurement and distribution of subsidized fertilizer in Nigeria has been characterized as persistently delivering fertilizer late with significant diversion of fertilizer from the intended beneficiaries (Nagy and Edun, 2002). Leakages of subsidized fertilizer into the regular market were common, leading to market price distortions as well as providing peak of 1.2 million metric tonnes arbitrage opportunities. As noted earlier, fertilizer subsidy occupies a significant position in the policy toolkits of the government and this explains why the federal, state, and local governments have all been involved in the procurement, distribution, and price determination of fertilizer at various times |(Nagy and Edun, 2002).

Objectives of the Study

The main purpose of the study was to assess the influence of FVP on the production of smallholder farmers in Taraba State, Nigeria (2009 - 2012). Specifically, the study sought to:

1. ascertain farmers' level of production as a result of implementation FVP;
2. examine the differences in the quantity of fertilizer allotted to farmers across the years in FVP;
3. assess the satisfaction of farmers participating in the FVP; and
4. determine major challenges in the implementation of the FVP in Taraba State.

Research Hypotheses

The following null hypotheses were postulated for the study:

Hypothesis One:

Ho_1: There is no significant difference in the quantity of total output of production during the farmers' involvement in FVP and before.

Hypothesis Two:

Ho_2: There is no significant difference in the quantity of fertilizer allotted to farmers across the years 2009 and 2012.

Sampling Procedure/Size

The study was conducted in Taraba State, Nigeria. The state has sixteen (16) Local Government Areas (LGAs) with Jalingo being the state capital. The state ranked 33 in Nigeria has an estimated population of 2, 300,736 million people according to the 2006 population census, is the 29th largest Nigerian state by GDP (US$3,397) andwikipedia,https://en.m.Wikipedia.org.,listofnigerianstatesbypopulationwikipedia.

Tropical climate is prevalent in the state. The dry season is from November to March and rainy season is from April to October. Average rainfall is 1350mm. The temperature varies from place to place with an average of 35^0C depending on the season. The

vegetation ranges from tall grasses and forest in the southern parts to short grasses and shrubs in northern parts of the state. Agriculture is the bedrock of the economy, over 80 percent of its population engages in agriculture or farming related activities. The state is endowed with fertile land, excellent climate conditions and immense agro-based raw materials.

Before 2009, fertilizer distribution and procurement was carried out by Taraba State Government agency; Taraba Agricultural Development Programme (TADP). This practice is common throughout Nigeria and has resulted in governments being the supplier of fertilizer to the Nigerian farmers.

Population and Sampling Procedure

The population for the study comprised all farmers that participated/benefited in FVP in the Taraba State, numbering 51,098 smallholder farmers (TFVP, 2011). Multistage sampling technique was used to draw the sample size. In stage one, two senatorial zones (Central & Northern) were purposively selected for their relative peace and security. The sample size was purposively selected from registered farmers from the different wards of each of the selected LGA in the study area. In stage two, 3 LGAs in each of the senatorial zones were randomly selected, namely; Bali, Gashaka, Gassol from the central zone and Ardo- kola, Jalingo, Zing from the northern zone. From each of the selected LGA, two percent of the beneficiaries were proportionally selected from the various wards and used to collect the primary data for the study. The two percent was proportionally selected from the total beneficiaries from each participating ward in the LGA to obtain from Bali (52), Gashaka (32), Gassol (52) from the central zone and Ardo- kola (83), Jalingo (53), Zing (64) from the northern zone to obtain a sample size of 336 respondents at wards level.

Table1: Sampling procedure for the study

LGA	Total no. of farmers	% proportion of farmers	2% of selected farmers	
Bali	2,620	2	52	
Gashaka	1,615	2	32	
Gassol	2, 602	2	52	Central Zone
Ardo kola	4,144	2	83	
Jalingo	2, 667	2	53	
Zing	3, 211	2	64	Northern Zone
Total	**16,889**	**12**	**336**	

Source: Taraba Fertilizer Voucher Programme (TFVP), (2011).

Instrument for Data Collection

Primary data were collected from the selected respondents through the use of interview schedule divided into relevant sections which encompassed necessary questions covering the objectives. Five percent of the sample size (approximately 17 instrument schedules were administered for validation, 15 were returned) and all necessary adjustments were made to tally with the objectives of the study. The instrument schedule was validated by the supervisor (Professor A. E. Agwu), Dr. (Mrs) C. E. Nwobodo and other staff in the Department of Agricultural Extension, University of Nigeria, Nsukka, before it was administered to the respondents.

RESULT AND DISCUSSION

Crop output before and during FVP implementation among the respondents

Entries in Table 1 reveal a significant difference in the output of the respondents before and during the implementation of FVP in the study area. During participation in FVP the respondents have an average of 359 bags (50kg) of main crops output of maize, rice, sorghum and cassava (t- value = 13.14; P= 0.00) as against average of 196 bags (50kg) before participation in the FVP of the main crops. The result

shows that there was significant influence of fertilizer obtained in the FVP with a margin difference of 196 bags between "the before" and "the during" participation in the programme, thereby improving the income generation from the sales of additional bags (50kg) during the FVP's implementation and achieving food security in Nigeria. Testing hypothesis 3 therefore, (Ho:), which states there is no significant difference in the quantity of total output of produce during the farmers involvement and before was rejected and the alternative (Ha:) accepted.

In their evaluation of various technological and institutional interventions to raise agricultural productivity and improve food security, Minot and Sawyer (2013) reported that, farmers' main reason for the use of fertilizers was to increase crop yields, in fact, 97% of the users of fertilizers opined that their major purpose was to add to their quantity of outputs or total crop yields.

Table 1: Mean differences of crop output during and before FVP implementation among the respondents

Quantity of Fertilizer Allotted in the 4 years (Kg/Bag)					**t-value P-value**
2009	2010	2011	2012	**Total**	
4.00	4.00	4.00	4.00	**16.00**	
Output of during the 4 years of Participation in Fertilizer Voucher Programme					**13.135**
2009	2010	2011	2012	**Mean**	**0.00**
91.84524	88.35714	90.74405	93.85714	**359.1639**	
Output in the 4 years before Participation in Fertilizer Voucher Programme					
2005	2006	2007	2008	**Mean**	
50.76488	50.0506	50.00893	53.04762	**196.2709**	

Source: Survey Data, 2017.

Quantity of fertilizer allotted to farmers across the years of FVP implementation

Table 2 shows that there is no significant difference in the number of fertilizer allocation among the farmers in the 4 years of the implementation of FVP. Each respondent was entitled to an average 4bags of fertilizers in each year of the implementation of the programme with no presentation by proxy or swapping voucher permits/cards among the beneficiaries or non-registered farmers. This because the method of allotment to beneficiaries was strictly an issue of policy in the FVP (F- value = 0.000; P-value = 0.000.Thus, the null hypothesis (Ho) of no significant difference in the quantity of fertilizer allotted to farmers across the years (2009 and 2012) was accepted, while the alternative hypothesis (Ha) was rejected accordingly

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Table 2: Mean differences in the quantity of fertilizer allotted to farmers across the years in FVP

Year	**Mean**	**Std. Deviation**	**F-value**	**P-Value**
2009	4.000	0.000		
2010	4.000	0.000		
2011	4.000	0.000	0.000	0.998
2012	4.000	0.000		
Total	**16.000**	**0.000**		

Source: Survey Data, 2017

Respondents' satisfaction with FVP implementation

Table 3 shows the level of satisfaction of the respondents in the FVP for the years under study. The results show that the respondents were satisfied with the followings: prices of Fertilizer (M=3.81, SD=0.43), time of arrival of fertilizer (M=3.29, SD=0.69),quality of fertilizers by the suppliers in FVP (M=3.76,SD=0.48), pattern in fertilizer purchase in FVP (M=3.70,SD=0.47), involvement of private supplier (M=3.59, SD=0.55),access to information in the FVP (M=3.69, SD=0.49), transportation of the fertilizer (M=3.49, SD=0.52),role of cooperative associations (M=3.74, SD=0.48) and leadership development among participants (M=3.68,SD=0.49).

Other areas of satisfaction identified by the respondents include: redeeming of vouchers (M=3.52, SD=0.55) and record keeping activities in FVP (M=3.31, SD= 0.58). Only credit facilities to participants (M=2.38, SD-0.64) was perceived as not satisfied by the respondents.

Minde, et. al, (2008) emphasizing on the level of success of fertilizer subsidies in Africa highlighted that targeting poorer households in FVP led to the high level of satisfaction with programme's implementation not only in Nigeria, but in other African countries (Malawi, Zambia, and Kenya) where similar Fertilizer Programmes were implemented.

Some of the respondents buttressed their satisfaction with FVP in the following quotations: "For the first time I get my seeds and fertilizers fast without any political interference", and "This is the first time that we received subsidized NPK ever". Smallholder Farmers representing Gembu, Sardauna LGA, Taraba State, Nigeria (TFVP), (2011).

Table 3: Distribution of respondents'satisfaction of FVP implementation

Variables	Mean	Std. Deviation
Price of fertilizer	3.81*	0.43
Time of arrival of fertilizer	3.29*	0.69
Quality of fertilizer by the suppliers	3.76*	0.48
Patterns in fertilizer purchases	3.70*	0.47
Involvement of private supplier	3.59*	0.55
Access to information in the FVP	3.69*	0.49
Transportation of the commodity/fertilizer	3.49*	0.52
Record keeping activities in FVP	3.31*	0.58
Role of cooperative associations	3.74*	0.48
Credit facilities for participants	2.38	0.64
Leadership development among participants	3.68*	0.49
Redemption of vouchers	3.52*	0.5

Source: *Survey Data, 2017.* **(*> 3= Very Satisfied).**

Respondents' perceived major challenges in the implementation of FVP

Table 4 shows that limited access to credit facilities (M=3.51, SD=0.73) and late arrival of fertilizers (M=3.33, SD=0.72) were classified as "Serious Challenges" in the FVP in all the years under consideration because their averages were above the mean of (M=3.00) as explained in the measurement of variables. On the other hand variables of: transport to distribution points (M=2.21, SD=0.55), purchase from importers (M=2.22,SD=0.54), access to the fertilizer (M=2.25, SD=0.57), blending plants produce low quality fertilizers (M=2.26,SD=0.61), purchase from wholesalers (M=2.27,SD=0.56), high fertilizer prices(M=2.32,SD=0.61), private sector factors manipulations (M=2.35,SD=0.62),low farmers' income (M=2.40,SD=0.66),providing agronomic information (M=2.44, SD=0.62), farmers and majority of those involved in fertilizer industry are not well trained (M=2.45, SD=0.72), high level of policy inconsistencies by government officials (M=2.47, SD=0.77), inappropriate technology use of the fertilizer (M=2.52, SD=0.67) and sales to wholesalers, dealers and large farmers (M=2.72, SD=0.86) were all perceived as ''Not Challenges'' faced by the respondents in the FVP implementation. This was so because all means of the perceived challenges were less than 3.

Access to agricultural credit has been positively linked to agricultural productivity in several studies. Yet this vital input has eluded smallholder

farmers in Nigeria (Phillip*et al.* 2009). Banks with large loan funds are generally difficult to access. Issues of collateral and high interest rates screen out most rural smallholders. Another problem associated with smallholder access to agricultural credit is that agricultural loans are often short term, with fixed repayment periods; this may not suit annual cropping, especially when loan release is not coordinated with growing cycles of crops. Short-term loans are also unsuitable for livestock production. For credit to be most effective, loan terms must flexibly relate to cash flows in the target business, the input demand/supply structure, and quantifiable business risks.

Table 4: Distribution of respondents' perceived major challenges in the implementation of FVP

Constraints	Mean	Std. Deviation
Transport to distribution points	2.21	0.548
Purchase from wholesalers	2.27	0.559
Lack of agronomic information	2.44	0.620
Purchase from importers	2.22	0.542
Sales to wholesalers, dealers and large farmers	2.72	0.860
Access to the fertilizer	2.25	0.566
Inappropriate technology use of the fertilizer	2.52	0.673
Private sector factors manipulations	2.35	0.624
Low farmers' income	2.40	0.661
High fertilizer prices	2.32	0.612
Limited access to credit	3.51*	0.729
High level of policy inconsistencies	2.47	0.768
Late arrival of fertilizers	3.33*	0.721
Blending plants use poor quality raw materials and produce low quality fertilizers	2.26	0.612
Farmers and majority of those involved in fertilizer procurement are not well trained on fertilizer application	2.45	0.719

Source*: Survey Data, 2017.* *** (> 3= Serious Constraint).**

CONCLUSION

From the findings of the study, it was concluded that the smallholder farmers' who participated in the FVP had increases in their yields during the FVP periods (2009-2012) than the before periods (2005-2008). Majority of the respondents possessed and utilized the Global System of Mobile (GSM). All the respondents paid cash as the mode for payment in the FVP, with no provision in the programme for credit purchase or bank transfer between the respondents and agro- dealers. Thus, the beneficiaries cannot buy the fertilizer on credit or via bank transfer. The results of the study further concluded that only a small proportion of the respondents obtained credit facilities from the various sources of credits: Bank of Agriculture (BOA), Commercial Banks, Cooperative Organisations and Friends and Relatives.

On the arrival time of fertilizer, the beneficiaries asserted that there were significant improvements on the month of arrival of fertilizer within the years under review 2009-2012. Majority of the respondents obtained the rations of fertilizers between May and July in the first year of the FVP and between April and May in the remaining three years of the programmme's implementation periods. The findings of the study also conclude that the FVP was effective as source of fertilizers to smallholder farmers in Taraba State.

In the final conclusion, the FVP in the study has crowded-in private sector participation as one of the major goals of the implementation of the fertilizer voucher programme. Thus, increasing private sector participation towards making the agricultural sector more business oriented. Reducing the frequency of government intervention in preference to building capacity in the private sector to handle all levels of the fertilizer value chain procurement, distribution activities would send the right directions to the private sector on government commitment to reform the fertilizer industry.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations were offered:

1. Government should endeavour to allow greater private sector involvement and participation through input vouchers that are redeemable at privately owned stores and address targeting issues to ensure that poor and smallholder farmers, who would not usually purchase fertilizer, actually benefit from the programmes.
2. There is the need to make provision for credit facilities in the fertilizer distribution industry for small scale farmers to enable them purchase their required needs of the commodity/fertilizer from the agro dealers who sell at higher prices than the subsidized government source of fertilizer distribution. Bank of Agriculture (BoA) and commercial banks should offer special credit to farmers at concessional rates to increase volume of purchase of fertilizer in any fertilizer distribution programme to increase agricultural production outputs and for food security in general in Nigeria. Furthermore, to remedy the lack of provision of credit facilities in the FVP, rural banking/ rural credit programme policy should be revitalized through establishment of rural banks. The rural credit programme, which should be administered among certified/registered farmers' cooperative society, would not only improve farmers' purchasing power but also encourage the private sectors participation in the sales of the fertilizers and remove the bureaucratic bottle neck of government direct involvement.
3. The number of bags of fertilizer per participating farmer should be increased to between 5 - 8 bags per season as against the 2-4 bags in the FVP. This would make farmers to increase output and income, by implication improve food security of the Nation. The large scale farmers could be offered between 50 – 100 bags based on categories to meet up their fertilizer needs.
4. There is the need of an Act of legislation by national assembly to establish a framework for a comprehensive set of regulations to govern how fertilizers are to be made available to Nigerian farmers. The Fertilizers Act to be enacted is to regulate the importation, distribution, storage, and marketing of fertilizer in Nigeria with the objective of ensuring that the fertilizers that farmers obtain for use are of the quality advertised. All fertilizers manufactured, imported, or sold in Nigeria must be registered, packed, and labeled in accordance with the Act. All dealers and their premises used for activities related to fertilizers must be registered. The fertilizer dealers must have a minimum level of knowledge concerning the products in which they deal in.
5. Since the farmers used mostly interpersonal communication in FVP, more extension agents should be involved in the FVP. Radio and television broadcast of the FVP in various Nigerian local languages should be increased most especially before the onset of each year's programme.
6. An operational handbook/manual on FVP approach should be comprehensively developed and distributed to all the stakeholders; farmers, personnel of the state ministry of agriculture, agro- dealers, etc to serve as a hands-on and guide to all participants in the FVP including vernacular versions of the manuals.
7. There is the need for the government to sensitize mobile network service providers in Nigeria to widen their network services coverage and possibly provide customized phone lines (Toll Free GSM Helplines) dedicated to FVP in rural areas for improvements in the programme. The primary objective of this is to provide useful information on demand to farmers and other stakeholders in the FVP. A multipurpose community telecentres could be set up for the sharing of information and communication facilities for farmers in rural and isolated areas. The services they may offer usually cover telephone, fax, typing, photocopying and printing, as well as training in the use of computers, email and electronic networking.
8. Finally, subsidies should be included in a holistic approach for the promotion of fertilizer use. Expenditures should be balanced against complementary public policies to raise the technical efficiency of input use (agro-research, extension, irrigation, etc.), increase farm income (cash transfers) and to establish strong, private-sector-led input supply markets (market liberalization, infrastructure development, etc.).

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