

Utilization of Global System for Mobile (Gsm) For Communication Byfarmers' In the Fertilizer Voucher Programme (FVP) In Taraba State, Nigeria

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Abstract

The main objectives of the study was to assess the utilization of Global System for Mobile (GSM) for communication by farmers' in the Fertilizer Voucher Programme (FVP) in Taraba State, Nigeria Specifically, the study sought to: determine extent of needs for information by farmers participating in the Fertilizer Voucher Programme; identify major sources of information used farmers participating in the Fertilizer Voucher Programme; ascertain farmers' level of productivity as a result of Fertilizer Voucher Programme; and determine major constraints 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, numbering 51,098 smallholder farmers. Multistage sampling technique was used to draw the sample size. In stage one (1), two senatorial zones (Central & Northern) was purposively selected for their relative peace and security. In stage two, 6 LGAs (Bali, Gashaka, Gassol and Ardo- kola, Jalingo, Zing) respectively were randomly selected, 3 LGAs in each of selected zones. From each of the selected LGA, 2 percent of the beneficiaries totaling 336 were proportionally selected for primary data collection. Results on the extent of information needs by beneficiaries on programme activities showed that they need information on prices of fertilizer (93.5%), time of arrival of fertilizers (90.2%), quality of fertilizers by the suppliers in FVP (84.2 %), role of cooperative associations (77.4%), pattern in fertilizer purchase in FVP (67.6%), involvement of private suppliers (66.7%), leadership development among participants (64.0%) and redeeming vouchers (60.4%). The findings revealed that all (100%) the respondents owned GSM phones. Majority (91.6%) of respondents utilized the Mobile Phone (GSM) in communication and dissemination of information in the FVP. 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 study recommended the use of GSM technology in all agricultural extension programmes for its popularity among farmers in Nigeria as a whole and Taraba state in particular.

Keywords: Fertilizer Voucher Programme (FVP), Global System for Mobile (GSM), Communication, Information Needs, Sources of Information.

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I. Introduction

Information Communication Technologies (ICTs) refer to technologies that facilitate the creation, processing and transfer of information across space and time. At the heart of ICTs technology lie two main or branches of technology: computing and telecommunication. ICTs facilitate the flow of large volumes of information to a wide audience across numerous geographical locations. It is required for effective and successful transfer of technologies that are designed to boost agricultural extension delivery. For farmers to benefit from such technologies, they must first have access to them and learn how to effectively utilize them in their farming systems and practices. The extension agencies make use of different ICTs, particularly the Global System for Mobile (GSM) in transferring improved agricultural technologies and practices to the end users (Ani and Baba, 2009). Torero (2013) reported that information and communication technologies (ICTs) play important role in empowering farmers. In other words, these technologies, especially mobile phones(GSM), stimulate agricultural and rural development through the provision of information and capacity-building opportunities thereby making rural farmers to need information in higher magnitudes for increased productivity. 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.

According to Takeshima and Lee (2012a) vouchers are systems which allow farmers to purchase inputs at a time and location that are convenient to them. The physical inputs are delivered and stored locally, generally by private input suppliers at their selling points. Farmers targeted to receive the subsidy are provided with vouchers for a specific amount of discount on the sales price of the inputs that is equivalent to the subsidy benefits they are intended to receive. Farmers redeem these vouchers with input suppliers, obtaining their inputs at the full market price of the inputs less the value of the vouchers that they redeem to the input supplier. The input supplier then is reimbursed by government for the value of the vouchers that he or she redeemed from farmers. Unlike a cash transfer, providing a voucher for inputs can provide an added incentive to or even force farmers to buy the intended inputs. However, an important logistical consideration with voucher subsidy schemes is that sufficient stock of inputs must be in place at the agro-dealers' at the time that farmers require the inputs at the start of the cropping season. Moreover, agro-dealers must be able to redeem the vouchers received from farmers with the government without delay so that they can replenish their input inventories quickly during the period farmers are acquiring the inputs they require. Rationing is often used to maintain the total budget of an input subsidy programme at a manageable level. Rationing, if combined with effective targeting to appropriate beneficiaries, may minimize the secondary market where intended beneficiaries re-sell subsidized inputs instead of productively using the subsidized inputs themselves (Takeshima and Lee, 2012a).

To facilitate a smooth transition and ensure that fertilizer, other relevant inputs such as improved seeds reach targeted beneficiaries, the Federal and State Governments of Nigeria requested the International Fertilizer Development Center's (IFDC's) help to design and deliver subsidized fertilizer and agro-inputs to 140,000 and 76,000 smallholder farmers during 2009 growing season in Kano and Taraba states, respectively using the voucher programme (IFDC, 2010; in Liverpool-Tasie, 2012b). The FVP supplies agro-inputs to farmers (generally at a lower cost to government) while encouraging the establishment/growth of commercial markets. Implements agro-input voucher programmes to help smallholder farmers obtain agro-inputs while building business for rural agro-dealers (IFDC, 2013a).

International Fertilizer Development Center (IFDC) provided vouchers for more than 170,000 smallholder farmers. In 2010 more than 16,000 metric tonnes of fertilizer were distributed. Stakeholders were informed about the programme through radio broadcasts, pamphlets; text messages (SMSs) (GSM) and launching ceremonies (IFDC, 2010; in Liverpool-Tasie, 2012).

Problem statement

The Nigerian government fertilizer subsidy programmes has been characterized by high level of policy inconsistencies, ambiguities and instabilities that have led to arguments regarding its basis, application, impacts and sustainability (Charles, 2011). The effects have been to stunt the growth of the private fertilizer sector and reduce the amount of fertilizer that would have been used by the farmers. The policy of procurement and subsidization of a limited quantity of fertilizer targeted to poor and rural farmers have not had the intended results. The policy has discouraged the private sector and the targeted farmers have not been the beneficiary of the subsidy. The former Minister of Agriculture, Adesina (2012) disclosed that, when he came on board as Minister of Agriculture in July of 2011, he found a corrupt and totally inefficient fertilizer sector. The government was spending huge amount of money on direct procurement and distribution of subsidized fertilizer, but less than 11 per cent of farmers got the fertilizers (Daily Independent, 2013). Furthermore, Adisena (2013) confirmed that the government system of fertilizer procurement and distribution was corrupt and undermined the private sector. It did not deliver fertilizers to genuine farmers. Instead, rich and powerful political farmers hijacked the subsidized fertilizers. Corruption was incipient, as sand was mixed with fertilizers and sold to

government. Payments were made for fertilizer not supplied, and subsidized fertilizers were resold back to government, with a lot more sold off to the neighbouring countries. To put it bluntly, government was not subsidizing farmers; instead it was subsidizing corruption. Farmers' powerlessness worsened as high quality seeds and fertilizers they need to raise their farm productivity were taken over by the elite, the rich and politically powerful. For the few fortunate farmers that got fertilizers, they often got them in bowls, like beggars. Farmers lost their dignity.

When compared with a free market scenario, Nigeria has lost agricultural production, income, and farm labor income, as well as, employment in the agricultural and fertilizer sectors, an economic multiplier effects that would have extended throughout the economy (Nagy and Edun, 2002). The agricultural sector as it is now is weak, despite the contribution to the gross domestic product (GDP), which has averaged 41 percent in the years 2001-2009. Studies have shown that the recorded GDP is not induced by productivity and efficiency gains, but rather by increase in hectares under cultivation. The inefficient production system is majorly characterized by poor input usage (Nigerian Vision 20-20-20 Report). Banful and Olayide (2010) in their study on the federal and state fertilizer subsidy programmes in Nigeria further explained that subsidized fertilizer is not available in time. Officials working in the state agricultural ministries unanimously agreed that fertilizer under the Fertilizer Market Supply Programme (FMSP) constantly arrived late (Banful and Olayide, 2010). Farmers, both those in small farmers associations and those who are not, also unanimously agreed that subsidized fertilizer arrives late. Agricultural Development Programme (ADP) officials and private agricultural input dealers also share the view that subsidized fertilizer was typically available well past the ideal fertilizer application time (Morris et al., 2007 in Charles, 2011).

The major constraint has been the operation of the dual markets system which promotes parallel sales of subsidized and free markets fertilizers. The contradictory signals on Nigeria fertilizer policy and programmes underscore the need to assess the utilization of fertilizer voucher programme (FVP) with the aim of coming up with recommendation that could inform a better policy option to realize the potential benefits of fertilizer use in Nigeria's agriculture. Consequently, this study sought to use the fertilizer voucher scheme in Taraba State to explore whether voucher system including the use of GSM of distributing fertilizer through farmer groups increased farmers' access to agricultural inputs and consequently improved agricultural outputs. Some pertinent questions to be answered by this study include: What are the major sources of information used and extent of needs for information by farmers participating in the Fertilizer Voucher Programme? Does the FVP subsidy programme increase availability of fertilizer to smallholder farmers? Do the FVP and the subsequent utilization of fertilizer increase the farmers' output? and What are the challenges confronting the procurement and distribution of fertilizer input in Taraba State?

II. Objectives of the Study

The main objectives of the study was to assess the utilization of Global System for Mobile (GSM) for communication by farmers' in the Fertilizer Voucher Programme (FVP) in Taraba State, Nigeria Specifically, the study sought to:

1. determine extent of needs for information by farmers participating in the Fertilizer Voucher Programme;
2. identify major sources of information used farmers participating in the Fertilizer Voucher Programme;
3. ascertain farmers' level of productivity as a result of Fertilizer Voucher Programme; and
4. determine major constraints in the implementation of the Fertilizer Voucher Programme in Taraba State.

III. 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°30' and 9°36' North and longitude 9°10' and 11°50' 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°C 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.

3.2 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).

IV. Results and Discussion

Respondents' information needs in the implementation of FVP

Results in Table 11 indicate that all programme activities in FVP were regarded as very important by the respondents. The results show that the information needs of respondents include: financial management (M=3.29,SD=0.65), record keeping activities in FVP (M=3.31,SD=0.67), transportation of the commodity/fertilizer (M=3.52,SD=0.60), leadership development among participants (M=3.59, SD= 0.59), price of fertilizer (M=3.93, SD=0.29), time of arrival of fertilizers (M=3.89,SD=33), quality of fertilizers by the suppliers in FVP (M=3.82, 0.46), role of cooperative associations (M=3.72, SD=0.52), pattern in fertilizer purchases in the FVP (M=3.63, SD=0.57), involvement of private suppliers (M=3.59, SD=0.50), and redeeming of vouchers (M=3.54, SD= 0.68).

Enwelu, et al., (2017) writing on significance and need for information reported that information is considered as the fifth need of man ranking after air, water, food and shelter. Therefore, the concept of information in general and of agricultural information in particular, as a resource for development is very important in the contemporary world and cannot be overemphasized. In most of sub-Saharan African countries, conventional media for example radio, newspapers and television (recently GSM) have played key roles in rural development.

The access to information is being an influential issue, and the ones with the contemporary information carry potential to grab the opportunities and benefits in our globalized society. The evolution of social media has changed the sphere of human lives and redefined the pattern and network of communication and interaction. With the increased use of social media, it is the subject of challenge for extension to stay relevant with the cliental in this digitalized era. This article reflects the role of Facebook, Twitter, and other social media as the extension's repertoire of methods for education, communication, program implementation, and marketing; and how it allows the extension professionals in building the social networks with the cliental online and transfer the social capital to offline world. As these media provide platform for the people with specific interests to connect and share knowledge and technologies through certain means such as developing groups or pages; it helps society to socialize, and the extension professionals need to consider this platform for the effective program implementation and analyze how these media can influence the outcome delivery to the cliental (Rajesh and Prakash,2018).

Table 1: Mean distribution of respondents based on information needs in the implementation of Fertilizer Voucher programme

Activities	Mean	Std. Deviation
Price of fertilizer	3.93*	0.29
Time of arrival of fertilizer	3.89*	0.33
Quality of fertilizer by the suppliers	3.82*	0.46
Patterns in fertilizer purchases	3.63*	0.57
Involvement of private supplier	3.59*	0.66
Transportation of the commodity/fertilizer	3.52*	0.60
Financial management	3.29*	0.65
Record keeping activities in FVP	3.31*	0.67
Role of cooperative associations	3.72*	0.52
Credit facilities for participants	2.52	1.24
Leadership development among participants	3.59*	0.59
Redemption of vouchers	3.54*	0.68

Source: Survey Data, 2020. (*>3 Very important)

Frequency of use of the various sources of information among the Fertilizer Voucher Programme beneficiaries

Table 2 shows frequency at which respondents come in contact with the various sources of information in the FVP. The majority (78.3% and 91.6%) of the FVP beneficiaries utilized radio and mobile phone respectively on a daily basis. Also 60.4% of the respondents sourced their FVP information from the agro dealers on a yearly basis. The high use of mobile phone and agro dealers could be because they are major components of FVP implementation in Nigeria. According to Enwelu, et al., (2017) the versatility and portability of mobile phone may be the reason why it has the highest level of use. It is something they move about with and as such, information can be transferred or received at any point in time. Television (29.8% and 24.4%) was used as a source of FVP information by the respondents on daily and weekly basis. Government extension agents were patronized by 23.5% of the respondents on a fortnightly basis, since bimonthly contact is a major component of extension programme in Nigeria.

Manda and Chapota (2015) argue that, if both the existing and potential Information Communication Technologies (ICTs), that include radio and e-media services and providers of the same (radio production studios, private, public and community radio stations, telecentres, mobile phones, and internet-resident platforms), were properly engaged and mainstreamed into the National Agriculture Policy (NAP) as a key tool for the improvement and widening of agricultural extension and advisory services, agricultural production, processing, and marketing would tremendously improve (quantitatively and qualitatively) and change the fortunes of the smallholder farmers and improve the national economy.

Table 2: Percentage distribution of respondents' use of different sources of information

Sources of information	Percentage (%) (n=336)					
	Number Response	Daily	Weekly	Fortnightly	Monthly	Yearly
Neighbors/relatives	54.8	29.2	9.5	2.1	1.5	3.0
Government extension agents	59.2	6.8	4.8	23.5	5.4	0.5
Radio	5.4	78.3	14.6	1.5	0.0	0.3
Print media	76.2	5.4	9.2	0.9	7.4	0.9
Television	42.9	29.8	24.4	2.4	0.0	0.6
Internet	75.3	19.6	3.9	0.6	0.0	0.6
GSM source	2.4	91.6	3.3	1.4	0.3	1.0
Local market days	50.6	3.6	44.0	1.5	0.0	0.3

Agro dealers	10.7	4.5	6.0	6.8	11.6	60.4
Private firm	89.0	0.9	2.7	2.1	2.1	3.3
Non-governmental organization (NGO)	55.7	5.1	18.8	5.4	13.4	1.8

Source: Survey Data, 2020.

Major sources of information used by respondents in the Fertilizer Voucher Programme Entries in Table 3 show the 11 major sources of information utilized in the FVP in the study areas. Mobile phone (98.2%), radio (94.3%), and agro dealers (90.8%) were major sources of information used by the respondents. The mobile phone and agro dealers are two (2) vital components in the FVP. Radio is also a common source of agricultural information in the rural areas and especially among rural smallholder farmers, thus, the higher percentages in the respondents' assessment. Collaborating this finding Julius and Okorie (2016) stated that, generally GSM phone and radio were significantly ($p < .05$) used more than the other ICTs while the least used were camera and computer (internet). Jaji, Abanigbe and Abass (2017) also confirmed the high rate of utilization of mobile phone in their study where they found out that majority (97.69%) of the respondents owned and used mobile phone for accessing market information among others. Television (56.3%), local market days (47.6%), Non-Governmental Organizations (NGOs) (44.9%) and Government extension agents (38.1%) were also used by the FVP beneficiaries to source the needed information.

Chauhan and Kansal (2014) further opined that the importance of improved technology for the farmers to a large extent depends upon the effective sources of information and channels to which they are generally exposed to directly or indirectly. Among various information sources, mass media sources viz. radio, television, newspapers, magazines and internet play a very important role for disseminating new technologies related with farming to the farmers. Their study revealed that 100% of respondents of all categories viz. small, medium and large were aware about radio and television as information sources.

Table 3: Percentage distribution of major sources of information used by respondents in the Fertilizer Voucher Programme

Sources of information	Percentage (%)
Neighbours/Relatives	44.6
Government extension agents	38.1
Radio	94.3
Print media	21.4
Television	56.3
Internet	22.3
GSM source	98.2
Local market days	47.6
Agro dealers	90.8
Private firms	8.6
Non-Governmental Organizations (NGOs)	44.9

Source: Survey Data, 2020.

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

Entries in Table 4 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, (H_0), 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 (H_a) therefore 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. The benefits derived from participating in e-wallet

(GSM Technology) approach by the farmers as studied by Adebo (2014) are follows: Quickened accessibility to improved seed (80.0%), access to fertilizer (87.5%), and subsidized farm input (97.5%) and renewed confidence in government programmes(67.5%). It was also indicated that participation in e-wallet(GSM Technology) led to increased output (90.0%) and increased quality of maize/rice production by 67.0% of the respondents.

Table 4. Mean differences of crop output during and before Fertilizer Voucher Programme implementation among the respondents

					T-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, 2020.

4.7 Factors constraining the implementation of Fertilizer Voucher Programme

Data in Table 5 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 5 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 parts of the fertilizers purchased by states were delivered to state warehouses, the rest were diverted to unknown locations. (Rosegrant, et al., 2014).

Table 5: Rotated varimax-matrix of respondents rating of challenges affecting distribution of fertilizer in the FVP in Taraba state (n=336)

Constraints	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.

V. Conclusion

From the findings of this study the following conclusions were drawn/made: 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. The smallholder farmers' who participated in the FVP had increases in their yields during the FVP periods than the before periods between (2005-2008). The findings further revealed that all (100%) the respondents owned GSM phones. Majority (96.1%) of the respondents utilized the Global System of Mobile (GSM) in communication and dissemination of information in the FVP. All (100%) 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 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 during the periods of its implementation using the GSM technology. Measures must be taken to make ICTs more affordable, accessible and easy to use by educating major stakeholders and extension personnel through extension education for farmers and national seminars/workshops for extension officers.

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