Assessment of the Socio – economic Characteristics of Famers in the Fertilizer Voucher Programme (FVP) in Taraba State, Nigeria

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Abstract
The study assessed the Socio – economic Characteristics of Famers in the Fertilizer Voucher Programme (FVP) in Taraba State, Nigeria. Specifically, the study sought to: ascertain the influence of socio-economic characteristics of the respondents involved in the Fertilizer Voucher Programme on number of fertilizer purchased; ascertain farmers' level of productivity as a result of Fertilizer Voucher Programme; and determine major challenges in the implementation of the Fertilizer Voucher Programme in Taraba State. The population for the study comprised all farmers that participated/benefited in FVP in the Taraba State. Multistage sampling technique was used to draw the sample size. In stage one (1), two senatorial zones (Central & Northern) were purposively selected for their relative peace and security. In stage two, 3 LGAs in each of the senatorial zones were randomly selected, namely; Bali, Gashaka, Gassol and Ardo- kola, Jalingo, Zing. From each of the selected LGA, 2 percent of the beneficiaries were proportionally selected and used to collect the primary data for the study. The 2 percent was selected from each participating LGA to obtain a sample size of 336 respondents, representing 15.5%, 9.5%, 15.5%, 24.7%, 15.8% and 19% in each of 6 LGAs. The findings of the study indicated that majority (72% and 75%) of the respondents were males and married. A little above half (51%) of the respondents had farming experience of between 11 – 20 years with a mean family size of 7 persons. A greater proportion (35%) of the respondents were within the age range of between 31- 40 years. Respondents have an average of 2.4 hectares of land per season. This reveals that 9.2% of the variability in the total number of bags of fertilizers used was accounted by sex, age, years spent acquiring formal education household size, years of farming experience, estimated annual income and farm size of the respondents, as the variance in the total quantity of fertilizer used is explained by variables included in the regression model. Correlation coefficient between access to credits and total number of fertilizer (in 50kg bag) obtained by the respondents was calculated to be negatively significant at 0.01 level (2-tailed). The result shows that there is a significant negative correlation (t = -0.144; n = 336; p = 0.000).The findings of this study further, indicated that the respondents were satisfied in the years under study (2009, 2010, 2011 & 2012) of FVP in the following activities: prices of fertilizer (M=3.81, SD=0.43), 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), role of cooperative associations (M=3.74, SD=0.48) and leadership development among participants (M=3.68, SD=0.49). Data were subjected to exploratory factor analysis procedure, using factor model with varimax- matrix rotation in grouping the constraint variables into major challenge factors. The factor loading under each constraint variable represent a correlation of variables (constraint areas) to the identified constraint factor and has the same interpretation as any correlation coefficient. However, only variables with loading of 0.40 and above (10% overlapping variance.Variables were grouped under factor 2 (point of purchase related factors) which included: transport to distribution points (0.834), Purchase from wholesalers (0.850) and purchase from importers (0.833). The sales related factors has only sales to wholesalers, dealers and large farmers (0.902) and the last class of challenges comprised: limited access to credit (0.839) and diversion and late arrival of fertilizers (0.785) which were categorized under credit and corruption related factors. The paper suggested that, the number of bags of fertilizer per participating farmer should be increased to between 5 - 8 bags per season in the FVP. This would make farmers to increase output and income, by implication improve food security of the Nation.
Keywords: Socio – economic Characteristics, Fertilizer Voucher Programme (FVP), varimax- matrix rotation

I. Introduction

Agricultural production like production activities in any other sector, such as mining and manufacturing requires accessibility to quality inputs to be transformed into output that will raise productivity. The access and efficient use of quality agro-inputs, such as improved seeds, fertilizers and Crop Protection Products (CPPs) is necessary to improve agricultural production and increase farmer's livelihood, such as farm output, incomes and assets, particularly in Sub-Saharan Africa (SSA). The need for inputs use is justified by reasons, such as replenishment of soil nutrients to combat decline in soil nutrients, control of pests, weeds which considerably suppress crop yields and to obtain higher farm yields. In Taraba State of Nigeria, smallholder farming is the major livelihood activities of about 75% of the population. Their major challenges are the use of unimproved inputs, like fertilizers, low income, low educational levels, and seeds arising from difficulties in accessing government subsidized improved inputs that are directly distributed to farmers due to problems, such as corruption and high cost. Their farm income is low arising from low productivity, crop yield and declining soil fertility. In order to address these challenges the input voucher programme was implemented on a pilot scale from 2009 to 2011 and following the successes recorded in the pilot project, the full programme was implemented in 2012 using e-wallet. As a result nearly 40,000 farmers were able to obtain two bags of discounted fertilizer from the private sector and more than 30,000 farmers have been given access to the programme using their mobile phones (IFDC, 2015). The input voucher programme has been implemented in the State for a considerable length of time now, but its effects on the beneficiary's livelihood remained unanalyzed and understood. Therefore, this study was undertaken to assess the effects of Agricultural Input Voucher Programme on the participant's livelihood in Taraba State, Nigeria, Vosanka, Bzugu, and Daloba, (2019).

Purpose of the study

The main purpose of the study was to assess the Socio – economic Characteristics of Famers in the Fertilizer Voucher Programme (FVP) in Taraba State, Nigeria . Specifically, the study sought to:

1. ascertain the influence of socio-economic characteristics of the respondents involved in the Fertilizer Voucher Programme (FVP) on number of fertilizer purchased;
2. ascertain farmers' level of productivity as a result of Fertilizer Voucher Programme; and
3. determine major challenges in the implementation of the Fertilizer Voucher Programme in Taraba State.

Research Hypotheses

The following null hypotheses were postulated for the study:

Hypothesis One:

Ho1: The total quantity of fertilizers obtained from the Fertilizer Voucher Programme (FVP) is not significantly influenced by the socio-economic characteristics of farmers.

Hypothesis Two:

Ho3: There is no significant difference in the quantity of total output of production during the farmers' involvement in FVP and before.

Hypothesis Three:

Ho4: There is no significant difference in the quantity of fertilizer allotted to farmers across the years 2009 and 2012.

Methodology of the Study

The study was conducted in Taraba State, Nigeria. The State has sixteen (16) Local Government Areas with Jalingo being the State capital. The state has an estimated population of 2 million people according to the 2006 population census, the state is located on $6^030'$ and $9^036'$ North and longitude $9^010'$ and $11^050'$ East (TADP, 1998 in Bonjoru, 2013). 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.

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 Taraba Fertilizer Voucher Programme (TFVP), (2011). Multistage sampling technique was used to draw the sample size. In stage one (1), two senatorial zones (Central & Northern) were purposively selected for their relative peace and security. In stage two, 3 LGAs in each of the senatorial zones were randomly selected, namely; Bali, Gashaka, Gassol and Ardo- kola, Jalingo, Zing. From

each of the selected LGA, 2 percent of the beneficiaries were proportionally selected and used to collect the primary data for the study. The 2 percent was selected from each participating LGA to obtain a sample size of 336 respondents, representing 15.5%, 9.5%, 15.5%, 24.7%, 15.8% and 19% in each of 6 LGAs.

Table 1: 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).

Data were subjected to exploratory factor analysis procedure, using factor model with varimax- matrix rotation in grouping the constraint variables into major challenge factors. The factor loading under each constraint variable represent a correlation of variables (constraint areas) to the identified constraint factor and has the same interpretation as any correlation coefficient. However, only variables with loading of 0.40 and above (10% overlapping variance (Olaolu, 2016).

II. Results And Discussion
Socio–economic characteristics of beneficiaries in the Fertilizer Voucher   Programme (FVP)

The following socio – economic characteristics of the beneficiaries were highlighted in this study, namely; age (years), gender, marital status, educational qualification (years spent acquiring formal education), household size, size of farm (in hectares), level of farming business, farming experience, estimated annual income, type of farming, main areas of farming focus, number of herd of livestock and accessibility to credit facilities.

Sex

Table 2 shows that a majority (77.1%) of the respondents were males, while the females made up 22.9%. This indicates that most of the respondents in the six (6) LGAs of the study were males. This is similar to the findings of Agwu,Uche-Mba and Akinnagbe(2008), where 66.7% of the farmers were males while 33.3% were females. This may be connected with the gender disparity found among farmers in Nigeria,where the socio-cultural factors restrict contact between men and female in some communities (Arokoyo, Chikwenduand Ogunbameru, 2002 in Agwu,Uche-Mbaand Akinnagbe, 2008). While women constitute over 60% of the agricultural producers in Nigeria, they have less than commensurate access to productive resources and inputs including fertilizers(Eboh, Ujah, and Amaechina, 2006).

Age

Table 2 reveals that greater proportion (32.7 %) of the respondents were within the age range of between 31-40 years. The age bracket of 41-50 years had a percentage of 33.3%. While age brackets of 21-30 and 51- 60 years had percentages of 26.5% and 6.3 % respectively. The lowest percentage (1.2%) are for ages less than 20 years. The average age of respondents was 38 years (SD=8.83). The higher percentages of 32.7 % and 33.3% which constituted mostly the middle- aged persons could be because four out of the six LGAs of the study (Ardo- kola, Bali, Jalingo& Zing), may be considered urban LGAs in the state, where the tertiary institutions of both the federal and state governments were located which harbor mostly young people of tertiary level institution in the state. This closely relate to Koyenikan and Ikharea (2014) which reported that most Nigerian farmers are between 41–50 years.

Marital status

Data in Table 2 indicate that a majority (79.8%) of the respondents were married. The singles were 12.2% while widowed constituted 6% only. Separated and divorcees constituted 2.1% of the respondents. The high percentage of married respondents could be because married individuals are more responsible and recognized in many communities in African cultures and traditions. This finding is in line with the findings of Olaolu (2016) who stated that majority (79%) of the non–beneficiaries of the National Fadama III

Programmewere married. These findings show that the married institution is still cherished and it isan indication of economic responsibilities of the respondents in caring for dependents.

Educational qualification

Results in Table 2 show that 24.1% of the respondents completed secondary school, followed by approximately 24% who had OND/Diploma/NCE certificates/qualifications. This could be because of the location of tertiary institutions within the study area. About 10% of the respondents had university degrees or its equivalent of the Higher National Diploma (HND).Also, about 17% of the respondents had non-formal education, 8.6% of the respondents had qur'anic education, secondary school attempted respondents had 7.1%, while 4.5% of the respondents completed primary school and1.2% of the respondents had vocational education,while 0.9% respondents attempted primary school level. Closely link to educational qualifications are the years spent by the beneficiaries in acquiring formal education. High proportion(38%) of the respondents spent between 13-18 years in acquiring formal education, 30% of the respondents were in schools for formal education between 0-6 years, 26% of the FVP beneficiaries acquired formal education for the period between 7-12 years and only about 6% of the respondents spent a period of above 18 years for formal education. The average years spent by the beneficiaries acquiring formal education in the study area was10.19 years (with SD=6.72).

Chavula (2013) opined that certain socio- economic characteristics such as higher educational levels and skills are prerequisites for effective improvements in agricultural production due to the adoption and utilization of new technologies such as fertilizers and GSM phones.These imply that the use of GSM technology fertilizer procurement require at least the school level certificate for the farmers to utilize the technologies more efficiently, especially for writing of SMSs and internet utilizations.Singh, De, and Pal (2015) in their findings on training needs of agro-input dealers asserted that respondents were found to be highly educated with three fourths of them having senior secondary and graduate degrees.

Household size

The findings in Table 2 further revealed that 42.6% of the respondents have a family size of between 1-5 family members, 39% had between 6-10 members in the family, while households with ranges of family members of 11-15, 16-20, 21-25 and 26-30 constituted 13.1%, 3.0%, 2.1% and 0.3% of the total respondents. The average number of persons per household was 7.0 persons (SD = 4.62) .Omotesho, Fakayode, and Tariya (2010) and Umar, Abdu, and Ahmad (2015) argued in their separate studies that the household size of the farmer usually determines availability of family labour for use on farms. This is so since farmers could have access to readily available family labour for their utilization in fertilizer application on their farms.

Size of farm

Results in Table 2 show that majority (56.8%) of the respondents have farm sizes of between 1-2 hectares, followed by 39.9% of the respondents of the FVP beneficiaries having a size of between 3-4 hectares of cultivable land.Also, 2.7%have land size of between 5-6 hactares and only 0.9% of the FVP beneficiaries have above 6 hactares of land. The calculated mean (M) farm size was 2.50(SD=1.77)hactares which implies that the majority (57%) of the FVP respondents were small holder farmers.The small farm holdings by the respondents is confirmed by the recent report of the Food and Agriculture Organisation (FAO) (2011) of the United Nations (UN)which stated that small farms that rely mainly on family labour are the backbone of agricultural production in developing countries. Also,according to the Food and Agriculture Organisation (FAO) (2012),four-fifths of developing world's food is a product of small sized farms. Small and family- run farms are also home to the majority of people living in absolute poverty and half of the world's undernourished people (International food Policy Research Institute) (IFPRI, 2014).

Estimated annual income

From the result in Table 2, 31.8% of the beneficiaries in FVP have annual income of between ₦700, 001 – ₦1, 000, 000, 29.8% have annual income of between ₦ 400, 001 – ₦ 700, 000. The lowest percentage (5.7%) of the respondents earned less than ₦100, 000 per annum. This was followed by 24.1% and 29.8% of the respondents with annual incomes of between ₦100, 001 – ₦400, 000 and ₦400,001- ₦700,000, while 8.6% of the beneficiaries had income of greater than ₦1,000, 000. The approximated mean and corresponding standard deviation wereM=₦695, 000 and SD= 814.10.

Biam, Akande, and Demenongnu (2016) in their study confirmed that farm income increases the farmers' access to adaptation measures as it was positively seen across all adaptation options. This variable had a positive and significant effect on planting improved varieties and different crops, changing farm size, irrigation farming, use of fertilizers and changing from farm to non-farm activities. Higher income farmers are less risk averse and have more access to information.

Table 2: Socio – economic characteristics of the respondents (n = 336)

Characteristics	Percentage (%)	Mean (S.D.)
Sex		
Male	77.1	
Female	22.9	
Age (years)		
Less than 20	1.2	
21-30	26.5	37.9(8.83)*
31-40	32.7	
41-50	33.3	
51-60	6.3	
Marital Status		
Single	12.2	
Married	79.8	
Widow/ Widowed	6.0	
Divorced	1.8	
Separated	0.3	
Educational Level		
Non- formal education	16.7	
Primary school attempted	0.9	
Primary School completed	4.5	
Secondary School attempted	7.1	
Secondary School completed	24.1	
OND/Diploma/NCE	23.8	
University degree/ Equivalent	10.1	
MSc/MA/M.Ed./ Ph.D.	2.4	
Qur'anic education	8.6	
Vocational Education	1.2	
Average years spent in acquiring formal Education		10.19 (6.72)*
Household size (Persons)		
1-5	42.6	
6-10	39.0	
11-15	13.1	
16-20	3.0	7.3 (4.62)*
21-25	2.1	
26-30	0.3	
Farm size(ha)		
1-2	56.8	
3-4	39.9	2.5(1.77)*
5-6Above 6	2.7	
	0.9	
Estimated annual income (₦)		
Less than 100,000	5.7	
100,001-400,000	24.1	
400,001 – 700,000	29.8	695,322.92 (814,066.11)*
700,001-1,000,000	31.8	
Greater than 1,000,000	8.6	

Source: Survey Data, *Value in parenthesis are standard deviations.

Influence of socio-economic variables on the number of bags of fertilizer used by the respondents in the Fertilizer Voucher Programme

The results of the regression analysis in Table 3 indicate that the socio- economic characteristics of the respondents have significant influence on total number of bags of fertilizer used particularly annual income (T=1.95; P<0.05) and farm size (T=4.55; P<0.05) of respondents with the F- value = 5.85;P=0.00 and an Adjusted R^2 = 0.092. The F value indicates that the model is significant (p<0.000). However, each predictor may explain some of the variance in respondents' dependent variable. This explains that 9.2% of the variation in the total number of bags of fertilizer used among the FVP beneficiaries are significantly influenced by their estimated annual incomes (T=1.95; P<0.05) and farm sizes(T=4.55; P<0.05). While, sex (T=-0.65; P>0.05), age (T=-0.71; P>0.05), years spent acquiring formal education (T=-0.89; P>0.05), household size (T=-0.69; P>0.05), and years of farming experience (T=-0.85; P>0.05), had no significant influence on total fertilizer used by the beneficiaries in the FVP.

The Beta values are the regression coefficients for the variables, for example, estimated annual income (B=0.10; P=0.05) and farm size (B=0.25; P=0.00). These values do not show the distinctive importance of age, sex, years spent acquiring formal education, household size and years of farming experience in explaining the variability in the total number of bags of fertilizer used by the farmers. The level of influence of each predictor variable is shown by the standardized coefficients.

The null hypothesis (Ho:) which stated that: the total quantity of fertilizers used from the Fertilizer Voucher Programme (FVP) is not significantly influenced by the socio-economic characteristics of farmers in

the study area was rejected, and the other alternative hypothesis (Hi:) accepted, because of the (9.2%) significance influence of estimated annual income(T=1.95; P<0.05) and farm size (T=4.55; P<0.05)of the respondents. Other regressors however,did not influence thequantity of total fertilizers used by the farmers significantly.

This finding connotes that the theoretical framework on which this study is based stands. Thus, the quantities of fertilizers farmers are able to obtain in the FVP are influenced by their income, that is, their abilities to pay for the prices of the fertilizers in the FVP. This is applicable to any fertilizer model as explained in the literature review of this study.

In a similar study by Sunday,Edet and Veronica (2012) the findings indicated that the R2 of 0.65 is fairly high and indicates that about 65% of variability in the index of fertilizer use intensity in Akwa Ibom state is caused by the specified explanatory variables of age, gender, household size, farm size, perceived price of fertilizer, value of farm output, extension agent visit, number of goats and sheep own by farmers, and decision to own poultry by farmers as well as the distance to fertilizer selling point are significant factors affecting fertilizer use intensity among arable crop farmers in Abak agricultural zone in Akwa Ibom state. The log likelihood value and the information criteria as well as the reset test for the model are significant thus confirming the fitness of the models and implies that the specified independent variables are important explanatory factors of the variations in the indices of fertilizer use intensity among food crop farmers in Abak agricultural zone of Akwa Ibom state.

Table 3: Regression analysis of the influence of socio-economic variables on the number of fertilizers used by the FVP respondents

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	23.176	1.181		19.617	.000
Sex	-.318	.490	-.034	-.649	.517
Age	.026	.037	.059	.709	.479
Years spent acquiring formal education	-.029	.033	-.050	-.889	.375
Household size	-.043	.062	-.051	-.692	.489
Annual income (estimated)	4.983E-007	.000	.104	1.947	.052*
Farming experience	.037	.043	.068	.851	.395
Farm size	.552	.121	.251	4.552	.000*

*Significant $P<0.05$,   Dependent variable= Total number of bags of fertilizer used, F= 5.852, P=0.000, Adjusted R^2 = 0.092.

Types of crops cultivated with fertilizers in the Fertilizer Voucher Programme

Results in Table 4 show the major crops cultivated under the Fertilizer Voucher Programme in the study area.Majority (97%) of the respondents cultivate maize on their farms, 68.5% of the farmers plant rice, while 55.1% of the beneficiaries cultivate cassava and guinea corn on their land. This result is in agreement with the FVP pamphlet on farmers' crops grown using FVP fertilizers, where maize production among farmers stood at 86% of the beneficiaries in 2011 growing year (TFVP, 2011). This could also be because maize is a major staple in the state.

Baltzer and Hansen (2012) in their study of world market fertilizer and maize price indices explained that the world market price of maize almost doubled between 2005 and 2008, which alone wouldmake maize production more profitable.Further reason for popularity of maize production in Nigeriaas emphasized by Ammani, et al. (2012) is that more than 70% of fertilizers devoted to cereals in Nigeria are used for maize crop production. In fact for sub-Saharan Africa as a whole, fertilizer consumption has shifted to cereals, particularly maize. All these are because of the importance of maize in the food menu of many Nigerians. Thus, maize has been put to a wide range of uses than any other cereal: as human food, as a feed grain, a fodder crop, and for hundreds of industrial purposes because of it broad global distribution, its low price relative to other cereals, its diverse grain types, and its wide range of biological and industrial properties(Ammani, et al., 2012).

Table 4: Percentage distributionof respondents by crops cultivated with Fertilizer Voucher Programmefertilizers

Types of crops cultivated	Percentage (%)
Maize production	97.0
Rice production	68.5
Cassava production	55.1
Guinea corn production	55.1

Source: Survey Data, (Multiple responses).*

4.6 Crop output before and during Fertilizer Voucher Programme implementation among the respondents

Entries in Table 5 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 of produce (T- value = 13.14) as against average of 196 bags before participation in the FVP. 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 during the FVP's policy 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:) therefore accepted.

In their evaluationof various technological and institutional interventions to raise agricultural productivity and improve food securityMinot 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 5. Mean differences of crop output during and before Fertilizer Voucher Programme implementation among the respondents

					T-value	P-value	P-value
Quantity of Fertilizer Allotted in the 4 years (Kg/Bag)							
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							
2009	2010	2011	2012	**Mean**	**13.135**	**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.

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

Table 6 shows that there is no significant differences in the number of fertilizer allocation among the farmers in the 4 years of the implementation of FVP. Each respondents was entitled to an average 4 bags 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 = 0.501; P-value = 0.682. 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.

Table 6: Mean differences in the quantity of fertilizer allotted to farmers across the years

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.

Factors constraining the implementation of Fertilizer Voucher Programme

Data in Table 7 indicate the results of rotated factors matrix showing the extracted factors based on the respondents' responses on the challenges hindering the implementation of the FVP. It is clear from the table 18 that there are four main factors restraining the FVP based on the beneficiaries' ratings. Factors 1, 2, 3 and 4

were classified into: procurement and delivery related factors, point of purchase related factors, sales related factors and credit and corruption related factors respectively.

Under the procurement and delivery factors, the specific challenging variables to the smooth implementation of FVP comprised the followings: high level of policy inconsistencies (0.799), blending plants use poor quality raw materials and produce low quality fertilizers (0.775), and farmers and majority of those involved in fertilizer procurement are not well trained on fertilizer application (0.864). This means that the programme implementation had problems which were linked with the delivery and quality of fertilizers, this could be because of government manipulations by the personnel of the state ministry of agriculture who supervised the implementation of the FVP.

Affirming the issues of adulteration and poor quality of fertilizers Roy, et al., (2013) stated that the existence of statistically significant association between market characteristics and fertilizer quality categories (good or bad). Impurities are foreign substances that become mixed with the fertilizer during deficient manufacturing procedures or as a result of management practices that compromise quality. When products are spread on the ground (a practice among small retailers to dry, break conglomerates and make blends), they may be contaminated with soil, plant materials or other materials.

Variables that were grouped under factor 2 (point of purchase related factors) included: transport to distribution points (0.834), Purchase from wholesalers (0.850) and purchase from importers (0.833). The sales related factors has only sales to wholesalers, dealers and large farmers (0.902) and the last class of challenges comprised: limited access to credit (0.839) and diversion and late arrival of fertilizers (0.785) which were categorized under credit and corruption related factors. Godson-Ibeji, Ogueri and Chikaire(2016b)confirming corruption in agricultural sector as an impediment which, when fought and eliminated will make agriculture demand-driven in Nigeria, suggested that, those actors who perpetuate the nefarious acts of corruption in the sector should be reprimanded by the law and made to face the penalties (Godson-Ibeji, Ogueri and Chikaire, 2016b).

Furthermore, Rosegrant, et al., (2014) asserted that fertilizer products were regularly stolen from the state government fertilizer depots and thousands of bags of subsidized fertilizer have been discovered in unauthorized depots around the country. The regulatory mechanism in place to curtail such malfeasance appears to be insufficient and security officials have been found conspiring with smugglers to transport fertilizer subsidized by the Nigerian government into neighbouring countries. Officials in charge of monitoring the distribution of subsidized fertilizers have also been caught in scandals to divert fertilizers to their private warehouses and retail outlets, while poor small holder farmers that are the rightful beneficiaries of fertilizer subsidy programmes were outsmarted. There is widespread evidence that subsidized fertilizers are often captured by wealthy local elites and politicians. It is also an open secret that subsidized fertilizers are used to reward officials for providing political support or to garner new support (Nagy and Odun, 2002). Cases of abuses and inefficiencies in the federal fertilizer subsidy programmes range from delays in the delivery of fertilizer to politicians and officials diverting fertilizer from the legitimate beneficiaries. Regularly, only part of the fertilizers purchased by states were delivered to state warehouses, the rest were diverted to unknown locations. (Rosegrant, et al., 2014).

Table 7: Rotated varimax-matrix of respondents rating of challenges affecting distribution of fertilizer in the FVP in Taraba state (n=336)

Challenges	Factors			
	1	2	3	4
Transport to distribution points	0.331	**0.834**	0.149	0.027
Purchase from wholesalers	0.166	**0.850**	0.264	-0.048
Provide agronomic information	0.157	0.439	0.719	-0.043
Purchase from importers	0.280	**0.833**	0.186	0.029
Sales to wholesalers, dealers and large farmers	0.089	0.145	**0.902**	0.119
Access to the fertilizer	0.486	0.626	0.188	-0.056
Inappropriate technology use of the fertilizer	0.619	0.180	0.443	0.191
Private sector factors manipulations	0.702	0.498	0.142	0.066
Low farmers' income	0.559	0.537	0.084	0.085
High fertilizer prices	0.500	0.615	0.094	0.108
Limited access to credit	0.072	0.076	-0.050	**0.839**
High level of policy inconsistencies…	**0.799**	0.342	0.024	0.092
Diversion and late arrival of fertilizers	0.082	-0.059	0.155	**0.785**
Blending plants use poor quality raw materials and produce low quality fertilizers	**0.775**	0.253	0.029	-0.027

Farmers and majority of those involved in fertilizer procurement are not well trained on fertilizer application

0.864	0.165	0.146	0.099

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.
Factor 1: Procurement and delivery related factors, Factor 2: Point of purchase related factors, Factor 3: Sales related factors and Factor 4: Credit and corruption related factors.

III. Conclusion

From the findings of this study the following conclusions were drawn:
1. Promoting policy stability by reducing the frequency of government intervention in preference to building capacity in the private sector to handle all levels of the fertilizer value chain activities would send the right directions to the private sector on government commitment to reform the fertilizer industry.
2. The smallholder farmers' who participated in the FVP had increases in their yields during the FVP periods between (2009-2012) than the before periods between (2005-2008).
3. On the arrival time of fertilizer, the beneficiaries asserted that there was significant improvements on the month of arrival of fertilizer within the years under review 2009-2012.
4. The findings of the study further conclude that the FVP as a source of subsidized fertilizers was effective as source of fertilizers to smallholder farmers in Nigeria.

IV. Recommendations

Based on the findings of this work, the following recommendations were offered:
1. 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.
2 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.
3. 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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