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THE ROLES OF FARM INPUTS SUBSIDIES ON INSPIRING FARMERS TO PRODUCE MORE CROPS IN NORTHWEST, NIGERIA

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Abstract

Northwest Geopolitical zone in Nigeria is a well-known zone with a large population, and a predominantly agricultural region as it plays a crucial role in Nigeria's food production, such as maize, millet, beans, groundnut, and soya beans among others. Government in the zone, at all levels, provides various kinds of farm input subsidies. However, the zone is facing severe hunger and malnutrition. The country is unable to provide itself with the much-needed food to be self-sufficient. This study examines the effect of farm input subsidies on inspiring farmers to produce more crops in northwest of Nigeria. The sample size of 440 was employed this study. Ordered Logit regression model was used in the analysis. Although, the results indicate that farm inputs subsidies have significant effect on providing more crops in Nigeria. However, the same result indicates insignificant impact on inspiring farmers to produce more crops. The little additional gain from these subsidies were channeled to social and other expenses, without reinvesting to farming activities. The study recommends redesigning policies and implementation that can increase amount or quantity of farm subsidies to the farmers. A clear criterion for farm inputs allocation formula shall be provided. Moreover, a policy which will improve food farming to be more profitable and attractive to youths should be implemented.

Keywords: Agriculture, farmer, food, subsidies

JEL Classification: Q11, Q12, Q13

1. Introduction

Subsidies are in different forms and are common in all sectors used by countries at all stages of development. Usually, governments around the globe provide subsidies to combat the positive externalities of innovation caused by market failure, thereby promoting enterprises' innovation skills (Xinle, Zhen, & Xinting, 2022). Agricultural input subsidy is not only subscribed in developing countries alone, but developed countries like the USA, China, and Russia among others are adopting various kinds of subsidies to farmers aiming at improving food production, increase farmers' incomes and minimization of negative externalities of agricultural production (Liang et al., 2019). For instance, in 2012, agricultural subsidies accounted almost US$160 billion and US$17 for China and U.S.A. respectively (S. W. Wang, Manjur, Kim, & Lee, 2019). Besides, the subsidy policy of the European Union's agricultural sector improves agricultural productivity in low- and middle-income member countries. It is a social protection, which plays a vital role in farmers making optimal decisions. (I. K Vozárová, Kotulič, & Vavrek, 2020).

African continent Nigeria included has been on the top lists on providing farm inputs subsidies among other continents in the world precisely during 70s and 80s due to the low adoption of technology in farming activities (Mason & Ricker-gilbert, 2014). Although, with the World Bank suggestions to SSA on the removal input subsidies and allowed market-based mechanisms, for more efficient which gave birth to the Structural Adjustment Program (SAP) in 80s and 90s. However, from early 2000s, the world is witnessing large-scale besieged technological input subsidies reintroduction with aims to make farm inputs available at the right time and below market price to farmers, encourage adoption of inputs, increased profit and profitability which can stimulate economic

growth and poverty reductions (Liverpool-Tasie, L. S., Takeshima, 2013).

The major reason for this reintroduction of farm inputs subsidies was due to low adoption of farm inputs technologies, low domestic food production as only half of land is utilized, population increment, income growing, urbanization patterns, as well as changes in family working structures have made the demand for food stuff increasing substantially from various majority of populace in Nigeria. Nigeria government executed a large-scale input subsidy in the year 2012 in named of the Growth Enhancement Support Scheme (GESS) program with aims of boosting food security by making fertilizer and improved seed more accessible and affordable to smallholders. The programme provided 50% subsidy on two 50-kg bags of fertilizer (NPK and Urea) and 90% subsidy on a 50-kg bag of improved seeds (typically maize and rice seeds) through e-vouchers which was receive via mobile phone given to farmers for easy communication to them (Wossen et al., 2017). Nigeria usually spent not less than $ 2.8 million (N1bn) on rice consumption annually as food subsidy as the country can only capable to supply 49% of domestic demand (Udemezue, 2018). Currently, over 200, 000 rice farmers have benefitted from loan at zero interest from Anchor programme under federal government (Leadership, 2019). Regrettably, the adoption of Nigeria's fertilizer proved to be very low which is against the recommended quantity to be used (Adeoye, 2006), the rate of certified or quality seeds used by smallholder farmers in the country is characterised as low as only 10% of rice planted area use certified seed (USAID, 2016), and only 8% of cultivated areas are using tractor (Takeshima, Edeh, Lawal, & Isiaka, 2014). The country is still counted among the countries with a poor application of fertilizer, chemical seeds and usage of tractors. In fact, the country is unable to provide itself with the much-needed food to be self-sufficient, especially in cereals, as yields are equally low and declining despite farmland expansion, which poses a food insecurity challenge for a growing population such as Nigeria (Chiaka, Zhen, Yunfeng, Xiao, & Muhirwa, 2022).

Northwest geopolitical zone of Nigeria, encompassing Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, and Zamfara states. This zone is a significant and predominantly agricultural region as it plays a crucial role in Nigeria's food production such as maize, millet, beans, groundnut and soya beans among others. In this zone, farmers, particularly those involved in wheat production, have been key beneficiaries of farm subsidy programs. The Ministry of Agriculture and Food Security has launched initiatives like the National Agricultural Growth Agro-Pocket (NAGS-AP) to provide subsidized inputs, aiming to boost productivity and yields. However, the Northwest geopolitical zone is facing a severe hunger crisis, with millions of people experiencing food insecurity and malnutrition. This is worsened by factors like conflict, economic hardship, climate change, and soaring food prices (VOA, 2024).

The roles of subsidies in addressing economic and health emergencies has been faced with extreme criticisms from policymakers as the criticism of the efficacy of government funding in subsidies reveals the problems policymakers face when having to design subsidy funding schemes (Murschetz, 2022). Equally, the stand of the I.M.F World Bank against developing countries in allocating huge amounts of capital and labelled the subsidy concept as analytically and politically jumpy (IMF, OECD, WORLDBANK, & WTO, 2022). It is on this background, this paper attempt to examine the roles these subsidies play on inspiring farmers to produce more crops.

2. Literature Review

There are various existing literature that mainly discusses the impact of government subsidies on agriculture and other economic sectors (Asfaw, Cattaneo, Pallante, & Palma, 2017; Datti, 2024; Kari, 2018; Kinuthia, 2020; Lin & Kuang, 2020; Wu, Wang, & Miao, 2019). The study of Vozárová & Kotuliˇ, (2025) examines the impact of subsidies on the competitiveness of farms in Slovakia in a broader context. The data were provided by the Ministry of Agriculture and Rural Development of the Slovak

Republic (MPRV SR) in the form of anonymized data sheets. Also, the Porter's generic strategy of cost minimization, known as cost leadership was employed. The results indicate that subsidies contribute to increasing the competitiveness of agricultural enterprises by allowing farms to better cover their costs, which can have a positive impact on their ability to competitiveness. The study conclude that EU subsidies have a significant impact on the competitiveness of agricultural enterprises in Slovakia. Also, (Mahmood, Arshad, Mehmood, Faisal Shahzad, & Kächele, 2021). Also, YISA, Muhammad, Tsado, Ajayi, & Shuaibu, (2024) assessed the effect of input subsidies on rice farmers under value chain development programme in Benue and Niger States, Nigeria. A multi-stage sampling technique was used to select 146 and 185 registered youth rice farmers, and data collected through a semi-structured questionnaire were analyzed using Ordered Logit regression model. The result concludes that increase in machine hiring service, access to rice production technologies and access to training on rice farming were the major input subsidies benefited among the youth rice farmers in Niger State. Zhou and Yuen, (2020) investigates how a government could set the optimal subsidy level to maximize the sales quantity of remanufactured products with a limited budget. The findings indicate that subsidy increases in end-user electricity prices caused by green certificates could also hamper employment in various parts of the economy. Li et al., (2023) investigate the hub location problem considering intermodal transportation and government subsidies. The study establishes a two-stage MIP model and proposes ILAGS, which combines a population-based algorithm with contest theory, to solve this problem. The results indicate that the total cost is lower under high-intensity construction subsidies. Also, rail subsidies are positively correlated with construction subsidies but are not necessarily related to the choice of hubs. Yu et al., (2020) analysed development supply chains in which transactions are commercial but subsidies are needed for affordability. They explored different supply chain structures, with product substitution and retail competition in Haiti of subsidized solar lantern supply chains. Results indicate that the donor can subsidize any echelon as long as the total subsidy per unit is maintained at the optimal level.

Moreover, Wang and Sawur (2022) Studied the correlations between the government subsidies, innovation input, and innovation output of the New Generation of Information Technology Companies (NGITCs). They employed the panel data on the Chinese A-Stock Market (Shanghai and Shenzhen Stock Markets) from 2011 to 2020. The results indicate that government subsidies positively promote the innovation output of the NGITCs and have a two-year effect. Chen et al., (2021) used game-theoretical models to investigate the impact of this new subsidy approach on policy design within the photovoltaic (PV) industry. The study findings indicate that the government should implement a balanced subsidy program and encourage subsidies on the improvement of market out and social welfare. Vozárová et al., (2020) evaluate the effect of EU agricultural subsidies in Slovakia. The data for the analysis were obtained from the ministry of agriculture and rural development of the Slovak Republic. The logical methods, financial analysis, and multi criteria TOPSIS were used in the analysis. From the findings, there is no statistically significant linear correlation between farms' performance results and the volume of subsidies per hectare of agricultural land for each legal form throughout the reporting period.

Wang et al., (2019) examined the socio-economic impacts of agricultural subsidy programs of farmers including co-payments in Bhutan, Korea. The study used a semi-structured questionnaire and interview. Data was collected in collaboration with policymakers, extension agents in January -February 2017 from six blocks representing two districts. 125 (61females and 64males). The sample size of household heads was selected through a two-step random sampling method. A logit regression was used in the analysis. From the result, the agricultural subsidy program does not converge very well. The aims of the subsidy were defeated. The majority of the beneficiaries were not the main targeted people.

From existing previous studies, only a few explore the impact of farm input subsidies on inspiring farmers to produce more crops if they exist. Thus, there is a need to conduct such kind of a study.

3. Materials and Methods

This study administered questionnaire to 500 farmers who benefitted farm input subsidies from government in any form through a multi-stage sampling technique. These include subsidies on fertilizer, chemical seeds and credit from financial institution. It has been found that only 440 questionnaires were returned which serves as sample size of this study. In the analysis area Ordered Logit regression model was used in the analysis. The first stage involved purposive sampling where only farmers were selected. The second stage is the selection only farmers who benefited of these kinds of farm inputs subsidies from the study areas. The third stage involved the selection of farmers from each Northwest Geopolitical zone, purposively selected based on their comparative advantage. The fourth stage involved random selection from each state.

4. Results and Discussions

Both descriptive and regression results were presented in this section. Table 1 indicates the descriptive nature of the respondents. It indicates 37 years old is an average age of farmers. 27% are youths and 61% farmers who age range 36-60. There numbers are connected to a productive stage. Only 12% are above 60 years old. Level of education indicates that majority of farmers can read and write as only 6% were found unschooling. This indicates the level of educational enrolment and improvement in the study area. The experience of farming also indicates that about 42% have farming experience of more than 10 years. Farming has become a primary occupation of many respondents as it indicates about 69% farmers take farming as their primary source while 31% take it as secondary. The size of farm is small in the study area as stated by many studies in the developing countries. 55% farm size is less than 2.1 hectares. The ownership of the land is majority self/family ownership, and majority of the annual respondents are low-income earners. The respondents indicate benefitted from one farm inputs subsidy to another. Although many farmers have access to fertilizer but at a low quantity, most of them could not either access the required amount or could not afford to buy even at the subsidized price, and the remaining who do not access fertilizer subsidy usually purchase it at market prices or used other local subsistence, such as manure. Also, respondents who have access to subsidized certified seeds usually obtained it at an insufficient quantity. In fact, access to subsidized fertilizer is higher compare to other packages. 85% access fertilizer, 54% access chemical seeds and 60% access loan from financial institution. The allocation of both subsidized fertilizer and subsidized certified seeds to farmers was usually four bags per hectare. Although it depends on the season, sometimes the allocations increase to more than four bags each.

Table 1: Socio-Demographic Profile of Farmers Accessing Subsidized Farm Inputs

Variable	Frequency	%
Age distribution	37*	
18-35	122	27
36-60	267	61
61 and above	51	12
Gender		
Male	337	77
Female	103	23
Marital status		
Married	341	78
Single	99	12
Family size (number)	08*	
1-10	224	51
11-20	152	35
21 and above	64	14
Level of formal education		
Unschooling	26	6.0
Madrasa	42	10
Primary school	118	27
Secondary school	123	28.00
Sub degree	89	20.00
Graduate	42	10
Farming experience (Years)	11*	
1-10	117	27
10-11	183	42
11-20	101	23
21 above	39	09
Primary occupation		
Farming	305	69
Non -farming	135	31
Farm size (hectares)		
0.1-2.0	241	55
2.1-4.0	130	30
4.1 and above	69	15
Farm ownership		
Self/family	312	71
Hired	128	29
Annual income (naira)		
Low income	272	62
Middle income	108	25
High income	60	13
***Subsidized* fertilizer used (kg)**		
Access	375	85
Not access	65	15
Subsidized certified seeds (kg)		
Access	238	54
Not access	202	46
Access to subsidized Credit (naira)		

Access	264	60
Not access	176	40

Table 2 indicates that 74% believe farm inputs subsidies provide additional income to them, and 48% believed that subsidized farm inputs lead to the addition and harvesting of more crops, yet, 66% believed that even if there are no government subsidies they can still engage into farming as 54% of the respondents indicate that providing subsidized farm inputs may not encourage them to cultivate more land. 52% spent any extra gain from their farming on wedding ceremonies and other social activities

Table 2: Farm Inputs Subsidies on Farming Expansion

	Yes %	**No** %
Providing subsidized farm inputs encourages me to cultivate more land	46	54
Subsidized farm inputs lead to the addition and harvesting of more crops	42	48
Accessing subsidized farm inputs may inspire other people to venture into farming	42	58
I cannot engage in farming without government farm inputs subsidies?	34	66
Farm inputs subsidies provide additional income to me	74	26
With farm inputs subsidies on No, I usually cultivate my farm as it is annually	69	31
I spent any extra gain from my farming on wedding ceremonies and other social activities	52	48

4.1 Regression Results

Table 3: Regression Results

Variable	**Model 1**		**Model 2**		**Model 3**	
Demography		**ME**		**ME**		**ME**
Age	0.225	-0.909	0.267	-0.842	0.266	-0.869
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Level of Education	1.008	2.961	2.925	1.033	0.421	0.342
	(0.004)	(0.004)	(0.005)	(0.005)	(0.079)	(0.065)
Family Size	0.587		0.571	1.803	0.561	
	(0.004)		(0.005)	(0.005)	(0.005)	
Farm factors						
Farm size	1.806	5.825	1.732	0.2.116	0.737	3.629
	(0.001)	(0.002)	(0.000)	(0.000)	(0.002)	(0.002)
					10.124	12.327
Farming experience (years)	0.37	0.421	0.945	3.710	(0.088)	(0.088)
	(0.136)	(0.336)	(0.000)	(0.000)	5.93	-0.735
					(0.926)	(0.926)
Farmers' association	4.932	3.266	1.827	11.216	4.227	3.161
	(0.095)	(0.095)	(0.000)	(0.001)	(0.100)	(0.001)
Subsidized farm inputs						
Subsidized fertilizer					0.737	0.629
					(0.002)	(0.002)
Subsidized certified seeds					10.124	0.327
					(0.088)	(0.088)

Subsidized credit				5.93 (0.926)	0.735 (0.926)
Pseudo R^2	0.875	0.870	0.873		
Probability>F	0.000	0.000	0.000		

The result was presented in the Table 3. The results were tested for multicollinearity and established the estimation accuracy of the result since the VIF results were found to be below 5 values (Daoud, 2018; Kim, 2019). The first column under the observation of the samples indicates the coefficient value, the astray values refer to the P-value and the figure inside the bracket indicates the standard error coefficient. The next column indicates the marginal effect (ME). This column indicates the change that may occur in accessing a subsidy due to the change in independent variables. The results were estimated in 4 different models. Model 1 estimated demographic profile, model 2 estimated farm factors, model 3 estimated subsidized farm inputs and model 4 estimated farming expansion. However, due to insignificance of subsidized farm inputs on farming expansion in model 4 estimation, the result was not reported together with other variables that are insignificant in other models. This insignificance in this model 4 was attributed to small quantities of subsidized fertilizer, chemical seeds and credit. This leads any additional gain from these farm subsidies to be channeled to social and other expenses, without reinvesting to farming activities.

In models 1, 2, and 3 age and level of education appeared in the models. For instance, in a model 1, a percentage increase of farmer's age above productive (>60 years) may likely decrease access to subsidy by 9%. This is attributed to protocol in accessing farm inputs subsidies by attending farmer's association meetings, elders meeting and visitation of politicians among others. Level of education plays a great role in accessing farm input subsides. A percentage additional level of education of farmer may likely increase access to subsidized farm input by 2%. This is connected to ability to read and understand the instructions on accessing farm inputs subsidies, and fill a requested form appropriately precisely access to credit from financial institutions. Also, in farm factors profile, farm size, farming experience and farmers' association indicate their significance effect in all the regressed models. In model 2, a percentage increase in farm size may likely leads to access subsided farm inputs by 2%. This is attributed to quantity of fertilizer, chemical seeds and bank's loan subsidies depend on the farm size. So also, both farming experience and farmers' association. In model 3, a percentage change in accessing subsidized fertilizer, chemical seeds and credit may likely affect accessing to subsidized farm inputs by 6%, 3% and 7% respectively. This is connected to these items are the major subsidized farm inputs provided by the government.

5. Conclusion and Recommendations

Inadequate domestic food crops farming, low adoption of farm inputs technologies despite population increment, have led African and Nigerian governments to reintroduce farm inputs subsidies to enhance food production and self-sufficiency. Even though, Nigerian government usually, at all levels, provides several incentives yearly. However, the interest of farmers to produce more food to meet both local and international demands remains below expectations. This study found the importance of farm input subsidies on food farming. Nevertheless, the study found that providing farm input subsidies to farmers does not expand their farming. The study recommends redesigning policies and implementation that can increase amount or quantity of farm subsidies to the farmers. A clear criteria of allocation formula shall be provided. Moreover, a policy which will improve food farming to be more profitable and attractive to youths precisely the educated should be implemented. Also, the government at all levels should address the problems of the difficulties faced by farmers in accessing credit from financial institutions.

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