



Modelling the Impact of Agriculture on the Development and Growth of Nigerian Economy

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Abstract:

This paper investigates the effect of various agricultural sectors on the economic development and growth in Nigeria from 1981 to 2024. Secondary data collected from the statistical bulletin of the Central Bank of Nigeria were used, and multiple regression technique was employed to analyse the data. The variables under consideration were crop production, forestry production, livestock production and fish production as the explanatory variables, whereas real gross domestic product as the response variable. The results showed that forestry production, crop production and fishing production have significant impacts on Nigerian economic growth, while livestock production does not. Similarly, the results indicated a positive correlation between gross domestic product and each of the independent variables. This implies that as livestock production, crop production, fish production and forestry production increase, gross domestic product increases. Also, the results revealed that 99% of the variation in GDP can be explained by agricultural variables. These findings underscore the vital role agriculture plays in driving Nigeria's economic development. Therefore, the study recommends that the Nigerian government and her citizenry should combine efforts toward increasing the agricultural production capacities with the aim of advancing economic development, growth and food security among others.

Keywords: Economic development, Agricultural production, Gross Domestic Product, Multiple regression, food security

Introduction

In the recent past, agriculture was a key segment in the Nigerian economy, and remains the foundation regardless of the oil boom. It accounted for 35% of the total employment in 2020 (World Bank 2020). It provides livelihood for swarming population and provides jobs opportunities for millions of Nigerian. Nigeria depends on the agricultural product for export and earn most of her national revenue for it (Aminu & Anono 2019). The agriculture is made up of four sub-sectors and they are crop, livestock, forestry and fishing/aquaculture.

The economic history shows that agricultural development is a requirement for economic growth, particularly in developing nations (Woolf and Jones 2013). In Nigeria, according to Ukeji (2003), about 64% of the overall gross domestic product (GDP) came from agriculture in the 1960's then gradually dropped in the 70's to about 48%. It continually deteriorated to 20% and 19% in 1980 and 1985 respectively, as a result of oil superfluity of the 80's. Agriculture is the bedrock of the Nigerian economy, providing a source of livelihood and employment opportunities for the citizens. More than 50% of her

GDP at independence in 1960 was attributed to agriculture (Olagunju, 2008). Nevertheless, its

position in the economic development has reduced over the years as a result of the influence crude oil on the economy.

As the demand for food increases in Nigeria and the nation has abundant natural resources and potentials to increase the volume of agricultural production to meet the nutritional and food requirements, and this will guarantee food security in the country. Thus, agriculture is a major source of national wealth. Economists concentrate on better ways to make agriculture contribute more to overall economic growth and modernization. According to Lewis theory of development as reported by Todaro and Smith (2003), the underdeveloped economy comprised of two sectors. These sectors are the traditional agriculture part described by zero peripheral labour productivity and the modern industrial part. Rostow (1960) argued that there are five distinct stages to the process of economic development, namely: Traditional, the precondition

for take-off, the take-off, Drive to maturity and the high mass consumption. From history, agriculture plays key role in the first three stages mentioned (Rostow, 1960). Agriculture can serve as the foundation for economic development and growth for nations at developmental take off stage. Stewart (2000) stated that agricultural activities take place mainly in underdeveloped regions where poverty reduction, rural transformation, socio-economic development and wealth distribution are needed. Agriculture is the backbone of the economy, without it a nation will rely on foreign nations to feed her citizens.

Generally, the fundament cause of economy crisis in Nigerian largely depends on the Government negligence of agriculture and relying completely on oil (Abogan et al., 2016). Therefore, the goal of this work is to examine the impact of different aspect agriculture on Nigerian economy having in mind the importance of the sector to life sustenance and economic development and growth.

Materials and Methods

For the purpose of investigating the effect of agriculture on Nigeria economy, four independent variables were considered. They are Crop, Livestock, Forestry and Fish Production. Whereas Real Gross Domestic Product is the dependent variable, served as

a measure economic development and growth. The data used in the study were obtained from 2024 statistical bulletin of Central Bank of Nigeria. It covers 44 years, spanning from 1981 to 2024. The reason for this period is to factually test the significance of agricultural on economic growth of Nigeria. A multiple regression model was used to predict the association between economic growth and one or more agricultural sectors. The model formulation can be presented as follows:

Model:

$$Y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu_t$$

Thus,

$$GDP = \beta_0 + \beta_1 CP + \beta_2 LP + \beta_3 FP + \beta_4 FSP + \mu_t$$

Where:

RGDP = Real Gross Domestic Product

CP = Crop Production

LP = Livestock Production

FP = Forestry Production

FSP = Fish Production

μ = Error term

and $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ are the regression coefficients

Test:

Null hypothesis $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4$

Alternative $H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4$

At 5% level of significant.

Results and Discussion

Table 1

Correlation Analysis of Real Gross Domestic Product and Agriculture Product

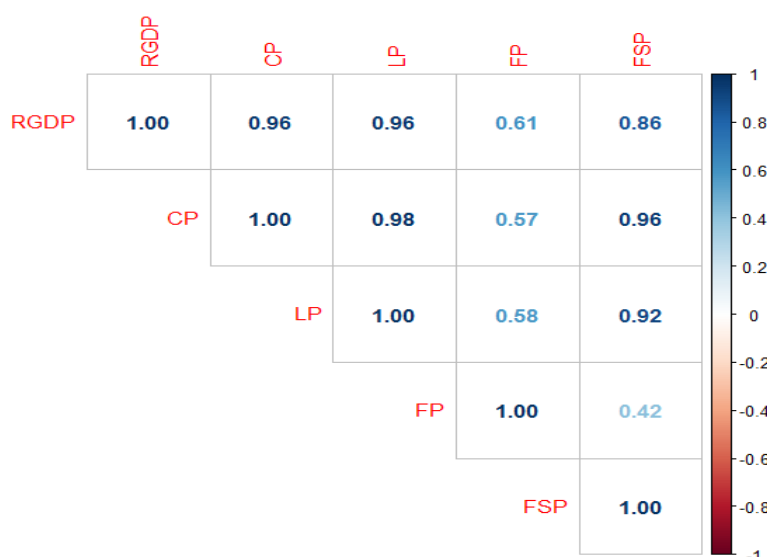


Table 1 shows the correlation coefficients between Gross domestic product and different agricultural sectors: Crop Production, Livestock, Forestry, and Fishing productions. Their coefficients characterise the direction and strength of the linear

relationship between RGDP and each of sectors. RGDP has positive correlation with all agricultural sectors respectively, which means that as crop, livestock, forestry and fish productions increase, the gross domestic product increases.

Table 2
Multiple regression Coefficients of Real Domestic product, Crop production, livestock, Forestry production and Fishing production

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	2998.053	2289.999	1.309	0.198	
CP	2.132	0.394	0.543	5.405	0.000
LP	1.555	6.396	0.022	0.243	0.809
FP	80.773	30.546	0.163	2.644	0.012
FSP	50.863	16.428	0.275	3.096	0.004

R: 0.997, R-squared: 0.993, Adjusted R-squared: 0.993, standard error of the estimate: 1915.81821.

Table 2 above displays the multiple regression coefficients describing the influence of different agriculture on Nigerian economy, with Real Gross Domestic product (RGDP) as the response variable and Crop, Livestock, Forestry and Fish productions as the explanatory variables. Also, from Table 1, it shows that forestry production (80.77) contributed the most to real domestic product; which means that for each unit change in FP there is resultant change of 80.77 in RGDP. Fishing production also contributes to the real gross domestic product, every unit change on FP there is a corresponding 50.86 change in RGDP. The same goes for crop production; for every unit change in CP, there is a corresponding 2.13 change in RGDP. Considering the p-value of

livestock production $0.809 > 0.05$, one would say that livestock production is nonsignificant. Then, going by the coefficient of LP, for every unit change in LP there is a resultant change in RGDP by 1.55.

The $R = 0.997$ signifies a high positive correlation between the explanatory variables (Crop, Livestock, Forestry and Fish productions) and RGDP. The coefficient of determination R^2 reveals that 99% of the variation in GDP was explained by independent variables (Crop, Livestock, Forestry and Fish productions) while the remaining 1% was due to randomness. Similarly, the adjusted $R^2 = 0.993$ which is the same to $R^2 = 0.993$, indicates that the model is a good fit for making generalization.

Table 3
Analysis of Variance of the model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.12E+10	4	5.31E+09	1.45E+03	.000a
Residual	1.43E+08	39	3670359.403		
Total	2.14E+10	43			

a. Predictors: (Constant), FSP, FP, LP, CP

b. Dependent Variable: RGDP

The results in Table 3 revealed that all four independent variables had a significant effect on RGDP. These variables statistically significantly predicted GDP at 95% level of significance with $F(4, 39) = 1446$, $p < 0.000$, $R^2 = 0.993$. All four independent variables added statistically significantly

to the prediction, $p < 0.05$. Therefore, the $F = 1446$ indicates model goodness of fit to the data. In Figure 1, the regression standardized residual appears symmetric, like a bell curve centred mean. This suggests that the residuals are normally distributed and supports the assumptions of linear regression.

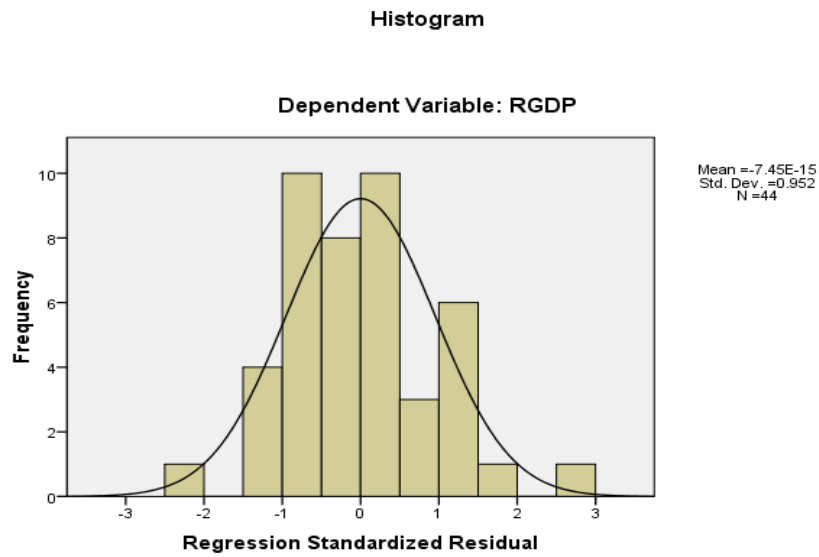


Figure 1: Histogram of the Residual of the regression model

Normal P-P Plot of Regression Standardized Residual

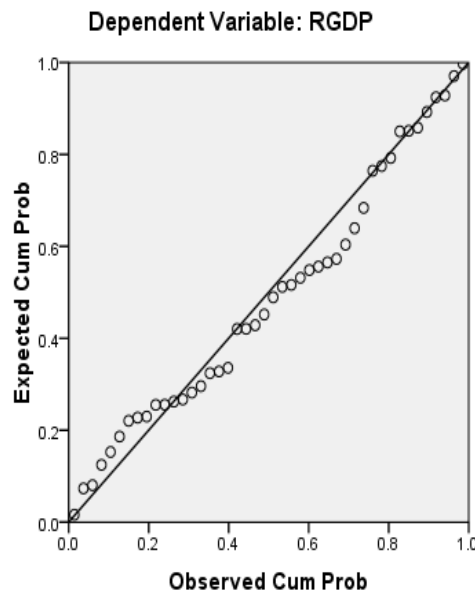


Figure 2: Normal P-P Plot of Regression Standardized Residual

Figure 2 reveals that the observed variables lay around the expected variables. This implies that the actual and expected results around Real Gross Domestic Product (RGDP) are closely related to the Independent Variable (Crop Production, Livestock

Production, Forestry Production and Fish Production)

Summary and Conclusion

This work investigated the impact of agriculture on Nigerian economy (1981 – 2024). The variables used to measure the economic growth was real gross domestic product and it serves as the dependent variable, whereas livestock production, crop production, fish production and forestry production were the predictor variables. Multiple regression method was employed in the model and following are the findings of the work. This work highlighted the significant effect of crop, fishing and forestry productions on Nigeria's RGDP from 1981 to 2024. These three sectors of are crucial drivers of economic development and growth in the country, reflecting the importance of agricultural activities in the national economy. However, livestock production did not show significant contributions to GDP within the study period. The results indicate that the four independents variables have a positive relationship with economic growth in Nigeria respectively. It implies that as crop, livestock, forestry and fish productions increase, real gross domestic product increases. Sequel to the findings of this work, the following submissions were recommended. It is important for Nigerian government and her citizenry should combine efforts toward increasing the crops production capacity with the goal to advancing economic growth and food security among others. The government should allocate more fund to agricultural universities to conduct more research on all aspect of agriculture. Also, government should encourage the youth to go into agriculture by providing modern mechanized farm machinery and tool, as well as subsidizing the prices of fertilizer and agro-chemicals.

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