Political Economy of Fertilizer Subsidy Implementation Process in Nigeria

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ABSTRACT: Fertilizer subsidy in Nigeria is staged towards making fertilizer available to small farmers at affordable prices. Unfortunately, the trend of leadership in the country has led to inconsistencies and instability. The gains are also not widely spread among the targeted beneficiaries hence, a negative implication on the increased food production programme. The objective of the study was to reveal the issues associated with defectiveness in fertilizer subsidy implementation in Nigeria. Secondary data on annual budgetary allocations to fertilizer subsidy, quantity imported and consumed, quantity requested and supplied to the36 States over years were utilized. Key informant interviews were also conducted among selected stakeholders as complementary data. Budgetary allocated to fertilizer subsidy had declined over years. A very few states had more than 50% of the total subsidy between 2001 and 2010. Fifteen and 21 States had less than the National average of 18.86kg/ha and 14.72Kg/farmer respectively for the same period. Quantity of fertilizer received in previous year and area planted determined the quantity of subsidized fertilizer that a state received. The farmers emphasized the existence of parallel *Elite* {urban} farmers group and other competitors that denied them of adequate access to the subsidized fertilizer. The farmers also submitted that members of ruling party gained more access to subsidized fertilizers. Government involvement in procurement and distribution of fertilizer should be redefined.

KEYWORDS: Political Economy, Fertilizer Subsidy Implementation Process, Nigeria.

1 INTRODUCTION

Among the subsidies in Nigeria, agricultural subsidies {especially fertilizers and improved seeds} are the largest. The small-scale famers dominate food production units in the country and are the targets of the subsidy programme. The Nigeria fertilizer subsidy dates back to 1970s with the aim of making the fertilizer available to the farmers at affordable prices. However, it has invariably witnessed inconsistencies and instabilities given the trend of successive government/leadership in the country. More so available literatures also showed that extent of access among the targeted beneficiaries is significantly low. In this study, secondary data on budgetary allocations to agricultural sector & fertilizer subsidy from 1976-2006, fertilizer subsidy allocation to each of the states in the federation were used. Key informant interviews were also utilized to describe the effectiveness of the programme. Results show that amount allocated to fertilizer subsidy had been fluctuating but declined on aggregate. States allocations suggested that the subsidies go to the Northern states more than the southern ones and only a few same set of states received over 50% of the whole subsidy between year 2001and 2010 under review. The key informants' interview reveals that the subsidies do not reach the farmers it intended to support. Hence the programme could be described as ineffective thus needs urgent attention. The paper is divided into seven sections as follows: Session one briefly introduces the research concept, method and the summary results. The Background; section two, gives the historical overview of the subsidy in Nigeria while the problem statement and aim of the study were discussed in section three. Literature review was discussed in session four. Data description on budgetary allocations and State fertilizer subsidy allocations were discussed in section five along with the analytical techniques. The results and discussion were presented section six. In the last section, summary and conclusions were presented and policy recommendations were drawn.

2   BACKGROUND

The concerns for increased food production in sub-Saharan African {SSA} countries have greatly manifested in recent times. This is revealed in several governments' policies staged towards combating poverty and food insecurity in urban and rural areas. A number of non-governmental organizations have also swung into action towards the same cause either independently or in collaboration with the existing governments. Several researches/studies have also been carried out pursuing the existence and severity of the predicament, possible causes and the likely effects this could have on the future generations. Fortunate enough, most of the studies would also draw important policy implications from the studies as well as useful and cogent recommendations. One of the key recommendations is improving the lots of the agricultural sector being the mainstay of the economy of SSA countries. Emphasis is particularly placed on providing an enabling environment for the small scale farmers that are characterized as resource poor. In Nigeria, food production decisions are made mainly by small scale farmers who represent 95 percent of the total food crop farming units in the country and produce about 90 percent of the total food output {39}. However, they have difficulties gaining access to credit, fragmented holdings resulting from land tenure system, low technology and seldom use of modern inputs {such as fertilizers and agro-chemicals} and poor access to agricultural extension services. These problems have led to the characteristic poverty; low income and vulnerability to risk as submitted by several studies {53}, {40}.

Fertilizer is a powerful productivity-enhancing input {29}, {17} but SSA uses very little. For instance, according to {23}, even though agriculture still provides livelihood for about 60 percent of the continents' active labour force; contributes 17 percent of Africa's total gross domestic product and account for as much as 40 percent of its foreign currency earnings, total fertilizer input in the continent is only 9 kg per hectare, compared to 73kg in Latin America, 100kg for South Asia, 135kg for East Asia and 206kg for industrialized countries. The fertilizer use in sub-Saharan Africa is also rated as only one tenth of the world average {50}, with small fertilizer markets. As at 2009; the use was only 2.1kg/ha in Nigeria {54}.

2.1   PROCUREMENT, DISTRIBUTION AND PRICES OF FERTILIZERS: HISTORICAL OVERVIEW

The involvement of the federal government in the fertilizer distribution system dates back to 1976 when it adopted a national fertilizer policy put in place to; (1) ensure self-sufficiency in national fertilizer requirement through local fertilizer production, (2) supplement local fertilizer production through fertilizer importation to ensure adequate and timely fertilizer supply to all Nigerian farmers, (3) offer subsidy on the market price of fertilizer to make fertilizer affordable to millions of small scale farmers, and (4) ensure that the right quality fertilizer is accessible to small-scale farmers at the right time in the right place {32}. A survey of procurement and distribution of fertilizer by the federal government and other relevant agents from pre 1976 till date reveals different scenarios. The trend depicts that there has been series of modifications, changes and general instabilities in the procurement and distribution of the input over years. For instance, the federal government was centrally procuring and distributing the input between 1976 and 1986. This arrangement was entirely dropped between 1987 and 1991 where the States were solely responsible for the procurement and physical transportation of the fertilizer from the port. The federal government discontinued the fertilizer subsidy programme in 1997 and fertilizer market was liberalised in order to encourage the private sector. However, this was grossly ineffective because the private sector were not properly facilitated hence; there was a sharp decline in fertilizer use. The federal government had to switch on to the programme again in 1999 and only to discontinue in 2000. Similarly over the years, different subsidy regimes have reigned while the attendant problems had been somewhat the same ranging from interstate arbitrage, weak accountability to non-delivery. Fertilizer prices had also been so volatile hence farmers could not afford the market prices thus calling for the reshaping of the subsidy programme. The nominal prices of fertilizer {type unspecified} for a 50kg bag rose from ₦50 in 1990 to ₦875 in 1996, ₦1200 in 1997, ₦1500 in 1999 and ₦1800 in 2000 with considerable price variation within State {21}. The market price as at 2012 was between ₦5000 and ₦6000 depending on location in the country. {20} showed that that efficient fertilizer usage leads to incremental yield. Farmers are also quite aware of the benefit of fertilizer but they could not afford the incremental cost of using it adequately {11}, {14}.

Certain features that amount to inefficiency characterized the fertilizer market in the pre-reform years shortly before 1986. These are among others, leakages, transit losses, inadequate and untimely supply, artificial scarcity, black marketing and smuggling, erratic importation pattern arising from untimely release of funds, transportation bottlenecks, including wrong delivery, non-delivery and under-delivery {5}. Hence the subsidy programme could be described as wasteful since the whole aim is not achieved. An important question at this occurrence is that are these features due to policy mistakes? If they are mistakes, why have they become perennial problems every year as if the actors in the implementation process cannot learn from the inadequacies recorded over years? If it is not due to policy mistakes; is it then intentional probably due to certain gains from the leakages or satisfying some interest groups? The continuous presence of these features will always keep the benefits of the fertilizer subsidy policy away from the farmers who are the intended beneficiaries while

unrecognized middlemen, transporters and other unintended beneficiaries have the gains. The resultant effect of this is not only in food shortage in the economy in general but a stagnation or retrogression in the welfare of the food producers, the small scale farmers.

The uninteresting scenario could be boldly referred to as policy defectiveness and which can be understood in the context of the political economy of policy choice. The dynamics involved understanding how political and economic institutions influence each other. It examines the dynamic interplay within a sovereign entity of social and political phenomena on one hand, and economic phenomena, on the other. Its core concern is how social and political processes determine economic outcomes and how, in turn, economic decisions influence social and political institutions {37}. In this context; it is assumed that resources are allocated not on the basis of relative efficiency or merit, but according to power {11}.

Various actors are significantly involved in the agricultural policy implementation process. On the supply side are the policy makers (civilian and military), policy advisors, civil servants and multilateral institutions like World Bank. The demand side however has farmers, agro industrialists, processors, transporters, and distributors {wholesalers and retailers}, non-governmental organizations, the general public and related interest groups.

3   PROBLEM STATEMENT

Studies on the performance of agricultural sector at least in the last decade have always begun the introductory parts on a 'sad note' of persistent dwindling in the expected contribution of the sector. The attendant situation of land depletion, land tenure and teeming population that is always on the increase have all contributed immensely to the shortage of land available for food crop production. This will grossly hinder the increased food production programme of the government. The traditional land use management adopted thus becomes a function of the available land, hence practices like shifting cultivation bush fallowing, crop rotation are gradually fading away. This calls for increasing dependence on inorganic fertilizer in order to improve the fertility of the available land under use. Fertilizer subsidy policy is also seen as an income transfer and market promotion strategy towards the development of infant agricultural industry. However, several literatures have shown that the policy implementation is still defective {29}, {5}, {21}, {55}, {45}.

Average fertilizer use in Nigeria is still low {22}. An historical review of Nigeria fertilizer policies indicates an inconsistency and instability over years where problems of availability, leakage and arbitrage are still lingering {35}, {45}.The expected gains have been transferred to unintended beneficiaries at the expense of government treasury. Consequently, the target beneficiaries; farmers and other stakeholders are still confused of the whole policy implementation process. The study of {55} showed that 76.1 percent of farmers did not benefit from the subsidy programme while majority {67.8 percent} of the farmers sampled still indicated fertilizer input as a felt need in which the government intervention is required. The problem becomes enlarged in that between 1990 and 1996, fertilizer subsidy expenditure consistently exceeded total capital on agriculture. It was 725 percent, 600 percent, 400 percent and 397 percent of total capital expenditure on agriculture in 1992, 1995, 1991 and 1993 respectively {21}. Total fertilizer use as a percentage of potential demand averaged a mere 7.3 percent in the same period {21}. In addition, the policy and politics of subsidy on fertilizer, which has generated a lot of debates and concern overtime needs to be properly addressed {36}.

Volatility of policies during the military and civilian regimes is crucial to the millennium agenda while the influences of the States in sourcing fertilizers from the federal government cannot be overemphasized. This defect has a lot of implications on agriculture and economic development. For instance inability of farmers to afford the market price of fertilizer {if he cannot access the subsidized ones} could lead to some alternatives/coping strategies that could threaten the economy. The achievement of the increased food programme will become so much impaired if the laxities are allowed to linger. Several programmes in the past and present staged to reduce the poverty of the rural poor would not also be well facilitated given the roles of fertilizer in food crop production; a primary occupation of the rural poor. What issues are really associated with defectiveness in fertilizer subsidy implementation in Nigeria? This is the central research question. The foregoing therefore permits us to provide answers to the following specific research questions:

- What are the budgetary allocations to fertilizer subsidy during the civilian and military rule eras as well as amount of fertilizer imported and consumed in the country during the regimes?
- What is the trend in fertilizer allocations to States over years?
- What are the determinants of quantity of fertilizer that a State received from the federal government?
- What are the perceptions of the farmers and government officials on the effectiveness of the implementation process?

4   LITERATURE REVIEW

4.1   THEORETICAL FRAMEWORK: FERTILIZER SUBSIDY EFFECTS ON EQUILIBRIUM PRICE AND QUANTITY DEMANDED

In a bid to make fertilizer affordable to the small holder farmers, subsidy programme is introduced where fertilizer is sold to farmers at reduced prices. This however leads to excess demand. Excess demand refers to a situation in which a market is not in equilibrium at a particular price because the available quantity of an item {fertilizer} demanded exceeds the quantity supplied at that specific price {49}. The excess demand does not only lead to reselling at higher prices; it also results to adulteration. In figure 1, Demand for fertilizer increases from the equilibrium quantity D_0 to D_1 due to fertilizer subsidy that pushes the fertilizer price from the equilibrium {EqP} down to subsidised price {SP}. However, the quantity of subsidized fertilizer available could not satisfy the excess demand at D_1 hence this motivates reselling of fertilizer at higher price P* {1} even above the usual equilibrium price. This further generates opportunities for rent seeking, satisfaction of interest groups, black marketing, corruption and political favouritism. The imbalance eventually impairs the objective of the programme. Similar scenarios in price movements are also discussed in {12}.
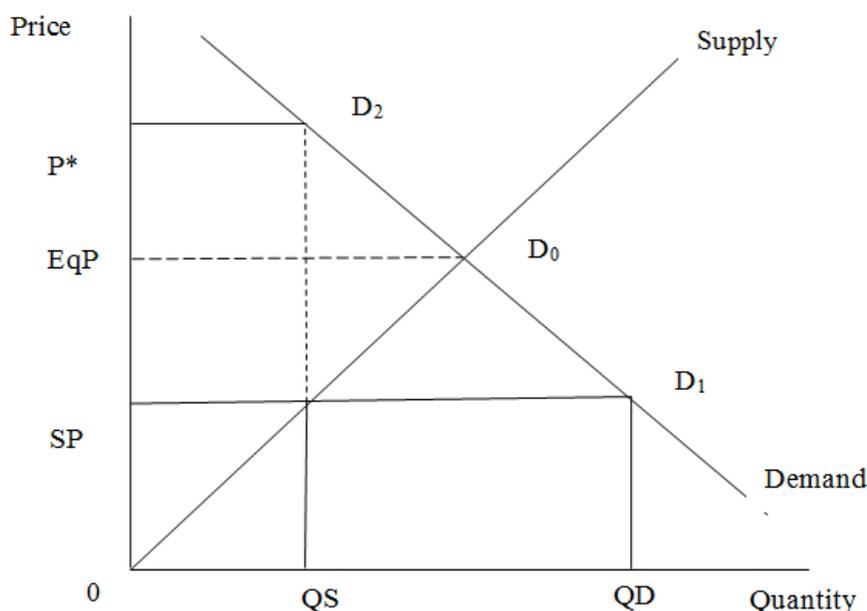

Figure 1: A Model Showing the Subsidy Effects on Equilibrium Price and Demand

4.2   THE INTEREST-GROUP THEORY OF GOVERNMENT

Usually, economic models are used to explain what happens in the real world. The common refrain is that economic models fail to explain what happens in the real world because they ignore politics {18}. Political economy literature, according to {30}, presents two model frameworks that can be used to characterize the policy process and policy outcomes. They are the Public choice, and the State-centered models. The public choice model shares basic assumptions with pluralist thinking but views both societal interest groups and government officials as purely self-interested, with the latter predominantly concerned with maintaining power by attracting and rewarding supporters and favouring certain groups. The State-centered approach argues that the perceptions and interactions of policy elites and the broad orientations of the State more generally account for policy choices and their subsequent pursuit.

This study therefore relies on Interest group theory of government. A branch of this theory termed *Chicago Political Economy* as exemplified by {48}, {42}, {15}; focuses on the impact of regulation and government on the allocation of resources. According to {3}, the goods sought by interest groups are taxes, price-fixing, subsidies, licences, tariffs, quotas among others. Becker's basic assumption is that taxes and subsidies are used to raise the welfare of the more influential pressure groups. Regulation is a redistribution of wealth from some groups to other groups in society. Redistribution is not neutral but favours certain groups at the expense of others; favours small and concentrated interests at the expense of large and diffuse ones. Becker's analysis unifies the view that governments correct market failures with the view that they favour

the politically powerful by showing that both are produced by competition among pressure groups for political favours. {31} identified three groups in developing countries as the farmers {largest and poorly organised}, the urban dwellers {educated and organised} and the military and other internal security forces. The politicians were however considered as brokers of wealth transfers between the various interest groups.

In this context, policy-makers are regarded as "representatives of their respective ethnic groups" consequently care greatly about the "origins" of those who would benefit from specific policies. In most cases, the expected sectional rather than national impacts of policies become the overriding consideration in their design and implementation. In essence, no matter the merit of particular policies or their potential "national" impact, if they were not perceived to favour the specific interests of the dominant power groups, such policies will not be adopted or implemented {30}.

4.3   EMPIRICAL REVIEW

This section provides a review of empirical studies on dynamics of subsidies. {47} in his study on 'Equity in Fertilizer Subsidy Distribution' in India revealed a high degree of inequality in cropwise and Statewise distribution of fertilizer subsidy. In the study, paddy and wheat crops alone accounted for over half of fertilizer subsidy. Also, regions and States with better irrigation facilities had a larger share in subsidies. A similar result was reported by {46} in Fertilizer Subsidy in India: Who are the Beneficiaries?' Specifically, the study showed that fertilizer subsidy was more concentrated in a few States and interState disparity in its distribution was still high though it has declined over the year. A fair degree of equity existed in the distribution of fertilizer subsidy among farm sizes. {13} had earlier submitted that subsidy benefits are selective, being generally confined to limited numbers of farmers - large or middle sized farmers or 'cooperative' farmers who maintain good relations with the officials administering the programmes and projects. Also in Indonesia, {41} reported that there was no targeting of benefits for the fertilizer subsidy program. Thus, most rice producers benefited from subsidized fertilizer regardless of whether they had small/large paddies or their level of wealth. The effect of this policy is regressive and that 40 percent largest farmers capture up to 60 percent of the total subsidy. They argued that there may be a rationale for subsidizing the purchase of agriculture inputs by small farmers who may be credit-constrained. However, fertilizer subsidies are only one of many options to do so and they may not be the most cost-effective instrument. A more cost-effective alternative to support small farmers and overcome potential credit-market constraints would be to establish a system of cash transfers, an area in which Indonesia already has extensive experience. The political and economic factors affecting the United States sugar subsidy program was also examined by {43}. Data on political variables from 1965-1992, sugar beet and sugar farms from 1978-1987, lobby data from 1977-1992 were used in the study. The result showed that both economic and political forces directly affected the US sugar subsidy programme. As the structure of many political institution changed, so did the support of the sugar subsidy. In the study, sugar loans, price supports and import quotas were all manipulated by political actors.

These shortcomings of fertilizer subsidies led to introduction of vouchers or smart subsidies or coupons. The vouchers imply farmers are given vouchers and make purchases from private input suppliers. The cost of the fertilizer to the farmer is reduced by the value of the voucher. The supplier in turn is reimbursed for its value at designated banks. A number of advantages were attributed to the use of vouchers which are: reducing the costs like transportation and storage by the government, building the private-sector distribution network, serves as a sure opportunity to secure the input by a farmer holding a voucher and a replacement for food aid in case of need among others {33}. Nevertheless, {19} in their study on agricultural input subsidy programme in Malawi from 2005/06 to 2008/09 showed that the use of voucher as smart subsidy had similar shortcomings just like the universal subsidy programme. Though the programme had impact on production and food security, the shortcomings included increasing budgetary allocation, diverting substantial staff time and resources from other pressing activities, allocation of vouchers to non-existent {ghost beneficiary or village}, diversion to traditional rulers and government staff and printing of extra or counterfeit vouchers among others. Similar findings were also revealed in {25} in Malawi where a subsidy program aimed to provide coupons for purchase of subsidized fertilizer and seeds targeted at poor rural households also faced serious problem. The critical findings were that the poverty and vulnerability reduction potentials of the programme were not optimal, leakages of coupons and fertilizers and misallocation of coupons away from the needy resulted through rent seeking. Other problems were existence of secondary markets for coupons and cheap fertilizers not even from farmer beneficiaries but the administrators. Similar findings from Ghana were recorded in {8}, {9} where farmers collected vouchers that they had no intention of using or could not afford to use. They rightly predicted that there would be periods of shortage of vouchers and sold the vouchers to other farmers who desperately needed to apply fertilizer.

5   METHODOLOGY

5.1   STUDY AREA DESCRIPTION AND DATA

Nigeria is located in West Africa with an area of 923,768 square kilometers {land: 910,768sqkm and water: 13,000 sq km} on the shores of the Gulf of Guinea, with Benin to the west, Niger to the north, Chad to the north-east and Cameroon to the south and south-east. The population is 151.87Million {2009 estimates}. National data on Annual allocations to Agriculture, fertilizer subsidy {Naira} from 1976-2006 were obtained from Annual reports of Central Bank of Nigeria {CBN} while those on annual fertilizer importations, consumption {tonnes} and production were obtained from FAOSTAT for the same period. Annual fertilizer quantity requested by States and quantity supplied by federal government were obtained from Federal fertilizer Department {FFD}. Data of political information Ruling political party} were obtained from Independent National Electoral Commission {INEC} from 2001-2010. Other States covariates such as area planted, production, farmers' population {employment in Agriculture} and fertilizer consumed from 2001-2010 were sourced from National Bureau of Statistics {NBS}. These were complemented with key informants' interview with selected stakeholders {farmers and government officials} in the implementation process.

5.2   METHOD OF DATA ANALYSIS

Descriptive statistics {such include frequency distribution, mean, percentages and ratio, standard deviation and coefficient of variation}, Fixed effects {FE}, and Generalized Method of Moment {GMM} were the analytical tools employed.

5.2.1   PANEL REGRESSIONS MODEL

Panel data {using States covariates} spanning 10 years {2001-2010} period were used. Amount of subsidized fertilizer supplied to State i was the dependent variable. Panel data regression model as stated below was specified:

$$Y_{it} = \alpha + \beta W_{it} + \varepsilon_{it} \qquad\qquad \text{........} \qquad\qquad \{1\}$$

Where Y is the dependent variable, W are the independent variables, α is the intercept and β are coefficients; i and t are indices for individuals and time. Panel data usually give the researcher a large number of data points, increasing the degrees of freedom and reducing the collinearity among explanatory variables – hence improving the efficiency of econometric estimates {28}, {27}.The error ε_{it} is very important in this analysis; assumptions about the error term determine whether panel regression is fixed or random effects. In a fixed effects model, ε_{it} is assumed to vary non-stochastically over i or t thus making the fixed effects model analogous to a dummy variable model in one dimension. In a random effects model, ε_{it} is assumed to vary stochastically over i or t requiring special treatment of the error variance matrix {28}. Theoretically, it has been submitted that fixed effect panel model is affected by incidental parameters problem i.e. the estimated coefficients are inconsistent unless the number of time period {T_i} approaches infinity for each individual. Though the standard estimator used to eliminate the potential bias caused by omitted heterogeneity is the fixed effects other than the ordinary least square. However, the assumption of about constant variance and serial correlation are very crucial for efficient estimates. Therefore presence of heteroskedasticity or serial correlation would justify the use of Generalized Method of Moment {GMM} procedure which would be more efficient than the fixed effects {2}, {4},{51}. Given the equation:

$$y_{it} = a_0 + b_0 y_{i_{t-1}} + c_0 w_{it} + \theta_i + V_{it} \qquad\qquad \text{.......} \qquad\qquad \{2\}$$

Where

y_{it} =The dependent variable
a_0 = Constant
$b_0 y_{i_{t-1}}$ =Lagged dependent Variable
$c_0 w_{it}$ = Other dependent Variables.
θ_i = Unobserved state effort

In the equation above as shown in {26}; the lagged dependent, $y_{i_{t-1}}$, is positively correlated with the states effect; θ_i; as a result the OLS level estimate of the coefficient b_0 in the regression is likely to be biased upward. Hence, biased and inconsistent estimates are produced. A downward bias within group estimate {FE} is also shown in {34}. However, both

problems can be addressed using a first difference GMM estimation. The dependent variable is: Amount of subsidized fertilizer supplied to State i in period t. The hypothesized independent variables were:

W_1= One period lag of fertilizer supplied to the State$_i$ {tons}
W_2= Area Planted {'000 hectares}
W_3= One period lag of Area Planted {'000 hectares}
W_4= One period lag of fertilizer consumption {tons}
W_5= Employment in Agriculture {'000 farmers}
W_6= Statutory Allocations to State$_i$ {₦ Million}
W_7= Political affiliation {Dummy: If the ruling political leadership in State i also rules at the National, 1 otherwise, 0
W_8= Quantity of Fertilizer requested for by state i
W_9= One period lag of quantity of fertilizer requested for by state i

6   RESULTS AND DISCUSSIONS

6.1   TREND OF FERTILIZER PRODUCTION, IMPORTATION, CONSUMPTION AND BUDGETARY ALLOCATION TO FERTILIZER SUBSIDY DURING MILITARY AND CIVILIAN REGIMES

Production, importation, consumption and budgetary allocation to fertilizer subsidy from 1976 to 2006 are as presented in Appendix 1 {more descriptive statistics are shown on Appendix 2}. These were also decomposed into military and civilian regimes. On aggregate, average amount allocated to fertilizer subsidy was ₦286.06Million with a dwindling growth rate of -0.01 and a high coefficient of variation of 1.41 {141%}. The negative growth rate could be attributed to the corresponding negative growth rate {-0.11} in the allocation to agricultural sector. Amount of subsidy as a percentage of allocation to agriculture had a very high coefficient of variation of 1.79. This implies volatility in the annual allocation to fertilizer subsidy in relation to agriculture budget as a whole. Despite very low proportion of national budget that was dedicated to agricultural sector, fertilizer subsidy costs alone had been enormous and this was very critical between 1990 and 1996 where the subsidy as a percentage of allocations to agriculture was always more than 100%. It was 619% and 623% in 1992 and 1995 respectively {see Salman, 2013[1]}. This period also coincided with the military era. Allocations to agricultural sector {₦678.34Million} was significantly higher {F=4.29} during civilian than military regime {₦413.87Million}. In contrast, this was not reflected in the allocation to fertilizer subsidy as the subsidy was significantly higher {F=6.97} during the military than the civilian regime. Production of fertilizer during military regime was 139190 tons. This amount was significantly higher {F=10.70} than the civilian period of 2354.55tons. Conversely, importations and consumptions of fertilizer were higher during the civilian regime.

6.2   FERTILIZER SUPPLIED BY FEDERAL GOVERNMENT TO STATES FROM 2001 TO 2010[2]

Data on quantity of fertilizer supplied by federal government to the 36 States of the federation and the federal capital territory, Abuja, from 2001 to 2010 are as shown in Appendix 3. This shows the sum total of fertilizer supplied to every State for two consecutive years {period} and the share of total by each State for the period are expressed in percentages. It is shown that a few number of States had always benefited immensely from the subsidy programme, for instance Adamawa had the largest share of 5.92, 9.37, and 9.39% for 2001/2002, 2005/2006 and 2009/2010 periods respectively. Similarly, Niger State had the second largest share of 6.07, 7.55 and 7.57% for 2003/2004, 2005/2006 and 2007/2008 periods respectively. Kogi State also had the largest share of 6.92 and 7.65% for periods 2003/2004 and 2007/2008 respectively. The same State had the third largest share of 7.43% for period 2005/2006. The result also informs that more than 50% of the total fertilizer subsidy went to only12 {one third} States of the federation in period 2001/2002, 11 States in 2003/2004, 9 States {one-quarter} in 2007/2008 and only 8 States in 2009/2010 periods. It is also worthy of note that Niger, Kano, Kogi, Bauchi, Adamawa, Gombe, Jigawa and Benue were always among these States at one time or the other for all periods from 2001/2002 to 2009/2010. The coefficient of variation {CV} moved from 56% in 2003/2004 period to 85% in 2005/2006. This

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[1] Detail report is available in Salman, 2013@ http://www.aercafricaevents.org/papers/GroupE/E1%20Kabir%20Salimonu-FR.pdf
[2] Data before 2001 and after 2010 were not available.

dropped to 77% in period 2007/2008but later moved to 90% due to fewer States that had more than 50% of the fertilizer supplied by the federal government. Appendix 4 further compares the average fertilizer received from the federal government by the States with the area planted and the farmers' population. The States are also ranked in order to show their respective positions based on the characteristics –fertilizer received, area planted and the farmers population. It is shown that Niger, Bauchi, Kano and Anambra States had same positions, R1, for Average Fertilizer as well as R2 for Area Planted. Niger State had the 1st position in both, while Kano, Bauchi and Anambra had 8th, 7th and 34thpositions in both respectively. Other States like Zamfara, Lagos, Ekiti, Edo, Cross River had almost very close positions in both characteristics; for instance, Zamfara State had 5th position in fertilizer but had 6th for Area Planted. Similarly, Lagos and Edo State had 37th and 31st respectively in fertilizer received from government but had very close positions of 36th and 30th for Area Planted. The various positions of the States based on farmers' population as shown by R3 had no noticeable connection with fertilizer received.

Further analysis from revealed an overall national average of 18.86kg/ha and 14.72kg/farmer of supplied subsidized fertilizer to States during the period under review. This is in consonance with available statistics of World Bank 2012 where fertilizer consumption per hectare in Nigeria were stated as 4.1, 7.7, and 2.1kg/ha in years 2007, 2008 and 2009 respectively. The fertilizer requirement according to FAO is 200kg/ha {Liverpool-Tasie et al, 2010}. Hence, average of 18.86kg/ha estimated in the study implies a short fall of about 180kg/ha[3] for the arable production in order to record an expected yield. Further, as many as 15 and 21 States of the federation had less than the National average for fertilizer supplied per hectare and per farmer respectively. The coefficient of variation however increased for these ratios.

In other to pursue some of the factors that influenced the fertilizer supplied to the States, a panel data of some States' covariates was employed using panel effect regression analysis. The covariates employed were as specified in the methodology. The result is as shown in the Appendix 5.

6.3   DETERMINANTS OF FACTORS THAT INFLUENCED QUANTITY OF FERTILIZER SUPPLIED TO STATES

Appendix 5 {the descriptive statistics are shown on 6} shows the result of the determinants of fertilizer supply to States in Nigeria as estimated by ordinary least square {OLS}, fixed effects {FE} and generalized method of moments {GMM} models. The diagnostic statistics of the OLS reveals that the OLS suffered from heteroskedasticity and serial correlation {otherwise known as Auto Regression}. This is as shown by the significant Breusch-Pagan/Cook-Weisberg test for heteroskedasticity and Arellano-Bond test for Auto Regression respectively. Similarly, the standard assumptions of the fixed effects estimator are that the time-varying errors have zero means, constant variances and zero correlations which do not hold again. This therefore justified the GMM estimation that corrects for the problems[4]. The GMM results show that only three coefficients of the nine explanatory variables included in the analysis have significant effects on fertilizer supplied to States during the period. These were fertilizer supplied to states in previous year, statutory allocation to States and area planted by the states in the previous year. Specifically, fertilizer supplied in previous year has a positive and significant influence on fertilizer supplied to States. That is, a state that received more fertilizer last year would also receive more this year. The coefficient shows that 10 percent increase in fertilizer received last year leads to about 5 percent increase in fertilizer received this year. Area planted in the previous year had a significant and negative influence on fertilizer received this year. A 10 percent increase in area planted in previous year would lead to 125percent reduction in fertilizer supply. This could be traced to the usual pattern where farmers cultivate large area in a year and small area in the following year due to glut in the previous year. Statutory allocation to State also has a negative and significant effect on fertilizer supply. The result reveals that 10 percent increase in statutory allocation to States reduces fertilizer to States by 2.7 percent. It should be noted that the State political affiliation was not significant in the result. This shows that quantity of fertilizers received by States was not dependent on whether a State is being ruled/led by same party with that of the federal. Hence the political influence at this stage was insignificant. The likely sizes of the fixed effects were also estimated and were also used to show that Northern states received more subsidies. The fixed effects for period t {where, t=1to10} were generated for every state. The average for each state were computed, sorted and graphed as shown in figure 2 below

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[3] FAO recommended 200kg/ha for optimum performance but 18.86kg/ha was in use hence a short fall of about 180kg/ha
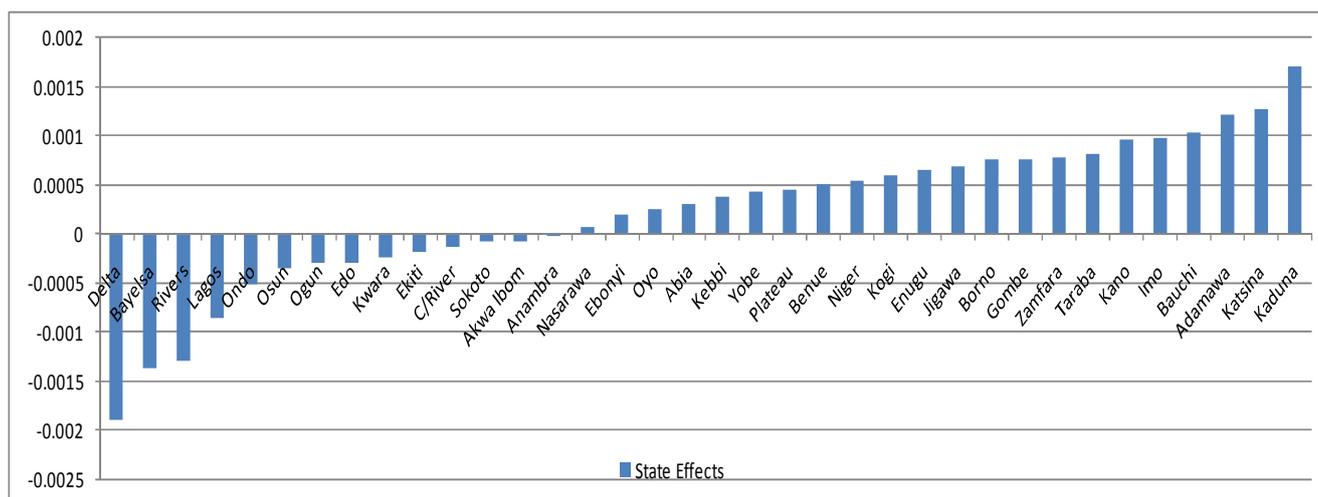[4] See Wooldridge, J.M. (2001) and Hoeffler, A. E.(1998)

Figure 2: State Effects Showing Northern States received more Fertiliser Subsidies

The graph shows that 77.3percent of the states with positive average fixed effects were from the north while only 14.2percent of these states {other Northern states} were among those with negative fixed effects. This further showed that northern states received more than others.

6.4   KEY INFORMANT INTERVIEWS

6.4.1   KEY INFORMANTS INTERVIEW {GOVERNMENT OFFICIALS[5]}

a. *Lateness in Arrival of Fertilizers*

There has been a perennial lateness in the delivery of fertilizers to states hence it is not timely available. Usually, the input arrived late around September while the planting would have begun since April/May. The sales to farmers commenced then but stopped by October when the planting season would have ended. The stoppage is to prevent farmers from hoarding or reselling the input since the input becomes useless except for the limited dry season farming. Hence the benefit derived by the farmers is so limited since they could only have access {if any} to the input long after planting. This would also have much implication on farmers' productivity, food availability and food prices.

b. *More Political Influence during Civilian Rule*

The key informants also submitted that political influences/pressures during the civilian era are always more than during the military era. Hence, the bureaucrats are always under pressure to fulfil some political goal against their professional ethics under civilian administrations. For instance, the bureaucrats received 'directives from the top' that certain quantity must be sold to some influential individual especially among the commercial farmers and traditional rulers at the expense of small farmers. This further corroborates the study of {55} {19}.

c. *Inadequacy of the Fertilizer Supply*

Inadequate subsidized fertilizer is adjudged to exist by key informant as farmers' desired quantity are not always met. Even though farmers are ready to pay the subsidized rate, there is always a peg on number of bags per farmers and this depends largely on the available supply which varies over years. Farmers are thus frustrated having received announcements on media such as radio, television, and village agricultural extension officers that 'they should go to their various respective ADP offices to purchase the supplied subsidized fertilizer.

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[5] These are the fertilizer procurement at the state and ADP officers in the implementation process

6.4.2 Key informants interview {Farmers Representatives}

a. *Existence of Parallel Elite Farmers Group and Other Competitors*

There exist competitions from the elite farmers who usually reside in the urban area. They also formed themselves into groups and compete with the real farmers not only over fertilizer but other inputs especially credit. These are either non farmers or at best part-time. Meanwhile, the full-time farmers most of those who reside in the rural area would not even have as much opportunities as the urban elites. This is in line with {36} that described urban dwellers as educated and organized. Hence these characteristics could place them above the real farmers that are the largest and poorly organized.

b. *Insincerity among the Government Officials*

The government officials were alleged to be insincere in the sales and distribution of the subsidized fertilizers. They usually allot more bags to their relatives and top functionaries or influential personalities and politicians. The preferential treatment over years made the farmers to lose confidence in the officials. However, the farmers are still at the mercies of the officials since they are always in charge of the process. Occasionally, some farmers need to align with some of these influential personalities in order to have opportunities of getting one or two bags.

c. *Inadequacies and Lateness*

This is very similar to the submission of government official as in 6.4.1 a and c.

7 Summary, Conclusions and Recommendations

7.1 Summary and Conclusions

Amount allocated to fertilizer subsidy had declined over years though this is attributable to the corresponding decline in agricultural budget. Allocation to fertilizer subsidy was higher during military than civilian regime. The supply of fertilizer by federal government to States had been concentrated on some States where few states had received more than 50% of the total fertilizer supplied. The total fertilizer supplied was also low at National average of 18.86kg/ha and 14.72Kg/farmer with 15 and 21 States respectively having less than the National average in the duo. A very wide variation was also recorded for amount of Fertilizer/hectare as well as amount of fertilizer/farmer among the States. Quantity of fertilizer received in previous year, statutory allocation and area planted determined the quantity of fertilizer that a state received. Apart from the inadequacy and lateness in arrival of the fertilizers, more political influence was experienced during civilian than during military rule as submitted by government officials. The farmers emphasized the existence of parallel *Elite* {urban} farmers group and other competitors that denied them of adequate access to the subsidized fertilizer. The farmers also submitted that members of ruling party gained more access to subsidized fertilizers.

7.2 Policy Implications and Recommendations

Firstly, the foregoing has shown that the fertilizer subsidy in Nigeria is volatile and the amount allocated to the programme is on a decline. While the volatility could be attributable to political instability in the country over years, the decline informs that the country could not bear with the burden of the subsidies. Secondly, from year 2001-2010, amount of fertilizer per hectare and amount received per farmer is still much lower than the recommended amount. Thus the question is 'has the programme or any of its components have been a success?' A market abuse is only a result of government inability to provide enough fertilizer for the use of the food producers despite huge amount devoted to the programme. Surely the dwindling productivity due to very low fertilizer usage in Nigeria would linger if nothing is done to rescue the situation. The universal fertilizer subsidy has not also been successful where untimely release of funds, inadequate availability and late delivery are the regular features. The voucher was introduced in some countries in Africa based on its merits as mentioned earlier as a promising solution to these challenges. However, the experience in Malawi and Ghana has shown that use of voucher does not promote the development of private sectors and that farmers are not far better off. Impact evaluation of vouchers from available studies is therefore not enough for it to be adjudged as a best option in tackling the problems. Recently the use of voucher was modified in Nigeria where registered farmers received authorization directly from the government {through mobile phones} to get fertilizer from agro dealers at 50% subsidy. Research efforts are yet reveal the effectiveness of this approach assuming that small scale farmers were indeed registered. Since the idea of subsidy came up due to poor conditions of the farmers; their purchasing power could therefore be improved through a well-structured rural credit programme. Though access to credit among farmers is hitherto low in Nigeria; {7} has attributed this to very few rural banks hence a limitation for the farmers.

It is therefore recommended that government involvement in the programme be redefined. The private sector {agrodealers} involvement is thus recommended while the government only involves in monitoring and evaluation. Since inability to afford the commodity is part of what drives the subsidy option, then the purchasing power of the farmers could be enhanced through a virile rural credit programme. This could be channeled through a well-organized and certified farmers group and cooperative societies hence the whole idea of fertilizer subsidy could be faced off. Production/procurement and distribution of the commodity should also be achieved through private sector {agrodealers}. This would go a long way in tapping the resources of the private sectors hence the huge amount incurred yearly by the government could be a relief. The timeliness and availability would also be guaranteed through establishment of fertilizer stores/sales outlets at designate various rural localities by the private sectors. Smaller packs than the usual 50Kg pack could also be introduced as trials in order to encourage the new farmers. The government only monitors and evaluates the exercise vis-à-vis quality control, periodic feedback from farmers, and sustainability of the credit programme.

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APPENDIX 1: PRODUCTION, IMPORTATION, CONSUMPTION AND BUDGETARY ALLOCATION TO FERTILIZER SUBSIDY

Items	Total			Military Regime {n=20}		Civilian Regime {n=11}		ANOVA test
	Average {SD}	Growth Rate {CV}		Average {SD}	CV	Average {SD}	CV	
Allocation to Agric {₦Million. 1985=100}	507.72 {358.34}	-0.11 {0.71}		413.869 {208.57}	0.50	678.34 {502.913}	0.74	4.29**
Amount of Subsidy {₦Million. 1985=100}	286.06 {402.83}	-0.01 {1.41}		415.48 {453.53}	1.09	50.74 {40.01}	0.79	6.97**
Amount of Subsidy as % of Agric. Budget	0.92{1.66}	0.09 {1.79}		1.39 {1.92}	1.39	0.07 {0.065}	0.95	5.11**
Production {tons}	90,635.48 {128195.20}	-0.72 {1.41}		139,190 {137652.8}	0.99	2354.55 {3506.384}	1.49	10.70***
Importation {tons}	225,854.00 {161366.11}	0.13 {0.71}		165,320 {83924.83}	0.51	335,915.8 {209954.6}	0.63	10.42***
Consumption {tons}	255,468.55 {158109.70}	0.11 {0.62}		242,704 {126857}	0.52	278,676.8 {208570.2}	0.75	0.36

*{Significant at 90%}, **{ Significant at 95%}, *** {Significant at 99%}

APPENDIX 2: DESCRIPTIVE STATISTICS FOR THE NATIONAL AGGREGATES {1976-2006}

Variables	Number of Observations 1976-2006	Mean	Standard Deviation	Variance	Minimum	Maximum
Year	31	1991	9.09	82.66667	1976	2006
Fertilizer Production {tons}	31	90635.48	128195.20	1.64e+10	0	371200
Fertiliser Importation {tons}	31	225854	161366.10	2.60e+10	23700	794994
Consumption {tons}	31	255468.5	158109.70	2.50e+10	71400	811154
fertilizer Subsidy {₦Million,1985=100}	31	286.05	402.83	162274.8	0	1426.89
Allocation to Agricultural Sector {₦Million, 1985=100}	31	507.71	358.33	128406.6	0	1521.61

Appendix 3: Total Fertilizer Supply {tons} by Federal Government to States {2001-2010}

State	2001/02	%	2003/04	%	2005/06	%	2007/08	%	2009/10	%
Abia	2790	1.92	2990	1.14	15013.9	4.21	19360	2.40	8970	1.07
Abuja	4620	3.18	13940	5.33[3]	0	0.00	8000	0.99	59489.5	7.08[3]
Adamawa	8589.2	5.92[1]	9920.35	3.79	33420.29	9.37[1]	20950	2.60	78823.05	9.38[1]
A/Ibom	1290	0.89	5709.9	2.18	10010	2.81	20016.8	2.48	51080	6.08
Anambra	2169.85	1.49	2725	1.04	2479.55	0.70	3938	0.49	7319.5	0.87
Bauchi	4490	3.09	8350	3.19	14520.9	4.07	44258.1	5.49	35000	4.17
Bayelsa	3250	2.24	2688	1.03	2170	0.61	6750	0.84	18100	2.15
Benue	6120	4.22	8510	3.26	6212.2	1.74	32830	4.07	17367.7	2.07
Borno	5215	3.59	8300	3.17	13345	3.74	17606.2	2.18	18000	2.14
C/River	1180	0.81	1980	0.76	1780	0.50	11430	1.42	7580	0.90
Delta	1604.25	1.11	4520	1.73	2239.65	0.63	4320	0.54	6080	0.72
Ebonyi	2779.65	1.92	3600	1.38	1660	0.47	3589.3	0.45	5784.7	0.69
Edo	1260	0.87	1660	0.63	2385.48	0.67	10470	1.30	7170	0.85
Ekiti	2700	1.86	3900	1.49	3465	0.97	10640	1.32	9460.6	1.13
Enugu	3236.7	2.23	6632.95	2.54	6017.5	1.69	17127.6	2.12	8955	1.07
Gombe	4920	3.39	11260.35	4.31	20553.21	5.76	52577.5	6.52[3]	31338.15	3.73
Imo	2549.3	1.76	6479.35	2.48	4890	1.37	15562.5	1.93	25327.5	3.01

Jigawa	7700	5.30	9780	3.74	14350	4.02	26090	3.24	31420	3.74
Kaduna	7710	5.31[3]	11750	4.49	11644.7	3.27	27704.95	3.44	4000	0.48
Kano	8500	5.86[2]	12190.9	4.66	15497	4.35	31707.45	3.93	34416.2	4.10
Katsina	6800	4.68	11270	4.31	500	0.14	6300	0.78	16900	2.01
Kebbi	6520	4.49	7710	2.95	6728.8	1.89	30686	3.81	65710	7.82[2]
Kogi	2380	1.64	18080	6.92[1]	26500	7.43[3]	61710	7.65[1]	44757.89	5.33
Kwara	240	0.17	4230	1.62	4269.65	1.20	2930	0.36	0	0.00
Lagos	2820	1.94	1560	0.60	4730	1.33	600	0.07	0	0.00
Nasarawa	3780	2.60	5590	2.14	9010	2.53	38372.25	4.76	23690	2.82
Niger	5449.9	3.75	15855.65	6.07[2]	26909	7.55[2]	61040	7.57[2]	49110	5.84
Ogun	2400	1.65	6320	2.42	4485	1.26	4607	0.57	3000	0.36
Ondo	2500	1.72	4950	1.89	4980	1.40	2549.95	0.32	12477.6	1.48
Osun	0	0.00	6806.75	2.60	5347.5	1.50	13947.5	1.73	300	0.04
Oyo	3720	2.56	7550	2.89	12521.04	3.51	15692.64	1.95	14626.05	1.74
Plateau	4800	3.31	6100	2.33	14033.35	3.94	36089.7	4.48	9990	1.19
Rivers	2550	1.76	4920	1.88	1050	0.29	13450	1.67	40726.31	4.85
Sokoto	5439.9	3.75	2100	0.80	4140	1.16	23709.75	2.94	13500	1.61
Taraba	3415	2.35	6464	2.47	16386	4.60	44980	5.58	9732.4	1.16
Yobe	4979.8	3.43	7260	2.78	19041.65	5.34	24776.8	3.07	16080	1.91
Zamfara	4680	3.22	7770	2.97	14277.5	4.00	39780	4.93	54000	6.43
Total	145148.6	100.00	261423.2	100.00	356563.9	100.00	806150	100.00	840282.2	100.00
Coefficient of variation	**0.56**		**0.56**		**0.85**		**0.77**		**0.90**	

APPENDIX 4: AVERAGE FERTILIZER {TONS}, AREA PLANTED {'000HA} AND FARMERS POPULATION {THOUSANDS} BY STATES FROM 2001-2010

States	Average Fertilizer {tons}	R1[6]	Area Planted{'000ha}[7]	R2	Farmers Pop{'000}	R3	Fertilizer {kg}/ha	Fertilizer {kg}/farmer
Abia	4912.39	22	50.82	32	437.40	15	96.66	11.23
Abuja	8604.95	11	27.80	35	72.60	36	309.59	118.53
Adamawa	15170.29	3	363.38	16	299.50	23	41.75	50.65
Akwa Ibom	8810.67	10	58.37	31	692.50	6	150.94	12.72
Anambra	1863.19	34	41.25	34	357.60	20	45.17	5.21
Bauchi	10661.90	7	701.74	7	772.60	4	15.19	13.80
Bayelsa	3295.80	26	2.51	37	75.90	35	1314.64	43.42
Benue	7103.99	15	405.58	14	455.90	12	17.52	15.58
Borno	6246.62	19	1026.60	3	636.90	7	6.08	9.81
Cross River	2395.00	30	67.12	29	257.30	27	35.68	9.31
Delta	1876.39	33	76.00	24	241.90	30	24.69	7.76
Ebonyi	1741.37	35	104.71	22	416.20	18	16.63	4.18
Edo	2294.55	31	58.54	30	247.80	28	39.19	9.26
Ekiti	3016.56	27	70.74	26	124.20	34	42.64	24.29
Enugu	4196.98	24	68.55	28	423.50	16	61.23	9.91
Gombe	12064.92	4	479.50	12	439.00	14	25.16	27.48
Imo	5480.87	20	72.43	25	601.80	9	75.68	9.11
Jigawa	8934.00	9	528.47	11	708.60	5	16.91	12.61
Kaduna	6280.97	17	1241.35	2	1114.50	3	5.06	5.64

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[6]R1, R2 and R3 indicate position based on fertiliser, area planted and population respectively.
[7]Area planted for Maize, Rice, Guinea Corn and Millet

Kano	10231.16	8	657.43	8	1479.70	1	15.56	6.91
Katsina	4177.00	25	716.02	5	1212.80	2	5.83	3.44
Kebbi	11735.48	6	381.45	15	383.90	19	30.77	30.57
Kogi	15342.79	2	239.14	17	267.30	26	64.16	57.40
Kwara	1166.97	36	139.58	20	201.30	32	8.36	5.80
Lagos	971.00	37	3.83	36	11.20	37	253.66	86.70
Nasarawa	8044.23	13	237.49	18	273.50	25	33.87	29.41
Niger	15836.46	1	1319.90	1	531.50	11	12.00	29.80
Ogun	2081.20	32	82.55	23	186.70	33	25.21	11.15
Ondo	2745.76	28	111.72	21	221.60	31	24.58	12.39
Osun	2640.18	29	49.14	33	247.10	29	53.73	10.68
Oyo	5410.97	21	230.19	19	322.30	21	23.51	16.79
Plateau	7101.31	16	422.75	13	418.90	17	16.80	16.95
Rivers	6269.63	18	70.09	27	311.70	22	89.45	20.11
Sokoto	4888.97	23	748.65	4	626.90	8	6.53	7.80
Taraba	8097.74	12	636.65	9	278.80	24	12.72	29.04
Yobe	7213.83	14	578.30	10	453.00	13	12.47	15.92
Zamfara	12050.75	5	707.34	6	568.90	10	17.04	21.18
CV	0.64		1.03		0.71		2.65	1.07

APPENDIX 5: DETERMINANTS OF FERTILIZER SUPPLIED TO STATES

	OLS		Fixed Effect		Generalised Method of Moments	
Explanatory Variables	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
One period Lag of Fertilizer supply	0.3463***	0.9024	0.2360***	0.0527	0.5058***	0.0826
State Political Affiliation	1.3593*	0.7329	2.4042**	1.1188	-1.5588	1.6887
Area planted {Hectares}	4.2776	2.7474	2.3801	4.6592	1.9564	5.6475
One period Lag of Area planted	-1.5179	2.7092	-0.6429	2.4907	-12.5636**	5.7214
Statutory Allocation {N'000}	-0.2063***	0.0451	-0.2791***	0.0552	-0.2756***	0.0676
Employment in Agriculture	-0.2582	0.3729	-0.9406	1.2419	-2.3735	1.4721
One period Lag of Fertilizer Consumption	-0.1187	0.3096	-0.2150	0.4652	0.4806	1.1330
Quantity requested {000'MT}	0.1039**	0.0418	0.0869***	0.0203	0.0061	0.0263
One period lag of Quantity requested {000' MT}	7.76×10^{-6}	1.98×10^{-5}	4.77×10^{-6}	2.1×10^{-5}	-2.1×10^{-5}	2.5×10^{-5}
Constant	2.1425	0.9052	4.1977	2.6727	12.5012	4.0153
R squared	0.3692					
sigma_u			3.0211			
sigma_e			6.1731			
rho			0.1932			
Number of observations	359		359		288	
Number of groups			36		36	
F-stat/Wald chi2{9}			12.42*** {0.0000}		101.45*** {0.0000}	
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	267.39*** {0.0000}					
Arellano-Bond test for Auto Regression {1}	-4.15*** {0.0000}					

*{Significant at 10%}, **{Significant at 5%}, *** {Significant at 1%}

APPENDIX 6: DESCRIPTIVE STATISTICS FOR STATE COVARIATES {2001-2010}

Variables	Number of Observations	Mean	Standard Deviation	Variance	Minimum	Maximum
Year	360	2005.5	2.876279	8.272981	2001	2010
Fertiliser requested by states {tons}	360	15020.64	19055.35	3.63e+08	0	200000
Fertiliser Supplied to States {tons}	360	6454.218	7917.789	6.27e+07	.01	42464.2
Proportion received {ratio}	286	0.5245041	0.3934173	0.1547772	1.82e-07	2.213333
Area Planted {000' hectares}	360	354.1633	359.199	129024	0.01	1497.03
Statutory Allocation {₦ Million}	360	4454.28	6697.32	4.49e+07	9.48	48108..30
Farmers Population {'000 farmers	360	4454.281	6697.316	954880.1	9.48	48108.3
Fertiliser Consumption {tons}	360	1326.933	977.1797	3102586	27	5944