

The Economic Evaluation of Agricultural Sector in Nigeria: A Disaggregated Analysis using Dynamic ARDL Model

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Abstract: Before the oil boom in 1970s, agriculture exhibited the pillar of Nigeria's thriftiness, providing natural resources for industries, generating job chances up to 70%, and food security to the citizens, providing 40% of budgetary income, 60% of external exchange and accounting for 47% of the output expansion in the nation. But due to oil boom in 1970s, the accentuation of government moved from agricultural to oil segment. This shift led to disregarding the agricultural segment as the oil became the chief means of income generation for the government, thereby accounting up to 60% of the nation's external revenue. It is in view of this that this research evaluated the economic impact of agricultural sector in Nigeria: A dis-aggregated analysis within the period of 1986 to 2023. Data used was sourced from CBN statistical bulletin. GDP, proxied for economic expansion served as an endogenous variable, while the exogenous variables for disaggregated agricultural sector outputs were Crop Production (CRP), Live Stock Production (LSP), Fishery Production (FSP), Forestry Production (FRP) and Inflation Rate (INF). Consequently, this research work made use of Ex-Post Factor research plan in which multiple regression was utilized. Dynamic ARDL was employed as the research technique and the results showed that crop production significantly and positively impacted economic growth by 0.42%; while live stock production significantly promoted economic growth by 0.43%. However, fishery production negatively and insignificantly impacted on economic growth by 0.10%; while forestry production positively impacted on economic growth in Nigeria by leading to 0.29% increase in GDP, but statistically not significant. Based on the results, the research recommends that government should efficiently provide a safety and stimulating surroundings for commercialized agrarian activities which will stimulate internal and external investors to commit in different components of agrarian activities in the nation.

Keywords: Agricultural Sector, Economic Growth, Dynamic ARDL, Nigeria

1. Introduction

In the world today, there is hardly a country that can survive on its own without engaging in agricultural activities. This suggests that agricultural sector is a basic building block for an economy (Ishola, Olaleye, Ajayi & Femi, 2013). Hence, its role towards the expansion can never be highly accentuated. Infact, it does not only provide food and natural resources for the industrial segment, but also necessary for the rapid increase in job opportunities, impoverishment emasculation as well as enhancement in revenue generation, for the establishment of industries, which helps to ease off burden on the country's balance of payment (Atuma, Ogbonna., Udentia & Nkwagu, 2024). This suggests that adequate harnessing the segment of agriculture, can lead to structural transmutation as well as economic diversification. It makes the nation to adequately engage its raw materials, thereby guaranteeing that the economy reduces over reliance on external agricultural commodity (Olabanji, Fakile, Ese & Emmanuel, 2017).

Generally, agricultural segment leads to economic expansion in these four main means. These comprise of product contributions, factor contributions, market contributions and international exchange contributions (Olabanji et al, 2017). Having noticed this, government formulated National Accelerated Food Production Programme (NAFPP) in 1972, Agricultural Development Projects (ADP) in 1974, Operation Feed the Nation (OFN) in 1976, River

Basin development Authority (RBPA) in 1986, Structural Adjustment Programme (SAP), and Green Revolution (GR) in 1980, National Fadama Development Projects (NFDPA), National Economic Empowerment and Development Strategy (NEEDS) in 1999 and Youth Employment in Agriculture Program (YEAP) in 2014, which led to the introduction of Agricultural Transformation Agenda (ATA) that became the largest ever government enabled private sector led effort to grow agriculture in Nigeria. This is believed to eliminate the bottleneck caused by middlemen association and thereby encourage large scale production (Muttandeen & Abdullahi, 2014).

Agricultural segment is various in Nigeria, encompassing diverse activities. It comprises four sub-segments such as crop, livestock, fishery and forestry production (Muttandeen et al, 2014). The segment of crop sector accounts for 90% of agricultural outputs in Nigeria, joined by livestock segment, accounting for 7%. Fishery production generated 2% while forestry accounted for 1% (NBS, 2015). Nevertheless, due to oil boom in 1970s, the accentuation of government moved from agricultural to oil segment. This shift led to disregarding the agricultural segment as the oil became the chief means of income generation for the government, thereby accounting up to 60% of the nation's external revenue (Orok & Ayim, 2017). Having concentrated on oil, the contributions of agricultural segment performed atrociously over the years. Infact, its Productiveness is debased and fundamentally dead.

For instance, according to CBN (2021), crop productiveness, live stock and fishery accounted for 0.3% , 0.07% and 0.7% separately in 1986, and GDP accounted for -2.5%. In 1990, crop productiveness, live stock and fishery augmented to 0.9%, 0.14 and 3.2% separately, and GDP accounted for 8.9%. Similarly, in 1996, crop productiveness, live stock and fishery productiveness accounted for 9.1%, 1.3% and 0.22% separately, and GDP accounted for 1.6%. In 2000, crop productiveness, live stock and fishery productiveness augmented to 12.7%, 1.72% and 0.41% separately, and GDP accounted for to 2.4%. In the same vein, crop productiveness, live stock and fishery productiveness in 2006, accounted for 6.7%, 5.6% and 2.5% separately, and GDP accounted for 3.3%. For 2010, crop productiveness, live stock and fishery productiveness augmented to 12.7%, 1.72% and 0.41% separately, and GDP augmented to 5.2% (CBN, 2021). For 2016, crop productiveness, live stock and fishery productiveness accounted for 4.4%, 1.2% and 1.4% separately, GDP accounted for -1.5%. Furthermore, in 2020, crop productiveness, live stock and fishery productiveness augmented to 2.24%, 22.5% and 12.3% separately, GDP even reduced to 1.8% (CBN, 2021). In the same vein, crop production decreased to 1.1%, live stock decreased to 1.9% and fishery production increased to 35.6% respectively, while that of GDP stood at 2.74% (CBN, 2023)

From the analyzed facts, we dully observed that agricultural segment productiveness contradicts economic postulation of Keynesian theory which postulates that active government intervention in the market place through government expenditure increases economic growth by ensuring efficiency in resources allocation and regulation of markets. This contradiction is observed when the increase in agricultural segment productivity which ought to augmented GDP, reduces it. This has result in limited supply of food, reduced productiveness, higher importation, reduced exports, relentless exchange rate diminution, etc as featured in the Nigeria's economy. In view of this, the research sets to evaluate the economic impact of agricultural sector in Nigeria utilizing Dynamic ARDL Model Simulation.

2. Literature Review

Anugwom (2024) researched on effect of agricultural sector productivity on the expansion of the economy and sustainability in Nigeria. Extracting data from CBN and using OLS method, the researcher found that agricultural productiveness shared and inverse and insignificant effect to economic expansion. This research did not examine the impact of various components of the sector on the economy.

Atuma, et all, (2024) examined the association between agricultural segment value chain contribution and the expansion Nigeria's economy within 1981-2019. The parameters employed in the analysis are GDP, a babelike parameter), and autarkic parameters comprise value chain in Crop Production, Live Stock production, and fishery Production (FSP). Using Vector Error Correction Mechanism and Granger Causality test, the results revealed that value chain in crop production, live stock production and fishery production are direct and statistically important

to gross domestic product in Nigeria. The researchers only made use of three out of the four components of agriculture.

Onunwo and Amadi-Robert (2022) investigated the association between agricultural output and the expansion of Nigeria's economy. ARDL method was used in their estimation procedure and the results validated that both crop and livestock productiveness crucially led to the expansion of Nigeria's economy. Fishery productiveness had anemic verse effect on economic expansion, while forestry productiveness indirectly impacted on the expansion of Nigeria's economy. This researcher did a good job by using the four components of the sector, however, they failed to use dynamic ARDL which allows for model simulation in their analysis, hence, the need for this present study.

With the data spanning from 2004 to 2016, Fatou and Majige, (2020) carried out a research on the impact of sub-segment of agriculture on the economy of Gambia. The outcomes of their research using ARDL, proved that the sub segments of both crops and fisheries had a hefty verse impact on the expansion of their economy; whereas livestock sub segment possesses a direct impact on the economy of Gambia. The researchers failed to incorporate forestry as a component of agriculture.

In the investigation of the kinship between the sub-segments of agriculture and the economic expansion in Nigeria, Sunday, Samuel, and Inimfon (2021) discovered when they applied ARDL, that crop creation directly influenced per capita income, in Nigeria. The researchers failed to use dynamic ARDL which allows for model simulation in their analysis, hence, the need for this present study.

With the range of data from 1981 to 2018, Atayi, Boniface, Bobola, and Olorunrinu (2020) carefully examined the effect of federal expenditure on the output of agriculture in Nigeria. Applying OLS, method, the researchers discovered that government disbursement on agriculture powerfully related with the output of agriculture. The researchers concentrated on how government spending affected agricultural output and not how the agricultural outputs affected economic growth.

With the application of Canonical Cointegration method, involving data gotten from CBN, Osabohien, Olurinola and Matthew (2020) investigated the influence of agro-financing on agricultural output in Nigeria. Their results maintained 1% rise in agro-financing augmented agricultural productivity by 0.12%. The researchers in this work were concerned on how agro-financing impacted on agricultural output in Nigeria, and not how the agricultural outputs impacted on economic growth.

3. Theoretical Framework

Cobb-Douglas Production Function

The concern of this hypothesis is all about the role of household in creation of goods and services. In other words, Cobb-Douglas production function postulates that farm productivity in a country is a function of factors of production such as labour and capital combined in production processes (Emerenini & Ihugba, 2014). Infact, according to Becker (1965), the theory upholds that household only consumes goods it produces, and the production of each commodity needs the resources of household, time and other factors such as capital and labour. This Cobb-Douglas Production Function is stated as:

$$Q = AL^{\beta} K^{\alpha} \quad (1)$$

Where; Q = amount of output created, L = amount of labour force used for goods creation, K = capital input creation of goods, A = innovation, representing technology, also known as multi-factor productivity, β = output elasticities of labour while α output elasticities of capital.

4. Methodology

Based on the fact that research design comprises the plan for the gathering, mensuration, and interpretation of data (BigBen, 2016), the study adopted an ex-post-facto research design. With the data gotten from the CBN report from 1986-2023, the researchers adopted Zivot-Andrews unit root test, for determining the rank of integrationand;

and Dynamic ARDL which allows for model simulation, for responsiveness of the coefficients of the autonomous variables as related to babelike variables. Thus, the model for this work is expressed as:

In order to capture the objective of this study, our model is therefore stated as thus:

$$GDP = F(CRP, LSP, FSP, FRP, INF) \tag{2}$$

Presented in a linear form, we have

$$GDP = b_0 + b_1CRP + b_2LSP + b_3 FSP + b_4 FRP + b_5 INF + U_t \tag{3}$$

Where; GDP represents gross domestic product; CRP represents Crop Production

LSP is Live Stock production; FSP is Fishery Production, FRP is Forestry Production

b₀ is Constant term; b₁ . b₄ are the regression coefficients of the agricultural sub segments, while U_t represents error term

5. Results

Table 1: Zivot-Andrews (ZA) Unit Root Test Results

	Level		First Difference		Remarks
	t-Statistics	5% critical	t-Statistics	5% critical	
LGDP	-2.595	-4.80	-4.821	-3.80	I(1)
LCRP	-2.753	-4.80	-4.238	-3.80	I(1)
LLSP	-1.247	-4.80	-5.311	-4.80	I(1)
LFSP	2.848	-4.80	-5.394	-4.80	I(1)
LFRP	-5.578	-4.80	-----	-----	I(0)
INF	-6.796	-4.80	-----	-----	I(0)

Sources: Researcher’s computation from Stata 16

The Zivot-Andrews (ZA) unit root test in above table, voiced that forestry output (FRP) and inflation rate (INF) were actually motionless at level while the economic output (GDP), Crop output (CRP), Live Stock output (LSP) and fishery Production (FRP) became motionless at difference 1. This Zivot-Andrews (ZA) outcomes actually confirms the presence of a mixed order of integration, implying the possibility of long-run relationship among the variables of the study

Table 2: Dynamic ARDL Test Results

Variable	Coef.	Std. Err.	t	P> t	95% Conf. Interval (Lower)	95% Conf. Interval (Upper)
L1_LGDP	-0.0880509	0.1809889	-0.49	0.632	-0.4682945	0.2921927
D_LCRP	0.4159377	0.1290287	3.22	0.005	0.1448584	0.6870169
L1_LCRP	0.3032045	0.1649733	1.84	0.083	-0.0433916	0.6498006
L1D_LCRP	-0.1336326	0.0889262	-1.50	0.150	-0.3204597	0.0531944
D_LLSP	0.4307308	0.1637760	2.63	0.011	0.0775363	0.6106247
D_LFSP	-0.1045669	0.1416608	-0.74	0.470	-0.4021851	0.1930513
D_LFRP	0.2909758	0.2015349	1.44	0.166	-0.1324334	0.7143850
D_INF	-0.0002202	0.0026610	-0.08	0.935	-0.0058109	0.0053704

R² = 0.8967; Adj R² = 0.8048; Prob. R² =0.0000

Sources: Researcher’s computation from Stata 16

From the outcomes of dynamic ARDL as presented in table 2, the coefficient of crop production (LCRP) at level is 0.4159377. Since p-value = 0.005 is less than 0.05, it shows that crop production significantly contribute output growth of Nigeria, suggesting that one percent increase in crop production contribute to about 0.41% to GDP. In the same vein, the coefficient of live stock production at level (LLSP) being 0.4307308 with associate p-value of

0.011, indicated a positive effect between live stock production and gross domestic product; and as well, statistically significant in Nigeria. Considering fishery production (LFSP) with the coefficient of -0.1045669 and associate p-value of 0.470, we deduce that fishery production (LFSP) at level, associated indirectly with gross domestic product in Nigeria; and as well, statistically not important. Similarly, the coefficient of forestry production (LFRP) being 0.2909758, with associated p-value of 0.166, equally indicated that forestry production at level, had positive effect with gross domestic product and statistically not significant in Nigeria. Lastly, the results verified that inflation rate (INF) at level, with the coefficient of -.0002202 and p-value of 0.935, effected negatively on gross domestic product in Nigeria but not important statistically.

6. Conclusion

The work evaluated the economic effect of agricultural segment in Nigeria: A dis-aggregated analysis using Dynamic ARDL. The function of components of agriculture as paramount tributary factor to gross domestic product in the nation can never be highly accentuated. Hence, the study is actuated to identify the degree to which dis-aggregated agricultural sector outputs impacted on the economic expansion in the country. This research employed the dynamic ARDL technique to actualize the stated goals. To this end, the results actually proved that agricultural productivity stimulate the nation's economy. Hence, investing in agricultural sector should be a burning desire to the government of Nigeria since its components are positively and significantly promoting the growth rate of the country.

Recommendations

Based on the empirical findings, the following recommendations are made

- 1) Since the study discovered that crop production exerts positive and significant impact on economic growth in Nigeria, should efficiently provide a safety and stimulating surroundings for commercialized agrarian activities which will stimulate internal and external investors to commit in different components of agrarian activities in the nation. This can be done by putting adequate securities on ground so as to ensure the lives and prop
- 2) As the study validate that live stock production positively and importantly influenced economic expansion in Nigeria, government should provide adequate forage environment in order to ensure effective improvement on the economy even in the long-term.
- 3) Discovering that fishery production negatively and insignificant influenced economic output in Nigeria, federal authorities should enact and implement a working agricultural development plans so as to encourage the fishery producers in the economy.
- 4) Having proved that forestry production exhibited a direct and unimportant influence on economic expansion in the country, government should encourage businesses that can convert the wood to finished products.

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