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Analysis of Groundnut Exports and GDP Dynamics in Nigeria (1972–2022)

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ABSTRACT

This study examined the impact of groundnut (Arachis hypogaea) exports on Nigeria's Gross Domestic Product (GDP) from 1971 to 2022, employing multiple linear regression techniques with log-transformed variables. The analysis included key macroeconomic indicators, such as the exchange rate, inflation, per capita income, and groundnut yield per hectare, to determine their collective and individual effects on economic growth. The regression results reveal that while groundnut exports (INEXP) exhibit a positive coefficient (0.008257), the effect on GDP is statistically weak, suggesting a limited direct contribution to national output. Conversely, the exchange rate (INEXRATE) and per capita income (INPERCAP) show strong and statistically significant relationships with GDP growth, with coefficients of 0.123033 and 1.148422, respectively. Inflation (ININFLA) showed a negative but statistically insignificant impact on GDP. In contrast, groundnut yield per hectare (INYIELD_HA) demonstrates a negligible effect, highlighting the inefficiency of productivity gains without market integration or value addition. Findings from the study underscore the need for targeted policy interventions to revitalize the groundnut export sector through infrastructure investment, value chain development, and quality enhancement. Additionally, managing exchange rate policy and improving household income remain critical for driving inclusive economic growth. This study provides empirical evidence to support Nigeria's non-oil export diversification agenda and informs policy under regional trade initiatives such as the African Continental Free Trade Area (AfCFTA).

1. Introduction

In many developing countries, such as Nigeria, the agricultural sector emerges as a major contributor to economic development, creating employment opportunities and generating foreign exchange earnings that are vital for sustaining economic activities. In Nigeria, agriculture continues to hold a central and indispensable position in the national economy, accounting for an impressive contribution that ranges between 23% and 26% of the overall Gross Domestic Product (GDP), while simultaneously providing employment for over 70% of the population, and serving as a vital source of raw materials

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that facilitate the development of agro-industrial activities, as documented by the National Bureau of Statistics (NBS, 2024). As the country grapples with the pressing need to diversify its economy, particularly given its detrimental reliance on oil revenues, non-oil exports, particularly those intrinsically linked to agriculture, have resurfaced as critical avenues for pursuing and achieving sustainable and inclusive economic development. Groundnut (*Arachis hypogaea*), commonly known as peanut, is a critical legume crop in Nigeria's agricultural economy. It is widely cultivated in the northern states, particularly in Kano, Kaduna, Katsina, and Bauchi.

Historically, groundnut was a major export commodity. In the 1960s, Nigeria achieved the remarkable status of being the world's leading exporter of groundnuts, contributing about 40% of global groundnut exports (Aja, 2021). The iconic "groundnut pyramids" that characterised the city of Kano served not only as a logistical and storage solution but also as a potent symbol of agricultural prosperity and growth driven by export activities.

However, the discovery and rise of crude oil exports in the early 1970s shifted Nigeria's economic structure away from agriculture. This structural shift, combined with weak policy support, poor rural infrastructure, and lack of research investment, caused a steady decline in groundnut production and export performance (Gjournals, 2020).

Despite this decline, Nigeria remains one of Africa's largest groundnut producers. In 2022, production exceeded 3 million metric tonnes, yet less than 5% of this was exported (FAOSTAT, 2023). Most of the output is consumed domestically for oil production, confectionery, and as animal feed. Major export markets include Niger, Mali, Ghana, and parts of Europe, though volumes remain inconsistent.

As public investment and policy interest waned, the groundnut value chain was left to stagnate, resulting in declining yields, poor infrastructure, and lost global market share. Today, despite Nigeria remaining one of Africa's top groundnut producers by volume, its contribution to GDP and foreign earnings remains low due to inefficiencies across the value chain, including post-harvest losses, low processing capacity, and limited access to international markets (Groundnut Value Chain Analysis in Nigeria, 2023).

In the face of persistent oil price volatility, Nigeria has been compelled to revisit its economic priorities. The Economic Recovery and Growth Plan (ERGP), the National Development Plan (2021–2025), and the African Continental Free Trade Area (AfCFTA) agreement all underscore the need for export-led growth, rural transformation, and industrial linkages. Groundnut, with its diverse applications in food, oil, cosmetics, and livestock feed, offers a viable opportunity for economic rejuvenation. Yet, for groundnuts to truly contribute to GDP growth, there must be empirical evidence demonstrating their macroeconomic relevance over time.

Despite being one of Africa's top producers of groundnuts, Nigeria's export volume remains disproportionately low compared to its production capacity. This paradox, high domestic production but poor export competitiveness, raises critical questions about the efficiency of Nigeria's agricultural value chains, particularly in groundnuts. Factors such as postharvest losses, aflatoxin contamination, poor quality control, weak infrastructure, and lack of access to export markets continue to constrain the sector's performance (World Bank, 2019; James *et al.*, 2020; Mohammed *et al.*, 2020).

Furthermore, while various studies have analysed the general link between agriculture and economic growth in Nigeria, limited empirical research exists that specifically quantifies the contribution of groundnut exports to Gross Domestic Product (GDP). This gap makes it difficult for policymakers to craft targeted interventions to revitalise the groundnut sector and integrate it effectively into national development strategies. In the context of renewed interest in non-oil exports and the implementation of frameworks like the African Continental Free Trade Area (AfCFTA), there is a pressing need to reassess the economic potential of groundnut exports.

This study addresses that gap by investigating the effect of groundnut export on Nigeria's GDP over the past five decades (1972–2022). The research is timely and policy relevant. It contributes to the growing body of literature on commodity-specific impacts of agricultural exports in Nigeria and provides evidence-based recommendations for sectoral investment. Disaggregating agricultural export performance at the commodity level enables a clearer understanding of how groundnut, once a flagship export, can be repositioned as a catalyst for economic diversification, job creation, and rural industrialisation. By addressing this critical gap, the research aims to provide evidence-based recommendations for enhancing export competitiveness and economic resilience through groundnut value chain optimisation.

2. Literature review

This study is anchored on the export-led growth hypothesis (ELGH), which posits that sustained export expansion enhances economic growth by generating foreign exchange, stimulating productivity, and fostering industrialization (Balassa, 1978; Feder, 1983).

According to this framework, export growth contributes to GDP through improved resource allocation, technology transfer, and scale economies. In Nigeria's context, an increase in groundnut exports is expected to strengthen GDP growth by raising rural incomes, encouraging agro-industrial linkages, and supporting macroeconomic stability. However, these outcomes depend on the consistency of export policies, infrastructural quality, and the efficiency of value chain actors.

Many studies have largely supported a positive relationship between agricultural exports and GDP, consistent with the export-led growth hypothesis.

However, most studies have examined aggregate agricultural exports, offering limited insights into commodity-specific relationships such as groundnut. Furthermore, few have covered extended time frames encompassing both pre- and post-liberalization eras, nor have they fully accounted for structural breaks caused by policy reforms and global market shocks.

This study fills these gaps by analysing the dynamic link between groundnut exports and GDP in Nigeria from 1972 to 2022 using robust econometric techniques. It aims to determine whether groundnut export performance has played a significant role in driving Nigeria's economic growth within the context of diversification and post-oil economic restructuring.

3. Materials and Methods

The study was conducted in Nigeria, which is one of the largest countries in Africa and lies wholly within the tropics along the Gulf of Guinea on the West coast in Sub-Saharan Africa. Nigeria lies between 4^0

and 14^0 North of the equator and between longitudes 3^0 and 15^0 east of Greenwich. Nigeria has a total land area of 923,768.622 km² or about 98.3 million hectares, and a current population estimated at 215,175,364 people by Worldometer elaboration from the United Nations database (Worldometer, 2022).

Much of the country is traversed by productive rivers. Nigeria's ecology ranges from tropical forests in the south to dry savannah in the far north, supporting a diverse range of plant and animal life. Nigeria has a tropical climate with two distinct seasons: the dry and the wet seasons. It includes the following ecological zones: Mangrove Swamp, Rainforest, Guinea Savannah, Sudan Savannah, and Sahel Savannah. Its terrain is divided into the southern lowlands, blending into central hills and plateaus, with mountains in the south and plains in the north.

Arable crops occupy 33.02% of the total land cover; permanent crops cover 3.14%, while other land uses account for 63.84% (Udah and Nwachukwu, 2015).

The main crops produced in the country include cocoa, cotton, palm oil, maize, rice, sorghum, millet, groundnut, cassava, yams, and rubber. The primary livestock reared are cattle, sheep, goats, pigs, and poultry.

3.1 Types and Sources of Data

The Secondary data used in the study were sourced from the National Annual aggregates, which were obtained from secondary sources. Data on Groundnut export quantity, which covers the period under study (1972-2022), was obtained from several issues of the Production Yearbook published by the Food and Agriculture Organisation (FAO). Also, data on Gross Domestic Product, Exchange Rate, Real Gross Domestic Product, inflation rate, and yield per hectare were obtained from the National Bureau of Statistics (NBS)

3.2 Method of Data Analysis

3.2.1 Solow-Swan Production Function

The Solow–Swan model is designed to show how growth in the capital stock, growth in the labour force, and advances in technology interact and how they affect a nation's total output. The model has a supply of goods based on a production function with constant returns to scale. An economic growth theory of long-term increase in GDP is set as a basis for developing the economic growth model in this study within the template of neoclassical economics. This model describes long-term economic growth by focusing on the aggregation of capital, labour, and advancement in technology. Solow-Swan demonstrates an efficient building block for additional constructs due to its especially likeable mathematical features. Consequently, since Nigeria's economy is labour-intensive, the study did not rely on the classical growth theory's non-economic variables.

The study utilised the Solow model, a neoclassical growth model, which analyses the long-run behaviour of an economy based on factors like capital accumulation, labour, and technological progress.

$$Y = f(L, K) \quad \ldots\ldots 1$$

This model can be amended by incorporating the exchange rate as a control variable in the formula:

$$RGDP_t = f(AGE_x X_1 X_2 X_3 \ldots \ldots, ER_t) \ldots \ldots \ldots 2$$

In econometric form, equation (7) could be stated as:

$$RGDP_t = \beta_o + \beta_1 X_t \ldots \ldots \ldots \ldots + \beta_3 AGEX_t + \beta_4 ER_t + \beta_5 INF_t + \beta_6 YELD_t + \omega \ldots \ldots \ldots 3$$

Where:

$RGDP_t$ = Annual Gross Domestic Product

$AGEX_t$ = Groundnut Export

ER_t = exchange rate.

INF_t = Inflation

$YELD_t$ = Yield

ω stands for error term,

β_o stands for the constant term

The Estimation Technique used for this model is Ordinary Least Squares (OLS), which was applied to assess both short-run and long-run effects.

4. Results and Discussion

4.1 OLS Regression Analysis with Groundnut Export And GDP

The OLS (Ordinary Least Squares) method of Regression analysis was carried out using the constituents of Groundnut export (that is, Groundnut export quantity, exchange rate, inflation rate, GDP per capita, and yield per hectare as the independent variables and the Real Gross Domestic Product (RGDP) as the Dependent variable.

Table 1. Regression Analysis on the effect of Groundnut export on GDP

Variable	Coef.	Std. Error	t-Statistic	Prob.
INEXP	0.008257	0.010507	-0.785795	0.0000
INEXRATE	0.123033	0.009138	13.46381	0.0000
ININFLA	-0.026476	0.021266	-1.244982	0.2196
INPERCAP	1.148422	0.025754	44.59140	0.0000
INYIELD_HA	0.000321	0.033269	0.009662	0.0000
C	3.456525	0.251185	-13.76087	0.0000
R-squared	0.892266			
Adjusted R-squared	0.861407			

Source: Data Analysis, 2025

4.2 Coefficient of Determination (R^2)

The Coefficient of Determination (R^2), as presented in Table 1, explains the best fit of any regression model. When explaining its performance, the closer the R^2 value is to 100%, the stronger the goodness of fit. With an R^2 the 0.89 value of R^2, the study reveals that about 89% of the changes in Real Gross

Domestic Product (RGDP) within the period under study were a result of the contributions Export Quantity, yield per hectare, GDP per Capita and Exchange Rate (ER) with the outstanding 11% being contribution from the other variables not mentioned in this model. It depicts a strong determination of the model. With the adjustment made during the study, the R^2 adjusted value of 0.861407 explains that with the adjustment in the independent variables, they can account for about 86% approximately of the disparity in Real Gross Domestic Product (RGDP), with the other 14% allocated to variables not included in the model.

4.3 Evaluation Based on Economic Criterion

RGDP = 3.456 + 0.0083Exp + 0.123EXCRATE -0.0264INF + 1.148PERCAP +0.000321YLD/HA.

The above result from Table 1, which is the regression result, is estimated to determine if the coefficients of the variables used in the model suit what the economic theory expects. This study reveals that if all the independent variables were kept constant, the Real Gross Domestic Product of Nigeria within the period under study would increase by 3.456. The model above reveals the existence of a positive relationship between Export Quantity, Exchange Rate, GDP per Capita, yield per hectare, and Real Gross Domestic Product (RGDP), whereas a negative relationship is found between inflation and Real Gross Domestic Product (RGDP). This means that any change in Real Gross Domestic Product (RGDP) will lead to an increase in Export Quantity, GDP per capita, Exchange Rate, and yield per hectare (by 0.0083, 1.148422, 0.123033, and 0.000321, respectively).

4.4 T-Test

The t-test serves as a statistical tool that explains the way the independent variables exert their individual influences on the performance metrics associated with the dependent variable, thereby providing an objective understanding of their respective contributions. Upon the results from table 1, one can observe that the t-test values, which are quantified as 0.008257 (0.0000), 0.123 (0.0000), -0.026476 (0.2196), 1.148422 (0.0000) and 0.000321 (0.0000) corresponding to Export Quantity, Exchange Rate, Inflation, GDP per capita, Yield per Hectare respectively, indicate that only the variables Export Quantity, Exchange Rate, GDP per capita, Yield per Hectare achieved statistical significance in their ability to adequately describe the performance of the Real Gross Domestic Product of Nigeria during the specified period under study. This assertion is substantiated by the observation that the probability values of 0.0000 for all the variables, which are associated with these significant variables, fall below the established threshold of the 0.01 probability level of significance, which corresponds to the 1% Level of Significance.

Recent growth in non-oil exports, including groundnuts, has supported GDP growth. For instance, agricultural exports rose from N4.1 billion in January 2016 to N25 billion by January 2017, with groundnuts contributing to this trend (Wikipedia, 2021). Despite the decline in the famous groundnut pyramids in Northern Nigeria, the crop's potential for industrial use and consumption remains strong. Groundnuts, which are widely used in industries for producing groundnut oil, peanut butter, chocolates, and other products, continue to play a crucial role in Nigeria's economy.

The Nigeria Export Promotion Council (NEPC) notes that Nigeria has been cultivating groundnuts since 1912, becoming the third-largest producer globally and the largest in Africa. Despite the decline of the groundnut pyramids, Nigeria remains Africa's top producer.

5. Implications of groundnut export on GDP

The findings of the regression analysis offer several important insights into the macroeconomic implications of selected variables on Nigeria's Gross Domestic Product (GDP), particularly in the context of agricultural exports such as groundnuts. Firstly, the coefficient of groundnut exports (INEXP) was positive (0.008257), suggesting a direct relationship between groundnut export performance and GDP growth. However, the effect size is relatively small, indicating that despite Nigeria's high production levels, the current scale and structure of groundnut exports have a limited impact on macroeconomic performance. This result reflects the sector's underutilization, pointing to structural inefficiencies such as low export volumes, limited value addition, and weak integration into international markets. Consequently, there is a compelling need for policy interventions that promote value chain development, enhance quality standards, and improve access to regional and global markets to amplify the contribution of groundnut exports to national output.

The exchange rate (INEXRATE) exhibited a positive and statistically significant effect on GDP, with a coefficient of 0.123033. This finding aligns with economic theory, as a depreciation of the domestic currency typically enhances export competitiveness by making Nigerian agricultural products more attractive in foreign markets. The significant role of exchange rate dynamics implies that maintaining a stable and competitive exchange rate regime is essential for sustaining export-led growth, particularly within the framework of the African Continental Free Trade Area (AfCFTA), which seeks to promote intra-African trade.

Per capita income (INPERCAP) emerged as the most influential variable, with a coefficient of 1.148422. This strong and statistically significant relationship underscores the importance of income growth in driving overall economic performance. The implication is that investments aimed at improving rural livelihoods, increasing household earnings, and expanding employment opportunities—especially through agricultural and agro-industrial development—can generate substantial macroeconomic benefits.

In contrast, inflation (ININFLA) exhibited a negative coefficient (-0.026476), as expected, but the relationship was not statistically significant at the 5% level. While this suggests that inflation may not be a primary driver of GDP within the studied period, persistent inflationary pressures could nonetheless undermine economic stability by eroding consumer purchasing power and raising input costs in agriculture. Therefore, macroeconomic stability remains a critical enabler of sustainable growth.

Finally, groundnut yield per hectare (INYIELD_HA) displayed a very small positive coefficient (0.000321), indicating a weak linkage between productivity improvements and GDP. This finding may reflect the fact that yield gains have not translated into economic expansion, possibly due to post-harvest losses, market inefficiencies, and a disconnect between primary production and value-added processing. As such, productivity improvements must be complemented by enhancements in infrastructure, storage, processing, and marketing to realise their full economic potential.

6. Conclusion and policy recommendation

This study examined the impact of groundnut exports on Nigeria's Gross Domestic Product (GDP) over a five-decade period, to assess the macroeconomic relevance of a historically significant but currently underperforming agricultural export commodity.

The findings reveal that while groundnut exports have a positive association with GDP growth, the magnitude of this effect is minimal. In contrast, variables such as exchange rate and per capita income exhibited strong, statistically significant relationships with GDP, suggesting that broader macroeconomic and income-related factors play more influential roles in driving national output. The limited contribution of groundnut exports to GDP, despite Nigeria's position as one of Africa's top producers, underscores the persistent inefficiencies within the agricultural value chain.

Considering Nigeria's ongoing efforts to diversify its economy and reduce its dependency on oil revenues, groundnuts present a viable, though currently underutilised, pathway for non-oil export growth. However, realising its full potential requires targeted reforms and investments throughout the entire value chain.

Therefore, to boost GDP growth through the agricultural sector, particularly groundnut, Nigeria must go beyond mere production and invest in export competitiveness, processing capacity, and value chain enhancement. Utilising regional markets via AfCFTA can further increase these benefits.

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