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## Fertilizer Policy of 2010-2015 and Changes in Farmers Fertilizer Use and Revenue in Taraba State, Nigeria

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### Abstract

*This study ascertained if the fertilizer policy of the Transformation Agenda; 2010-2015 made any difference in Nigerian farmers' fertilizer use rate and their revenue. It examined the fertilizer use rate by farmers before and during the policy period and, analyses the effect of the policy on the revenue of farmers before and during the policy period. A paired t-test was employed to examine the fertilizer use rate and revenue of farmers before and during the policy period. The result shows that the average fertilizer use rates during the policy period and before the policy period were 9.3kg/ha and 8.8kg/ha respectively with a difference of 0.5kg/ha of fertilizer used between the periods. It also shows that the average revenue of farmers during the policy period and before the policy period were ₦139,745.8 and ₦126,169.5, respectively with a difference of ₦ 13,576.3 between the two periods. There was statistical difference between the quantities of fertilizers used by the farmers and their revenues before and during the policy period. Thus, indicating that the policy intervention actually made a difference in both the quantities of fertilizer used and the welfare of the farmers. Due to the fact that Nigeria is still using below recommended fertilizer quantities, the potential of applying more fertilizer is huge. Proper fertilizer usage can boost food production which will in turn affect farmers' revenue positively.*

**Keywords:** Fertilizer use rate, liberalization, agricultural transformation agenda.

### Introduction

Liberalization policies have been advocated and implemented at both international and national levels; however, crop yield at the average has not met up with food demand. This implies that there is a need for better fertilizer use via policy(s) that must meet up with the food demand. Despite the various policy reforms and campaign by the Federal Government to encourage the use of fertilizer, farmers are yet to adopt optimum fertilizer use rate. Fertilizer use rate in Nigeria averages 10-15kg/ha nutrient per hectare against 100kg world average (The Fertilizer Suppliers

Association of Nigeria (FEPSAN), 2014). If this is required when Nigeria does not want to export food or cash crop at all, then a higher rate should be expected if the country is to consider exporting products in order to meet up with the National Economic Empowerment and Development Strategy's (NEEDS) agricultural crop production target. With the current application rate, Nigeria is still far from achieving this (FEPSAN, 2014).

### **Issues Militating Against Nigeria Fertilizer Sector**

Several issues have been identified by scholars (Liverpool-Tasie, Auchan, & Banful, 2010), as being responsible for the fertilizer sector's poor functioning and farmers' low use of fertilizer. To begin with, quality assurance is a prime concern of policymakers as it affects one of the fundamental demand side factors (agronomic response) which determine the profitability and intensity of fertilizer use. The national fertilizer policy explicitly states the need to control the quality of fertilizer imported and produced locally, but the existing institutional framework operating within public service has not been able to deal with quality problems. Fake, adulterated, and misbranded fertilizers, as well as underweight fertilizer bags, are prevalent in the Nigerian market (Research Gate, 2014)

Other factors are the price of the crop, the price of fertilizer, prices of other inputs that substitute for or complement fertilizer, and the parameters of the fertilizer production function. In a world of perfect information and well-functioning markets, a farmer would demand that the amount of fertilizer that maximizes financial returns-profit maximization occurs when the marginal cost of the last unit of fertilizer applied is equal to the value of the marginal returns (The World Bank, 2006). Agricultural prices act as signals for the allocation of resources by farmers. However, some inherent fertilizer characteristics help explain both the difficulty of devising optimal policies and the reason such policies are likely to vary in time and space. In practice, however, fertilizer costs are a considerably larger part of production-related cash outlays and thus likely to subject the farmer to greater financial risk than the costs of improved seed. Even after fertilizer is adopted, the information requirements for determining optimal fertilizer types and application rates pose considerable challenges to agricultural research systems. In Sub Saharan Africa (SSA), input/output price ratios tend to be higher (more kilogram output is required to purchase one kilogram of fertilizer) and more variable than elsewhere in the developing world (Takeshima & Liverpool-Tasie, 2013), making it difficult for farmers to use prices when making decisions about fertilizer use. Transmission of price signals is not easy when communication and transportation infrastructure are weak and institutions to support markets are poorly developed. This increases marketing risks and costs, often resulting in low usage of fertilizer.

Supply factors generate their own concerns. Over-dependence on external supply was brought about by the substantial availability of budgetary resources to support imports and overvaluation of the local currency in the past. During the late 1980s and mid-1990s, domestic fertilizer production of the total supply varied between 46 and 60 percent (Phillip et al., 2009). The situation deteriorated, as in the early 2000s (between 2002 and 2005) that all the Nitrogen Phosphorous Potassium (NPK) fertilizer used in Nigeria were imported in the absence of any domestic production as the result of the closure of the only producing unit, the National Fertilizer Company of Nigeria (NAFCON) was closed for repairs. In the meantime, the Federal Market Stabilization Program (FMSP) remained an integral part of fertilizer policy in Nigeria and accounted for 43 percent of total capital spending in agriculture from 2001 through 2005 (Hammed,2015), thereby

supplying the budgetary resources needed for fertilizer imports. In addition, overvalued currency for most of the post- 1980 period made it unprofitable to generate domestic production. Furthermore, domestic sources of organic manure were limited by a livestock industry that is largely mobile and separated from crop agriculture, making biomass sources uncompetitive with imported inorganic fertilizer, while agro-forestry technologies were not widespread (Liverpool-Tasie, Auchan, & Banful, 2010).

Lastly, seasonal demands and product bulkiness lead to relatively slow stock turnover and considerable storage requirements, which, in turn, result in high financing charges. Distributors are faced with substantial short-term credit requirements as well as the need to offer credit to end users or to work closely with credit agencies (Smale, Byerlee, & Jayne 2011). The quest to improve fertilizer use by facilitating timely access to it and ensuring that fertilizer subsidies get to intended beneficiaries has been one of the motivations behind the voucher system. The voucher system is an alternative to the government-administered system of the fertilizer subsidy program and depends on a viable private agro-input dealer network (Liverpool-Tasie, Auchan, & Banful, 2010). This system was first implemented in Nigeria by the Taraba and Kano state governments in 2009. Due to its peculiar nature with favourable conditions, the Taraba state government in the quest to boost agricultural productivity intervened on the availability and timeliness of fertilizer supply to farmers by introducing the fertilizer voucher system. This intervention was observed to have yielded great result, thus, Federal Government decided to adopt the technique which was transformed into the fertilizer policy component of the Agricultural Transformation Agenda of Nigeria, 2010-2015 and Taraba State was one of the first states for the pilot project.

The majority of the studies on fertilizer policy in Nigeria have been focused on agricultural development in the economy and hence, better farmers' welfare. Such studies by (Coker, 2014) studied the effect of fertilizer policy on crop production in Nigeria; (Eboh, Ujah and Amaechina 2006; Aloyce et al., 2014) studied how government fertilizer subsidies benefit rural farmers in Nigeria. Making sense out of existing data; Nagy and Edun (2002) assessed Nigerian government fertilizer policy and suggested alternative market-friendly policies. Oko (2011) analysed the impact of fertilizer policy on crop production in Nigeria and Liverpool-Taise, Olaniyan, Salau and Sackey (2010a) worked on a review of fertilizer policy issues in Nigeria. However, limited research has been done to ascertain if fertilizer policy of the Transformation Agenda; 2010-2015 made any difference in fertilizer use and farmers' welfare in Nigeria. But how can a better and an efficient fertilizer policy be formulated without empirical evidences?

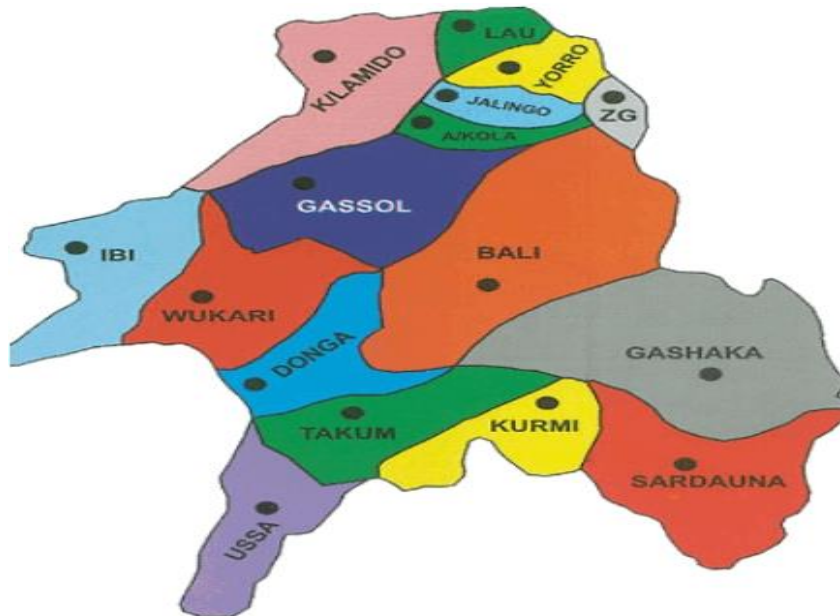
It is on this premise that this study evaluated the effect of 2010 – 2015 fertilizer policy on fertilizer use rate and farmers' livelihood in Nigeria. Hence, there is a need to fill this knowledge gap by critically assessing the impact of the past Nigerian fertilizer policies. This will involve juxtaposition, critique and the framing of a better policy to meet the present need of improved agricultural production in Nigeria.

## **Methodology**

The study was conducted in Taraba State, Nigeria. The state was chosen for the study because the majority of its population are involved in agriculture and because it was one of the pioneer states to implement the fertilizer voucher system in Nigeria. Taraba State, is located between latitude 8<sup>00</sup>' North and longitudes 10<sup>30</sup>' East with a land area of 54473km<sup>2</sup> (National Bureau of Statistics, 2008). According to 2006 census figure, Taraba state has the population of 2,300,736 people (National Population Commission (NPC), 2006). It is bounded in the West by Nasarawa

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and Benue states, Northwest by Plateau and Gombe states, Northeast by Adamawa state and Southeast by Cameroun (Figure 1). Taraba state lies largely within the middle of Nigeria and consists of undulating landscape dotted with a few mountainous features which includes the prominent Mambilla Plateau.



**Figure1. Map of Taraba State, Nigeria**  
**Source: Tarabastate.gov.ng (2011)**

A multi-stage sampling technique was used in this study for the purpose of collecting data. In the first stage, three local government areas (LGAs) were randomly selected from among those that participated in the Growth Enhancement (Support) Scheme (GESS), one from each of the three agricultural zones. In the second stage, two (2) communities were chosen from each of the selected LGAs of which twenty (20) homogenous farmers who participated in the programme were randomly selected, giving a total of 120 respondents.

Questionnaire was used to collect primary data for the study. The questionnaires were administered to the literate households while the researcher interviewed the illiterate households and their responses were recorded accordingly to ensure accuracy of collected data. The data collection instrument was organized in sections to reflect specific objectives of the study.

A paired t-test was used to analyse the fertilizer use rate by farmers before and during the policy period, and effect of the policy on the revenue of farmers.

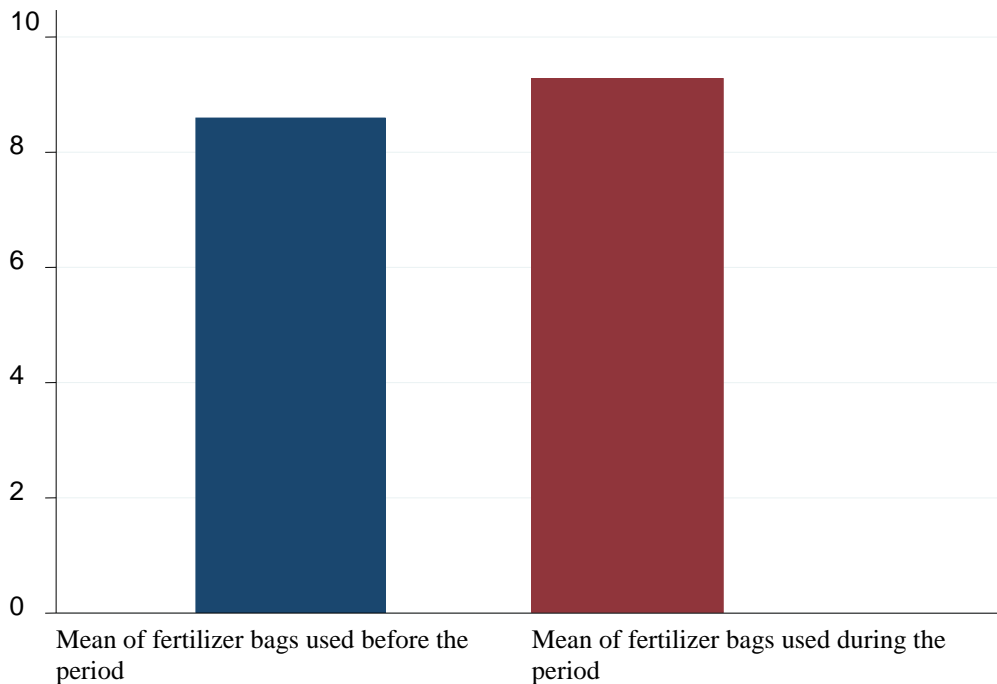
## **Results and Discussion**

### **Fertilizer Use Rate Before and During the Policy Period**

Figure two shows the different use rates of fertilizer during the two periods. The fertilizer use rate during the policy period was greater than before the policy period. The figure shows that fertilizer

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was available in both periods. However; farmers had access to it more during the policy period (2010 – 2015) which eventually led to increase in output and income of farmers (Figs. 2). In order to infer if the absolute value of the use rates was statistically significant, a t-test analysis was employed. Table 1 shows a paired t-test result of fertilizer use rate by farmers before and during the policy period.



**Figure 2: Fertilizer use rate before and during the policy period**  
**Source: Field survey, 2016.**

**Table1: Fertilizer use rate before and during the policy period**

Variable	Obs	Mean	Std.Err.	Std Dev	[95% Conf. Interval]
Fertilizer bags before	120	8.8	0.4697577	5.145937	7.869833 9.730167
Fertilizer bags during	120	9.275	0.5022307	5.501661	8.280533 10.26947
Difference	120	-0.475	0.0953855	1.044896	-0.6638728 0.2861272
mean(diff) = mean (fert. bags before – fert. bags during)		t = - 4.9798			
Ho: mean(diff) = 0		Degrees of freedom =		119	

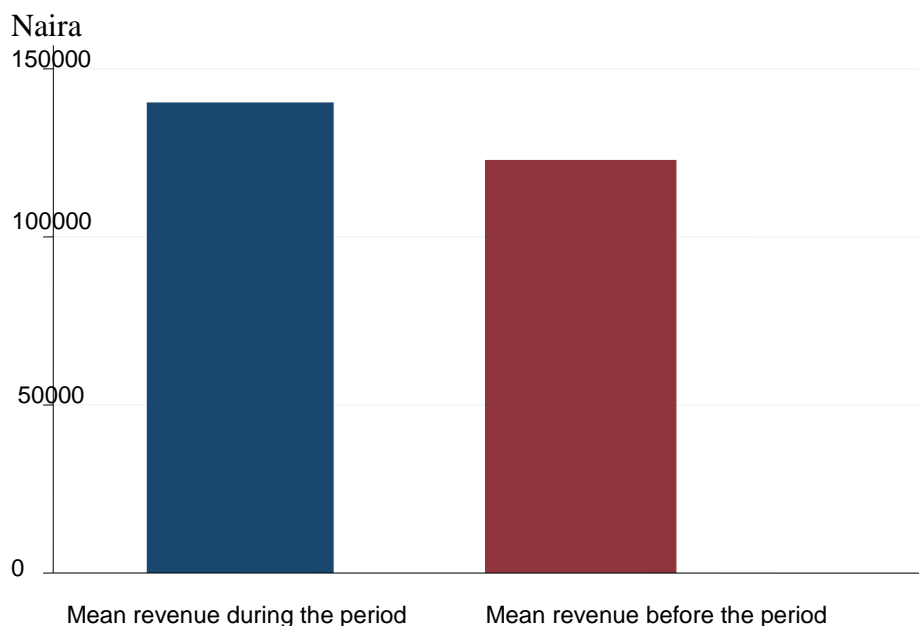
**Source: Field survey, 2016.**

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The result shows that the average fertilizer use rates during the policy period and before the policy period were 9.3kg/ha and 8.8kg/ha, respectively with a difference of 0.5kg/ha of fertilizer used between the periods. The t-test result shows that there was a statistically significant difference between the use rate of fertilizer for the two periods (before and during), as the difference between the two means (-0.475) is greater than the t-test value (- 4.9798). This was possible because of government interventions on availability and timeliness of fertilizer supply to farmers during the policy period. According to Ayodele, Oladapo and Omotoso (2007) liberalization would increase fertilizer availability as numerous suppliers compete to satisfy the customers' needs, capture a larger share of the market and maximize profit. Therefore, the policy made significant impact on the use rate of fertilizer in the study area. Nigeria must therefore intensify fertilizer use to improve agricultural production, raise rural income and ensure food security in the face of rapidly growing population and worsening poverty incidence (FEPSAN, 2014).

### **The Effect of the Policy on the Revenue of the Farmers.**

Figure 3 shows the mean farmers' revenue (in Naira) before and during the policy period. The result shows that the mean revenue of the farmers was higher during the policy period than before.



**Source: Field survey, 2016.**

**Figure 3: Farmers revenue (in Naira) before and during the policy period**

The figure shows that in both periods, farmers made some substantial amount of revenue but on a greater percentage during the policy period, which eventually led to increase in farmers' income, thus implying possibility of a better standard of living for them.

A paired t-test was further used to verify if the difference in the revenues of the farmers was statistically significant (Table 2).

**Table 2: Difference between Farmers' revenue before and during the policy period**

Variable	Obs	Mean	Std.Err.	Std Dev	[95% Conf. Interval]
amount before	118	126169.5	8712.572	94642.75	122491 157000.6
amount during	118	139745.8	7516.348	81648.42	111283.8 141055.2
difference	118	-	2436.783	26470.24	8750.35 18402.19
mean(diff) = mean (naira amount before – amount during)					t =
5.5714					
Ho: mean(diff) = 0					degrees of freedom =
117					

**Source: Field Survey, 2016.**

The average revenue of farmers during the policy period and before the policy period were ₦139,745.8 and ₦126,169.5, respectively with a difference of ₦ 13,576.27 between the two periods. This implies that there was a significant difference between the revenue of farmers for the two periods (during and before), as the difference between the two means (13576.27) is greater than the t-test value (5.5714). This means that farmers had more revenue during the policy period than before the period, which improved their livelihood and welfare. Therefore, the policy had made a significant impact on the farmers in the study area, hence implying a better standard of living. In this regard, it is posited that agricultural policies aim to maintain adequate standards of living for farmers and aim to restrict income disparities (El Benni, Finger and Mann, 2012). This finding is in agreement with Ugochukwu and Ezedinma (2011) and Ogbe *et al.*, (2011) that rice farming in Kano, Niger, Ekiti and the south eastern states of Nigeria was profitable. Thus, it can be affirmed that the main objectives of Nigeria's agricultural policy (2010 – 2015) of increasing production and farmers' revenue was attained among crop farmers in Nigeria.

There is therefore a need for government to monitor and evaluate fertilizer use rate through quality control and periodic feedback from farmers. Low crop productivity could result from inadequate fertilizer usage by farmers on available land and this would affect agricultural development in Nigeria unless something is done to improve the use of fertilizer.

The fertilizer policy of the 2010 – 2015 agricultural transformation agenda, though performed better in comparison with previous policies was not totally successful, as the use rate was found to be low (9.3kg/ha). There is therefore room for improvement, drawing lessons from the shortcomings. Low fertilizer usage could lead to food shortage and increase in food prices, thereby affecting farmers' welfare. The timeliness and availability of fertilizer would be guaranteed via establishment of fertilizer sales outlets and stores across rural localities by the private sectors.

## Conclusion and Recommendations

The result showed that the average fertilizer use rate during the policy period was significantly more than before the policy period, likewise the farmers' revenue. More also, this has implication on farmers' welfare; the increase in the revenue of farmers during the policy period (Agricultural

Transformation Agenda) when compared to the past period is an indication of better earning and more disposable income for the farmers to take care of their needs. If this policy is sustained it is therefore, bound to improve the livelihoods of the farmers and therefore, help to lift them out of poverty. Therefore, the policy made a significant difference both in the use rate of fertilizer and on farmers' revenue.

Thus, the Nigeria government needs to start designing strategies to support the development of a vibrant and sustainable private fertilizer marketing sector, with the appropriate incentive mechanisms to reduce price which was the case in the 2010 – 2015 policy. As evidenced in other countries, there are different approaches for government to take to encourage fertilizer use while still promoting the private sector. It may well be that the government should allocate more resources for the provision of pure public goods such as agricultural research and extension services which may increase the demand for fertilizer and effectiveness of fertilizer use leading to increased yield and substantial revenue.

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