

Performance of the Growth Enhancement Support Scheme (G.E.S.S.) Among Food Crop Farmers in Anambra State, Nigeria

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Abstract

The Growth Enhancement Support Scheme was an innovative scheme which seeks to remove the difficulties usually associated with the distribution of fertilizer and improved seeds in the country. In the past, there were complaints of diversion, exorbitant cost and adulteration of various inputs, which ultimately led to low productivity, increased poverty, unemployment and lack of interest in farming. This work evaluated the performance of the scheme among food crop farmers in Anambra State, Nigeria by estimating and comparing annual incomes, establishing determinants of the farmers' annual incomes before and after joining the scheme and identifying constraints to implementation of the scheme. Primary data were collected using questionnaires which were administered to 200 respondents selected by multistage and random sampling methods. Data were analyzed using descriptive and inferential statistics. Findings indicated mean age of the farmers as 47 years and average farm size of 0.7 hectare. The farmers realized mean annual incomes of ₦433,974.87 and ₦717,796.48 before and after joining the scheme respectively. There was significant difference between mean annual incomes of the farmers before and after joining the scheme. Farm size and educational level significantly influenced the farmers' annual incomes both before and after joining the scheme. Constraints to implementation of the scheme arranged in descending order of seriousness were: stress farmers go through in redeeming agro-inputs, less quantity of agro-inputs supplied, late release of government funds, mobile phone and network failures and poor farmers' registration process. Farm visit and assessment during farmers registration process, establishment of fertilizer blending plants in the six geopolitical zones of the country and adoption of one-check approach by crediting the farmers' accounts with the value of subsidy will ensure improved performance and sustainability of the scheme.

Key Words: Performance; Determinants; Constraints; G.E.S.S; Anambra State, Nigeria

INTRODUCTION

The Agricultural Transformation Agenda (ATA) of the Federal Ministry of Agriculture and Rural Development (FMARD) introduced in 2012 was packaged to transform the agricultural sector of the Nigerian economy for employment generation, food security and poverty reduction. It was designed to be a private sector driven, agri-business based, development of commodity value chains to create wealth, attain industrialization and sustain livelihood in the country (FMARD, 2012).

The launching of this policy document was expected to be a roadmap in solving fundamental problems associated with the agricultural sector (Akinwumi, 2011).

The Growth Enhancement Support Scheme (GESS) is a component of the Agricultural Transformation Agenda (ATA) which seeks to tackle the inefficiencies in the distribution of key inputs, and making them more readily available and affordable. In this regard the private sector agro-input business enterprises

(agro-dealers) are assigned a critical role especially in the implementation of GESS which took off in 2012. They are involved in the procurement, distribution and delivery of inputs (fertilizers, improved seeds and agro-chemicals) to small-scale farmers. Under the scheme farmers are to benefit directly from an innovative electronic system of delivering subsidized inputs in which the subsidy payments are delivered directly to the beneficiaries through mobile phones.

Despite efforts of the Nigerian government to transform the agricultural sector, modern inputs (fertilizers, improved seeds and agro-chemicals) that are critical to the attainment of the desired productivity increases and output targets under the ongoing (ATA) are not available in the right quantity, quality and price. Although the agricultural sector has been recording positive growth rates in recent times, the input distribution system has been in a parlous state. The inputs at the disposal of an average farmer remain grossly inadequate and of low quality (Tiri, Ojoko and Aruwayo, 2014).

A major policy stance underpinning the implementation of the GESS was the withdrawal of the Federal government from the procurement and distribution of fertilizers and improved seeds in 2011. This was in a bid to decontaminate the input distribution system and promote effective service delivery. The objectives of the GESS scheme were to:

- i. remove the usual complexities associated with fertilizer distribution;
- ii. encourage critical actors in the fertilizer value chain to work together to improve productivity;
- iii. enhance farmers income and promote food security; and
- iv. shift the provision of subsidized fertilizer away from general public to genuine small-scale farmers.

The commercial banks, fertilizer importers and major distributors, seed companies and agro-dealers were the key private sector groups that were to be relied upon for the successful

implementation of the GESS. The banking sector was expected to finance the participation of the agro-dealers in the procurement and delivery of inputs to farmers under the GESS. The commercial banks were however, not forthcoming with the supply of the required loans during the first year of GESS implementation in 2012 (Tiri *et al.*, 2014). Many of the agro-dealers who could not obtain credit from other sources and who could not self-finance their investments failed to deliver the required inputs and many farmers did not use the modern inputs during the 2012 production season as expected (Tiri *et al.*, 2014).

Over the years, there have been attempts to develop agro-dealership, however, the level of organization and investment attained was far from being adequate for agro-dealers to cope with the large market they need to serve as far as distribution of inputs was concerned. The weaknesses in their financial capacity came to the limelight when many of them could not ordinarily provide the financial backing for their role in the distribution of inputs under the GESS (Tiri *et al.*, 2014). Nigeria spent about ₦1.3 trillion annually to import basic food including ₦635 billion on wheat, ₦356 billion on rice, ₦271 billion on sugar and ₦71 billion on fish (FMARD, 2013). These constitute a huge drain on the nation's income with its untold negative effect on the balance of trade. The GESS was therefore targeted to produce 20 million tonnes of food by 2015 (Akinwumi, 2011), which would help to reduce government spending on importation.

In year 2014 annual report of Anambra State on GESS scheme, a total of 232,205 farmers from the state were captured into the National Farmers Register. This provided the database for the 2014 GESS activities in the state. The generic GESS for fertilizer and seeds was rolled out in Anambra state on March 31st, 2014 and actual redemptions followed thereafter and wound up on June 6th, 2014 making a ten weeks window. A total of 148,010 farmers benefitted and redeemed 14,801 metric tonnes (296,020 bags) of fertilizers with subsidy equivalent of Eight Hundred and Fourteen million, Fifty Five Thousand naira only

(₦814, 055,000.00). Forty five agro-dealers provided fertilizers in fifty seven centers across the State.

The GESS was targeted at small scale farmers. It was ICT based and used an electronic platform to extend financial support to the registered small holder farmers through mobile phones. It was private sector driven and as such, fertilizers were procured and distributed by private agro-input dealers generally referred to as agro dealers. The agro dealers sold fertilizers to registered farmers less than the approved subsidy of Five Thousand Five Hundred naira only for two bags of fertilizer per registered farmers (Anambra State 2014 GESS Annual report). After reconciliation of records by GESS team, FMARD Abuja refunds the agro dealers the subsidy equivalents of their redemptions. National Agricultural Seeds Council (NASC) appointed seed companies to supply seeds to agro dealers for free distribution to registered farmers at the rate of 10kg and 12kg of maize and rice seeds respectively per farmer, as they redeem fertilizers. However, farmers paid a token of Two Hundred naira only for maize seeds and Two Hundred and Fifty naira only for rice seeds, as a kind of commitment fee. Agro dealers retain half of the money as handling charges and remit the other half to the seed company. Subsidy on fertilizers was shared by the Federal and State Governments in the ratio of 50:50 while that of seeds and agro chemicals was borne 100% by the Federal Government.

The agro-economy in Nigeria has huge potentials and fertilizer plays a significant role in harnessing this opportunity in crop production. Research has shown that farmers in Nigeria apply less than 20kg fertilizer nutrients per hectare compared to world average of 100kg. It is also established that farmers in Nigeria use less than 5% improved seeds (FEPSAN, 2012). For many years, agro inputs supply and distribution in Nigeria has been limited by ambiguity in government policy regarding production, liberalization, regulation and subsidy provision. Subsidy administration has been fraught with so

many inefficiencies with farmers claiming that the inputs do not get to them at required times and recommended rates or at all. Fertilizer procurement and distribution in particular has been fraught with fraud, discrepancies and inefficiencies. Governments at the Federal and State levels were spending a lot of money on farm inputs which were not reaching the intended beneficiaries (small holder farmers) and thus, had no significant impact on the national food output. Government has now realized that its intervention in the market with presumed subsidized inputs might have been limiting development of the private sector driven inputs distribution channels thus limiting the farmers' productivity, national food security and economic growth (FEPSAN, 2012).

To address this, the Federal Government decided from the 2012 farming season to opt out of direct procurement and distribution of inputs and instead instituted the Growth Enhancement Support Scheme (GESS), aimed at delivering subsidized farm inputs to farmers through an electronic wallet. Under the Scheme, an accredited farmer will receive agro inputs allocation through an e-wallet that hosts unique voucher numbers sent to his or her phone, and goes to an accredited agro dealer to redeem his inputs. It is expected that this should lead to improvements in agro inputs distribution and marketing by private sector; as well as consequent improvement in crop and agricultural productivity; and profitability for both the input suppliers/dealers and farmers. Based on this backdrop, the need to examine the performance of GESS scheme among crop farmer beneficiaries in Anambra State after three years of implementation becomes vital so as to enable policy decisions for sustainability of the fertilizer and improved seed value chain, hence this study conducted with the following specific objectives intended to:

- i. estimate the income of GESS food crop farmers before and after joining the scheme;
- ii. estimate the influence of socio-economic variables of the GESS food crop farmers

- on their annual incomes before and after joining the scheme; and
- iii. identify constraints to implementation of the GESS.

MATERIALS AND METHODS

The study was carried out in Anambra State of Nigeria. The state has 21 Local Government Areas (LGAs), 177 autonomous communities and four agricultural zones which are: Aguata, Anambra, Awka and Onitsha agricultural zones. The state is located in the humid tropical rain forest zone between latitude $6^{\circ}45'$ and $5^{\circ}44'N$ and longitude $6^{\circ}36'$ and $7^{\circ}29'E$. Anambra State has the following neighbouring states: Enugu, Imo, Delta and Kogi. It has an estimated population of 4,182,032 comprising of 50.9% men and 49.1% women (National Population Commission (NPC), 2006). It has a total land area of about 4,415.54 square kilometer with about 70% arable land area. The State has a mean temperature of $30^{\circ}C$ during the hottest period of February to April and $21^{\circ}C$ during the coldest period of December to January and two seasons of dry and rainy seasons. The average annual rainfall is between 2000mm and 2300mm and distributed between April and November with bimodal peaks in July and September while the dry season lasts from mid-November to March with an intermittent harmattan.

Agriculture is the major occupation of the rural economy in the state and activities include: crop farming, fishing, livestock and forestry and wild life. The State has 338,721 farm families with an average size of eight persons per farm family (Anambra State Economic Empowerment Strategy, SEEDS, 2006). Two major land forms are recognized which are low lands with Ph of 6.3 and uplands which are well drained and strongly acidic (FAO, 2007). The farmers practice mixed farming and grow food crops which include yam, cocoyam, cassava, maize, potato, rice and tree crops which include oil palm, pear, mango, cashew, citrus, banana and so on. Most of the farmers reside in the farm communities which have limited infrastructural and institutional developments in the study area while the GSM

services is wide-spread across the entire area mainly provided by MTN, Airtel, GLobacom and Etisalat companies. Farmers still make use of traditional tools such as hoe, cutlass, axe, and so on.

The food crop farmers in the 177 autonomous communities of the State formed the population of the study. Multistage and random sampling methods were used to select 200 respondents. The first stage of the selection process involved random selection of two agricultural zones – Aguata and Awka from the four agricultural zones in the State. In the second stage, five L.G.As were selected at random from the two selected agricultural zones to arrive at 10 L.G.As. Stage iii was the selection of four town communities from each of the 10 L.G.As earlier selected to arrive at 40 town communities. Finally, five food crop farmer beneficiaries were selected from each of the 40 selected town communities by random method to make up the 200 respondents.

Primary data were collected from the beneficiaries by means of questionnaires which were administered by personal interview using trained enumerators. The data were collected on socio-economic characteristics of the respondents such as: age, sex, education, marital status, farm size, farming experience, and household size; annual income of the food crop farmers before and after joining the GESS scheme; constraints to the new e-wallet system used in GESS; and suggested solutions to the problems.

Data collected from primary source (food crop farmers) were analyzed using descriptive and inferential statistics. Means, frequency counts and percentages were used to describe the socio-economic characteristics of the respondents, annual incomes before and after joining the scheme, and constraints to the scheme while the influence of respondents' socio-economic variables on their incomes before and after joining the GESS scheme was determined by means of Ordinary Least Squares (OLS) multiple regression analysis.

The multiple regression model is implicitly specified as:

$$FIC = f(AGE, GEN, MAR, EDU, FSZ, FXP, HHS, e_i)$$

Where:

FIC = Farmer's annual income before/after joining the scheme (₦)

AGE = Age of farmer (years)

GEN = Gender of respondent (dummy: male = 1; female = 2)

MAR = Marital status of respondent (dummy: married = 1; single = 2)

EDU = Educational level (years)

FSZ = Farm size (hectare)

FXP = Farming experience (years)

HHS = Household size (number in the household)

e_i = Error term

Four functional forms (linear, exponential, semi-log, and double-log) of the regression model were tried with the data. Outputs of the forms with the best result in terms of econometric *a priori* criteria were chosen as the lead equations for before and after joining the GESS. The explicit forms of the model are stated as:

- i. Linear: $FIC_i = \beta_0 + \beta_1AGE + \beta_2GEN + \beta_3MAR + \beta_4EDU + \beta_5FSZ + \beta_6FXP + \beta_7HHS + e_i$
- ii. Exponential: $LnFIC_i = \beta_0 + \beta_1AGE + \beta_2GEN + \beta_3MAR + \beta_4EDU + \beta_5FSZ + \beta_6FXP + \beta_7HHS + e_i$
- iii. Semi-log: $FIC_i = \beta_0 + \beta_1LnAGE + \beta_2LnGEN + \beta_3LnMAR + \beta_4LnEDU + \beta_5LnFSZ + \beta_6LnFXP + \beta_7LnHHS + e_i$
- iv. Double-log: $LnFIC_i = \beta_0 + \beta_1LnAGE + \beta_2LnGEN + \beta_3LnMAR + \beta_4LnEDU + \beta_5LnFSZ + \beta_6LnFXP + \beta_7LnHHS + e_i$

Where:

β_0 = Constant/ Intercept.

β_1 to β_8 = Parameters to be determined.

Difference in mean annual incomes of the farmers before and after joining GESSThe study used Paired Samples T-test to test the

hypothesis which stated that there is no significant difference between mean annual incomes realized by GESS food crop farmers before and after joining the scheme in Anambra State. The output as shown in Table 3 indicated the existence of significant difference between the mean annual farm incomes of GESS food crop farmers before and after joining the scheme. The t-statistic value of 11.26 is significance at 1% level. This result led to the rejection of the null hypothesis that the mean incomes realized by the farmers before and after joining GESS are not statistically and significantly different. The alternative hypothesis was then accepted which implies that the scheme significantly improved farmers' income in the State.

Estimated influence of socio-economic characteristics of the farmers on their annual farm incomes before and after joining GESS

The study used multiple regression analysis to establish the influence of socio-economic characteristics of the farmers on their annual incomes before and after joining the scheme. Four functional forms (Linear, exponential, semi-log and double-log) of the regression model were fitted with the data and tried using the MINITAB statistical software. Results of the analyses are shown in Tables 4 and 5. The result from Linear and Double-log forms gave the best results in terms of number, sizes and signs of significant parameter estimates as well as R^2 , R^2 (adjusted), F-statistic and Durbin-Watson statistic for the two periods (before and after joining the GESS) respectively and were taken as the lead equations:

- i. $FIC_b = 267255 - 933AGE + 13202GEN - 19739MAR + 2934EDU + 226143FSZ + 1466EXP - 5887HHS$
- ii. $FIC_a = 5.61 + 0.173AGE + 0.0303GEN + 0.030MAR + 0.140EDU + 0.619FSZ - 0.081EXP - 0.0067HHS$

A total of seven regressors were included in the model and two of them, farm size (FSZ) and educational level (EDU) were statistically

significant. The remaining five, age (AGE), gender (GEN), marital status (MAR), farming experience (EXP) and household size (HHS) were not significant. Farm size was significant at 1% level of probability both before and after the farmers joined the GESS. This result implies that the more farm land used, the more the income realized. This agrees with Kern and Paulson (2011) that stated that profit varies with farm size as larger farms may be able to more efficiently use larger resources or obtain discounts by buying larger volumes of inputs resulting in lower capital and or variable inputs costs per acre.

Educational level was also significant at 5% and 1% levels of probability before and after the farmers joined the GESS respectively. This implies that farmers with more years of formal education are likely to increase their annual farm income by utilizing more efficiently all the improved seeds and fertilizers and also understand better the functioning of e-wallet system of GESS implementation. Also, the better the educational level of a farmer, the more access to vital information for better farming. Improved farming technologies such as high yielding crop varieties, chemical fertilizers, and irrigation techniques have been central in raising yields, however, farmers have been much slower in adopting these new methods because of lack of information regarding how to apply the improved inputs. Access to reliable information is an integral part in any farmer's ability to raise productivity (Okechukwu, (2014).

The R^2 values of 83.1% and 66.9% before and after joining the GESS respectively implied that 83.1% and 66.9% of the variations in the farmers' annual income levels were explained by variations in the explanatory variables. The F- statistic values of 134.47 and 55.6 before and after the GESS respectively were significant at 1% level, and imply goodness of fit of the model. The result led to the rejection of the null hypothesis which states that socio-economic variables of GESS food crop farmers have no statistical and significant effects on their annual incomes and the acceptance of the alternative

hypothesis which is that socio-economic characteristics of GESS food crop farmers have statistical and significant effects on their annual incomes before and after the scheme.

Constraints associated with GESS implementation

The challenges associated with the implementation of GESS were: stress farmers go through in redeeming agro-inputs, less quantity of agro-inputs supplied, late release of governments funds for GESS, mobile phone and network failures, poor farmers registration process, poor quality of agro-inputs supplied, inadequate facilitators and cellulators, late supply of agro-inputs, transportation costs incurred by farmers and sharp practices by agro-dealers. Data on the constraints were analyzed by calculating their mean scores and ranking them to determine their severity as shown in Table 6. The critical mean of 2.0 was obtained and the constraints that scored above 2.0 in the table were considered severe ones. These findings partly agree with Fadairo, *et al.* (2015) that identified similar constraints to be associated with GESS implementation. Institutional, political, managerial, economic and social issues, in addition to resistance of bureaucrats to change, over dependence on foreign institutions and models, relegation of findings of Research Institutes and Universities, high interest on agricultural loans, and farmers' low technical capacity were severe constraints facing GESS as identified by Osinowo (2012).

CONCLUSION AND RECOMMENDATIONS

The introduction of GESS in 2012 enhanced farmers' annual income which was one of the main objectives of the scheme. The estimated farmers' income level significantly increased as a result of joining the scheme. High literacy level attained by the crop farmers and gender sensitiveness of the implementators contributed to success of the scheme.

Government should direct policy towards

addressing challenges to better implementation of the scheme identified by the study for more comprehensive planning of similar schemes and sustainable growth in the sector. The mitigation measures should include

- i. Farmers' registration process should include farmers' farm visit and assessment to ensure that real farmers are registered and financed.
- ii. The Federal government should plan towards the establishment of fertilizer blending plants in the six geopolitical zones of the country so as to make the input readily available and affordable.
- iii. Government should adopt a one-check approach by crediting the

farmers' accounts with the value of subsidy so that they can go straight to agro- dealers and buy the inputs as too many processes and levels of confirmations create stress to farmers.

- iv. The Federal Government should show more commitment by paying the farmers promptly, as much delays in settling subsidy values was also a challenge the scheme faced.
- v. The Facilitators and State Coordinators should be encouraged by the State Government through necessary logistics and finances to enable them reach out to farmers' in distant communities

Table 1. Estimated annual income of the farmers before joining GESS

Food crop	Income (₦)	Percentage (%)	Mean
Cassava	34,026,234.00	39.40	
Yam	22,920,209.40	26.54	
Rice	21,365,711.40	24.74	
Maize	2,564,921.70	2.97	
Vegetables	2,219,477.70	2.57	
Plantain	1,865,397.60	2.16	
Cocoyam	1,485,409.20	1.72	
Total	86,361,000.00	100	433,974.87

Source: Computed from survey data, 2016.

Table 2. Estimated annual income of the farmers after joining GESS

Food crop	Income (₦)	Percentage (%)	Mean
Cassava	57,365,146.40	40.16	
Rice	35,996,058.00	25.20	
Yam	34,396,233.20	24.08	
Maize	5,042,304.95	3.53	
Vegetables	3,742,447.30	2.62	
Plantain	3,513,900.90	2.46	
Cocoyam	2,785,409.25	1.95	
Total	142,841,500.00	100	717,796.48

Source: Computed from survey data, 2016.

Table 3. Estimated difference in mean annual incomes of the farmers before and after joining the GESS

Variable	Mean	Difference between Means	StDev	T	P
MAI _b	433,974.87				
MAI _a	717,796.48	283,821.61	4672	11.26*	0.000

Source: Computed from survey data, 2016. MAI_b = Mean Annual Income before joining GESS; MAI_a = Mean Annual Income after joining GESS. *= Significant at 1% level. T = t-statistic value. P = Probability. StDev = Standard Deviation.

Table 4. Determinants of the respondents' annual farm income before joining the GESS

Predictor	Linear	Exponential	Semi-log	Double-log
Constant	267255 (4.21)	5.57833 (91.26)	148267 (0.56)	5.5904 (28.19)
AGE	-933 (-0.61)	-0.002434 (-1.64)	238712 (1.10)	0.0316 (0.20)
GEN	13202 (1.31)	0.009807 (1.01)	17364 (0.37)	0.02257 (0.64)
MAR	-19739 (-0.81)	-0.03520 (-1.51)	-100399 (-0.59)	-0.1215 (-0.96)
EDU	2934 (1.89)**	0.001176 (0.79)	182668 (4.09)*	0.12321 (3.70)*
FSZ	226143 (29.19)*	0.163428 (21.93)*	504581 (18.26)*	0.39611 (19.25)*
EXP	1466 (0.89)	0.002675 (1.69)***	-118321 (-1.23)	-0.02894 (-0.40)
HHS	-5887 (-1.43)	-0.005761 (-1.46)	-41627 (-0.64)	-0.04346 (-0.90)
R ²	83.1%	73.6%	66.3%	68.4%
R ² (adj)	82.5%	72.6%	65.1%	67.2%
F-stat	134.47	75.89	53.72	58.93
D-W stat	1.57	1.48	1.67	1.54

Source: Computed from survey data, 2016. Notes: F-stat = F-statistic. D-W stat = Durbin-Watson statistic.

Figures in () are T-statistic values * = Significant at 1%. ** = Significant at 5%. *** = Significant at 10%.

Table 5. Determinants of the respondents' annual farm income after joining the GESS

Predictor	Linear	Exponential	Semi-log	Double-log
Constant	90918 (0.46)	5.6591 (53.43)	-280568 (-0.37)	5.6059 (17.68)
AGE	-2753 (-0.58)	-0.003350 (-1.30)	801128 (1.28)	0.1735 (0.67)
GEN	38517 (1.24)	0.01198 (0.71)	57865 (0.43)	0.03030 (0.54)
MAR	59363 (0.80)	-0.00007 (-0.00)	170906 (0.35)	0.0300 (0.15)
EDU	4002 (0.84)	-0.000502 (-0.19)	419844 (3.28)*	0.14033 (2.64)*
FSZ	621630 (26.04)*	0.24760 (19.17)*	1396652 (17.63)*	0.61851 (18.79)*
EXP	5099 (1.01)	0.004067 (1.48)	-351263 (-1.27)	-0.0811 (-0.71)
HHS	-4356 (-0.34)	-0.001822 (-0.27)	-6437 (-0.03)	-0.00667 (-0.09)
R ²	79.3%	67.5%	64.3%	66.9%
R ² (adj)	78.6%	66.3%	63.0%	65.6%
F-stat	104.82	56.67	49.10	55.06
D-W stat	1.45	1.56	1.67	1.78

Source: Computed from survey data, 2016. Notes: F-stat = F-statistic. D-W stat = Durbin-Watson statistic.

Figures in () are T-statistic values * = Significant at 1%. ** = Significant at 5%. *** = Significant at 10%.

Table 6. Constraints associated with GESS implementation

Constraints	Mean score	Rank
Stress farmers go through in redeeming agro-inputs	2.81	1
Less quantity of agro inputs	2.56	2
Late release of government funds	2.36	3
Mobile phone and network failures	2.27	4
Poor farmers registration process	2.14	5
Unsuitable and poor quality agro inputs supplied	1.93	6
Inadequate facilitators and cellulators	1.90	7
Late supply of agro-inputs	1.87	8
High transportation cost incurred by farmers	1.75	9
Sharp practices by agro dealers	1.65	10

Source: Computed from survey data, 2016.

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