

# Budgetary Provision for Agriculture and Output Performance of Selected Crops in Nigeria (2000-2024)

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## ABSTRACT

Evaluating and providing evidence for Nigeria's Agricultural budgetary provision and the performance of crops given the allocated budget is imperative. This study examined the budgetary provision for agriculture and output performance of selected crops in Nigeria (2000-2024). It relied on secondary data obtained from the Central Bank of Nigeria (CBN) Annual Bulletin and Food and Agriculture Organization Corporate Statistical (FAOSTAT) Database. To compute the annual compound growth rates of output of selected crops (Rice, cassava, and Yam) exponential equations in time were fitted to these data. In confirming the acceleration, deceleration and stagnation in growths, quadratic equations in time variables were fitted to the output data. The actual performance of rice, yam, and cassava was evaluated using descriptive statistics by comparing their average outputs to the average budgetary allocation from 2000-2024. To estimate the correlation between budgetary expenditure and the output of the selected crops. Correlation analysis was estimated to quantify the strength and direction of the relationship between budgetary expenditure and the selected crop outputs. The result showed that rice output increased at annual rate of 2.53% but at a decelerating rate. Both yam and cassava experienced negative annual growth rates, with yam at -1.49% and cassava at -2.66%. The study confirmed statistical significant deceleration in rice and cassava output variables and stagnation in the output of yam. There was a positive correlation between budgetary expenditure and rice output, but negative correlations for yam and cassava. The low performance in the crops indicates budgetary allocation does not effectively result in higher crop yield. The result indicated that despite budgetary expenditure, the selected crops reflect inconsistencies in funding or lack of complementary investments. This implies that increases in budgetary allocations were associated with increases in rice output but decreases in yam and cassava outputs. The study recommended that a thorough review of the budget allocation processes should be conducted to identify inefficiencies and ensure equitable distribution of resources among all crops thereby optimizing the allocation which could enhance the performance of crops.

**Keywords:** Budgetary, Growth, Provision, Output, Performance, Crops and Agriculture

## INTRODUCTION

The agricultural sector plays a strategic role in both economic development and employment (Ngadi *et al.*, 2023). Agriculture plays a major role in poverty reduction, improvement of livelihoods and well-being in Sub-Saharan Africa (SSA) as it provides source of jobs, incomes and food, and also a significant contribution food security in this region, particularly in rural areas (Yeboah & Jayne, 2018 and Workneh, 2020). According to the Food and Agricultural Organization (FAO), agriculture contributed about 15% to GDP in 2016, employing over half of the labor force in the countries of the SSA and also essential to achieving sustainable goals (FAO, 2016).

However, there has been a systematic neglect of the sector at both national and state levels since the discovery of crude oil in Nigeria in the 1960s. Agriculture has been a major source of livelihood in most rural Nigerian society (International fund for Agricultural Development (IFAD), 2013); hence, neglect of the agricultural sector has opened the way for increased rural poverty, rural-urban migration, hunger and crimes (Iruo *et. al.*, 2010).

Nevertheless, part of the effort by the government to sustain the country's agricultural sector is evidenced by its various allocations to the sector in terms of lending and budgetary provisions. Budgetary provisions are often made for specific programmes or projects in agriculture, under numerous sub-sectors mainly; crops, livestock, fisheries, and forestry (Central Bank Nigeria (CBN), 2003). These allocations which are normally specified in the government budget are often expended either on physical structures, grants, and other inputs distributed to farmers or funding to agencies that perform agriculture-related services.

A budget which is a financial plan of action provides details of projected cash allocations and disbursement within a stated period of time, and becomes a critical element for effective management decisions (Petershie, 2008). Budgetary allocation is the finances allocated to plan for growth and development of a sector. Budgetary analysis is thus an important tool that helps to promote the economic assessment of all sectors of the economy including the agricultural sector, and it is useful for planning and management at the farm level (Abang, *et al.*, 2008).

Government budgetary allocations make capital available for agricultural production by helping to secure inputs, technology and management, hence promoting increased agricultural production. Government contributions to the agricultural sector therefore enable capital investments that help in the development and growth of the sector (Douillet & Grandval, 2011). For instance, such allocations can enable increased land size and improvement, as well as increased research in agriculture; hence, budgetary allocations thus have both direct and indirect effects on the production level of food and raw materials, and consequently affect the standards of living of the people. In other words, lending and budgetary allocations to the agricultural sector should be increased by the government to help improve the performance of the country's economy (Uzomba *et al.*, 2012). This will also promote both local and foreign investments, and agricultural productivity, hence helping to solve economic and food security challenges in the country.

Issues of neglect of the agricultural sector characterized by instability in government allocations and insufficient capital to the agricultural sector, as well as inconsistent agricultural policies have received lots of debate since the discovery of oil and gas in Nigeria. Capital may perhaps not be a problem if adequate funding is made available for agricultural production by the government. Also, allocations to different economic sectors including the agricultural sub-sectors (crops, livestock, fisheries, and forestry) are sometimes not released on time, and in some cases diverted, and the programmes they were meant for therefore suffer serious neglect and delay.

Despite ensuring food security and economic stability in the agricultural sector, there remains a persistent challenge in achieving the promised impact of increased budgetary provisions on crop performance. However, the issue is compounded by the fact that, eighteen years down the line, Nigeria is yet to meet up in terms of commitment of resources to the agricultural sector (Izuaka, 2021). Despite the challenges the agricultural sector encounters due to inefficient implementation, budgetary allocation stands out as a key component affecting the sector's growth. The disparity between the expected positive effects of well-funded agricultural sectors and the tangible results in crop performance shows the need for a comprehensive investigation into budgetary provisions/allocations in improving crop yields and overall sectoral growth. In line with the above observations, this study further analyzed the historical trends and growth rates of output of selected crops such as rice, cassava, and yam over the period 2000-2024, estimated the acceleration, deceleration, and stagnation in output of selected crop for the same period, assessed the actual performance of the selected crops vis-a-vis factors such as yield during the said period and estimated the correlation between the budgetary provisions allocated to the agricultural sector and the observed output performance of the selected crops.

## MATERIAL AND METHODS

The area of study for this project is Nigeria which is located on the west of Africa and share borders with the Gulf of Guinea in the south, the Republic of Benin in the west, Chad and Cameroon in the east and Niger in the North. Nigeria has a total area of 923,768 km<sup>2</sup> (356,669 square miles), with land area of 910,768 km<sup>2</sup> (351,648 square miles) and water area of 13,000 km<sup>2</sup> (5,019 square miles). Nigeria comprises of 36 states that are grouped into six geopolitical zone. Nigeria is extremely rich in resources such as petroleum and gas, coal, iron, limestone and several minerals. Nigeria has the potential of supporting a heavy population of livestock, has 78.5 million

hectares of agricultural land of which 36.5 million hectares is arable land and 0.29 million hectares is equipped for irrigation as at 2008 (FAOSTAT, 2010).

Data used for this study were secondary data and were obtained from multiple sources such as Central bank of Nigeria (CBN) annual bulletin, Food and Agriculture Organization Corporate Statistical (FAOSTAT) Database and National Bureau Statistics (NBS). This is to limit variation among available data set.

**Data analysis**

Data collected for this study were analyzed using different statistical tools and methods. The annual compound growth rates of output of the selected crops (Rice, cassava and Yam) was computed by fitting exponential equations in time to these data as follows:

$$Q = A_e^{bt} \dots\dots\dots 1$$

Which when linearized in logarithm:

$$\log Q = a + bt \dots\dots\dots 2$$

Where

- Q = Sum of output value for rice, cassava and yam in metric tonnes.
- t = the time trend (variable),
- a and b = the regression parameters to be estimated.

The annual compound growth rate (r) in output of selected crops (rice, cassava and Yam) is expressed as follows:

$$r = (e^b - 1) \times \frac{100}{1} \dots\dots\dots 3$$

Where

- e = Euler's exponential Constant (2.71828)

To confirm the acceleration, deceleration or stagnation in output of selected crop (Yam, cassava, Rice) in Nigeria from 2000 to 2024, quadratic equation in time variables were fitted to these data as follows:

$$\log Q = a + bt + ct^2 \dots\dots\dots 4$$

In the above specification, the linear and quadratic time terms gave the circular path in the dependent Variables (Q). The quadratic time  $t^2$  allows the possibility of acceleration, deceleration or stagnation in growth during the period of study. Significant positive value of the coefficient of  $t^2$  confirms significant acceleration in growth, significant negative value of  $t^2$  confirms significant deceleration while non-significance of the coefficient of  $t^2$  confirms Stagnation.

Descriptive statistics was used to assess the Actual Performance of the Selected Crops (the collected data on the performance of selected crops [e.g., rice, cassava, yam]) during the said period, while in order to estimate the correlation between Budgetary Provisions and Crop Performance, the Pearson correlation coefficients was employed to know the relationship between budgetary provision and crop performance.

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2] [n\sum y^2 - (\sum y)^2]}} \dots\dots\dots 5$$

x =budgetary Expenditure

n = number of years

y<sub>1</sub> = output of rice

y<sub>2</sub> = output of yam

y<sub>3</sub> = output of cassava

## RESULT AND DISCUSSION

### Estimated Trend Equation for Output and Growth Rate

**Table 1a: Estimation of trend analysis for product output**

Independent Variables/Periods	a	b	r <sup>2</sup>	F
<b>Rice</b>	9.490 (156.401)	0.025 (2.019)***	0.609	32.755
<b>Yam</b>	11.626 (181.815)	-0.015 (-3.199)***	0.328	10.232
<b>Cassava</b>	11.735 (154.182)	-0.027 (-4.941)***	0.538	24.414

Source: Computed from FAOSTAT data 2025

**t-ratios are in parenthesis**

**\*\*\* significant at 1%**

The result shows the estimated trend analysis for output of rice, yam, and cassava. The coefficient of the time trend is positive and significant in the case of output of rice indicating increase in the output of rice during the period 2000-2024. The coefficient of the time trend is negative and significant at 1% for both yam and cassava, which implies a decrease in output of yam and cassava.

**Table 1b: Compound growth rate in Output of Rice, Yam and Cassava in Nigeria (2000-2024)**

PERIOD	PRODUCT	OUTPUT
<b>2000-2023</b>	Rice	2.53 (104.69) ***
<b>2000-2023</b>	Yam	-1.49 (-46.609) ***
<b>2000-2023</b>	Cassava	-2.66 (-106.528) ***

Source: Computed from FAOSTAT data 2025

**t-ratios are in parenthesis**

**\*\*\* significant at 1%**

The compound growth rate shows the annual growth throughout the given period (2000-2024). For Rice, the output increased at annual rate of 2.53%. Both yam and cassava experienced negative annual growth rates, with yam at -1.49% and cassava at -2.66%. This suggest that rice has been increasing over the period while yam and cassava has been declining over the period. This shows that there is no significant growth relationship between budgetary expenditure and Output of the crops. Oserei *et al.*, (2022) found that budgetary allocations to agricultural sector in Nigeria over the years has been very low and do not have significant effect on crop output. This supports the findings from this study.

**Estimation and confirmation of acceleration, deceleration and stagnation in output of the selected Crops (Yam, Cassava and Rice).**

Table 2: Estimated quadratic Equations in time variable for Rice, Yam and Cassava Output in Nigeria-(2000-2024)

Independent Variables	a	b	c	r <sup>2</sup>	F
<b>Rice</b>	9.349 (103.934)	0.059 (3.427)	-0.001 (-2.019) *	0.676	20.817
<b>Yam</b>	11.602 (111.792)	-0.009 (-0.462)	0.000 (-0.295)	0.331	4.937
<b>Cassava</b>	11.474 (116.524)	-0.035 (1.858)	-0.003 (-3.408) ***	0.707	24.181

Source: Computed from FAOSTAT data 2025

**t-ratios are in parenthesis**

**\* significant at 10% \*\*\* significant at 1%**

Significant negative values of the coefficient of  $t^2$  in output of rice and cassava confirmed statistical significant deceleration in these variables. This findings further explains the result obtained earlier that though output of rice increase in some years, it increased at a decelerating rate. It also indicate that though output of cassava reduced, it continues to decelerate. The non-significant of the coefficient of  $t^2$  in output of yam confirmed stagnation in the variable. The deceleration and stagnation in this study suggest that despite budgetary expenditure the deceleration in rice and cassava, and stagnation in yam might reflect inconsistencies in funding or lack of complementary investments, underscoring the need for a holistic approach to budgetary expenditure. Kilic *et al.* (2021), obtained Increased government expenditure led to significant improvements in crop yields when funds were directed towards improving irrigation, providing quality seeds, and training farmer. The significant negative values of cassava and rice in this study could suggest a lack of such targeted interventions, highlighting the need for focused spending to achieve desired outcomes.

**Output Performance of Selected Crops**

This objective evaluated the performance of rice, yam, and cassava by analyzing their average outputs and performance ratios from 2000 to 2024.

Table 3a: Descriptive Statistics of Crop Output

	Mean	Standard Deviation	N
<b>Aggregate Expenditure</b>	6576957.30	6236032.23	24
<b>Output</b>			
<b>Rice</b>	18345.435	4075.5303	24
<b>Yam</b>	95020.783	16797.6790	24
<b>Cassava</b>	92507.565	21715.2480	24

Source: Computed from FAOSTAT data 2025

Table 3b: Analysis of Crop Performance

CROP	RICE (a)	YAM (b)	CASSAVA (c)	Average Aggregate Output (rice, maize, cassava) (d)	Average aggregate budgetary expenditure (e)
<b>Period</b>	2000-2024	2000-2024	2000-2024		
<b>Average Output</b>	18345.43	95020.78	92507.57	205873.7826	6576957.304
<b>Performance Ratio/Index</b>	0.089	0.46	0.45		
<b>Rank</b>	3 <sup>RD</sup>	1 <sup>ST</sup>	2 <sup>ND</sup>		
<b>Overall Performance</b>	0.031				

Source: Computed from FAOSTAT data 2025

From the table above the overall performance of the selected crops (Rice, Yam, and Cassava) was analyzed by comparing their average outputs to the average budgetary allocations from 2000 to 2024. The overall product performance index is 0.031, indicating the aggregated performance across all three crops. This indicates a poor overall performance relative to the substantial budgetary expenditures. Average Aggregate output of 205,873.78 units and Average Aggregate Budgetary Expenditure of 6,576,957.30 units.

A very low value (0.031), indicating that for the substantial average budgetary allocation of 6,576,957.30 units, the combined average output of all crops was only 205,873.78 units. This indicates a poor performance comparing to the actual expenditure allocated for the crops. This low index points to inefficiencies in how the budget is utilized across all crops.

The low performance index indicates or suggests that the funds allocated are not effectively translating into higher crop outputs. This suggests a need to evaluate how budgetary provisions are being used and to identify and address any underlying inefficiencies or mismanagement. This disparity between budgetary allocation and output indicates that, on average, the significant amount of funds allocated did not translate into proportionate increases in crop productivity. These points to inefficiencies or issues in the allocation or utilization of the budget.

### Individual Crop Performance

The individual performance of each crop was analyzed individually to understand their relative productivity and efficiency as indicated below.

Table 3c: Summary of Individual Crop performance

Crop	Average Output	Performance Ratio	Rank
Yam	95,020.78	0.46	1 <sup>st</sup>
Cassava	92,020.78	0.45	2 <sup>nd</sup>
Rice	18,345.43	0.089	3 <sup>rd</sup>

Source: Computed from FAOSTAT data 2025

For Rice, the average output which is 18,345.43 units and performance ratio which is 0.089. Despite receiving budgetary allocations, Rice had the lowest average output and performance ratio. This indicates significant inefficiencies or challenges specific to Rice cultivation, such as inadequate farming techniques, poor soil quality, or other limiting factors.

For Yam, Average output is 95,020.78 units and performance ratio is 0.46. Yam performed the best among the three crops, with the highest average output and performance ratio. This suggests that Yam cultivation is relatively more efficient in converting budgetary allocations into crop outputs, although there is still room for improvement. However, the performance could still be considered suboptimal given the high expenditure.

For Cassava, Average output is 92,507.57 units and performance ratio is 0.45. Cassava had a performance ratio slightly lower than Yam but much higher than Rice. However, like Yam, it could benefit from further improvements to maximize the return on budgetary investments.

Yam has the highest average output and performance ratio, followed closely by cassava. Rice, despite the positive impact of budgetary provisions and positive relationship with budgetary allocations, lags significantly in both output and performance ratio. The low performance index for rice suggests other factors may be limiting its productivity, such as soil quality, climate conditions, or farming practices.

The ranking (1<sup>st</sup>, 2<sup>nd</sup> & 3<sup>rd</sup>) indicates that Yam performed better than Cassava, and Cassava performed better than Rice in terms of total output generated per unit of budgetary allocation. The poor performance suggests a need for a detailed review of budget allocation efficiency and although Yam and cassava, despite performing better than rice, still require improvements to maximize return on budgetary investments.

### Correlation between Budgetary Provisions and Crop Performance

Correlation Analysis between Budgetary Provisions and Crop Performance using Pearson correlation coefficients shows relationship between budgetary provision and crop performance. This correlation analysis was conducted to quantify the strength and direction of the relationship between aggregate budgetary expenditure and crop outputs.

Table 4a: Correlation Table (Relationship between Budgetary Provisions and Crop Performance)

		Aggregate expenditure	Rice	Yam	cassava
Aggregate Expenditure	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	23			
Rice	Pearson Correlation	0.511*	1		

	Sig. (2-tailed)	0.013			
	N	23	23		
<b>Yam</b>	Pearson Correlation	-0.474*	-0.348	1	
	Sig. (2-tailed)	0.022	0.104		
	N	23	23	23	
<b>Cassava</b>	Pearson Correlation	-0.740**	-0.352	0.801**	1
	Sig. (2-tailed)	0.000	0.099	0.000	
	N	24	24	24	24

Source: Computed from FAOSTAT data 2025

Table 4b: Extension of table 4a (Relationship between Budgetary Provisions and Crop Performance)

	<b>Aggregate Expenditure</b>	<b>Rice</b>	<b>Yam</b>	<b>Cassava</b>
<b>Aggregate Expenditure</b>	1			
<b>Rice</b>	0.511*	1		
<b>Sig. (2-tailed)</b>	0.013			
<b>Yam</b>	-0.474*	-0.348	1	
<b>Sig. (2-tailed)</b>	0.022	0.104		
<b>Cassava</b>	-0.740**	-0.352	0.801**	1

Source: Computed from FAOSTAT data 2025

**\*\*Significant at 5% level; \*Significant at 1% level**

Table 4c: Summary of the correlation analysis result

<b>Variables</b>	<b>Pearson Correlation</b>	<b>Significant level</b>
<b>Aggregate Expenditure &amp; Rice</b>	0.511	5%
<b>Aggregate Expenditure &amp; Yam</b>	-0.474	5%
<b>Aggregate Expenditure &amp; Cassava</b>	-0.740	1%

Source: Computed from FAOSTAT data 2025

### **Relationship between Aggregate Expenditure and Rice Output**

From the result obtained as shown in the table 4c, Pearson Correlation is 0.511 with Significance at the 5% level and a P-value of 0.013. It indicates that there is a moderate positive correlation between aggregate expenditure and rice output. This implies that increases in budgetary allocations are associated with increases in rice output.

For instance, a correlation of 0.511 suggests that a 100% increase in budgetary allocation would lead to a 51.1% increase in rice output.

### **Relationship between Aggregate Expenditure and Yam Output**

The table shows that Pearson Correlation is -0.474 with significance of at the 5% level and a P-value of 0.022. There is a moderate negative correlation between aggregate expenditure and yam output. This implies that increases in budgetary allocations are associated with decreases in yam output. For example, a correlation of -0.474 suggests that a 100% increase in budgetary allocation would result in a 47.4% decrease in yam output.

### **Relationship between Aggregate Expenditure and Cassava Output**

A Pearson Correlation -0.740 coefficient was obtained from the correlation analysis between aggregate expenditure and cassava output with Significance at the 1% level. The result suggested that there is a strong negative correlation between aggregate expenditure and cassava output. This indicates a significant inverse relationship, where higher budgetary allocations are associated with lower cassava output. For instance, a correlation of -0.740 suggests that a 100% increase in budgetary allocation would lead to a 74.0% decrease in cassava output.

For Rice, there is a moderate positive correlation, indicating that increases in budgetary allocations are associated with increases in rice output but at a decelerating rate as observed from previous findings in this study. For Yam, there is a moderate negative correlation, suggesting that increases in budgetary allocations are associated with decreases in yam output. For cassava, there is a strong negative correlation, indicating a significant inverse relationship between budgetary allocations and cassava output. Nhemachena et al. (2020) obtained Positive correlation between increased budgetary allocations and improved crop yields, particularly for staple crops. The decreasing trend in this study, particularly for cassava, suggests that factors other than budgetary allocation (e.g., implementation efficiency, external factors) might be impacting these crops negatively, unlike the positive outcomes observed in the study by Nhemachena et al. Mogue et al. (2019) highlighted that not all agricultural expenditures are equally productive. Investments in research, extension services, and infrastructure showed higher returns. The results obtained in this study, align with the notion that the efficiency and targeted use of budgetary resources are crucial for enhancing crop productivity.

The positive correlation between aggregate expenditure and rice output indicates that budgetary allocations adjustments are somewhat effective for rice production. This relationship suggests that increasing funding can potentially improve rice yields, aligning with expected outcomes. The negative correlations for yam and cassava are unexpected and concerning, indicating inefficiencies in how budgetary allocations are utilized for these crops. This could be due to several factors which may include: Funds and Resources intended for yam and cassava production might be diverted to other purposes after allocation and disbursement, Ineffective use of funds allocated for yam and cassava could lead to lower outputs, etc.

## **CONCLUSION**

The positive correlation between budgetary allocations and rice output indicates that the funds allocated were somewhat effective in improving rice yields though at a decelerating rate. However, the negative correlations for yam and cassava suggest misappropriation of funds or inefficient use of resources, leading to poor performance for these crops.

On the basis of these findings, budgetary allocations positively impacted rice production but at a decelerating progression, whereas they had negative impacts on yam and cassava, indicating potential inefficiencies, diversion of funds and possible corruption.

## RECOMMENDATION

A thorough review of the budget allocation processes should be conducted to identify inefficiencies and ensure equitable distribution of resources among all crops. Optimizing the allocation could enhance the performance of yam and cassava.

1. Investigating the root causes of negative impacts on yam and cassava is essential, including examining management practices, resource utilization, and potential diversion of funds after disbursement.
2. Implementing robust monitoring and evaluation mechanisms is necessary to ensure that funds are utilized effectively and for their intended purposes. Regularly assessing the impact of budgetary allocations on crop performance will help make necessary adjustments.
3. Investing in research and development is crucial to develop and promote best agricultural practices, particularly for under-performing crops. Focusing on improving farming techniques, soil quality, and pest management will enhance crop yields.
4. Policymakers should design targeted interventions to address inefficiencies in budget utilization. Developing strategies to ensure that budgetary allocations lead to desired increases in crop outputs and overall agricultural productivity is vital.

By addressing these recommendations, it is possible to improve the efficiency of budget utilization, enhance crop productivity, and achieve better agricultural outcomes in Nigeria.

## LITERATURE

1. Abang, S. O., Agom, D. I., Enyenihi, E. A., & Ele, I. E. (2008). *Introduction to Farm Management: Principles, Plans, Budgets and Control*. Calabar, Nigeria: King Judah Publishers.
2. African Union Conference. (2003). *Allocation of 10 per cent of budget to agriculture*. Conference Report, Maputo, Kanya.
3. Aja, O. O., Chikaire, J., & Ejiogu-Okereke, E. N. (2010). Mobilization of Youths for effective participation in Agriculture: Implication for the attainment of Vision 20:2020 in Nigeria. *Proceedings of the Sixth Internatonoional Conference on Sustainable Development*, Ibadan, Nigeria, 6(14), 33-37.
4. Akande S. O, Falokun G. O, Taiwo S. O, Ogunwale A.O & Adeoye B.W. (2009). *Budget Process in Selected Countries: Lessons for Nigeria*. NISER Monograph Series No 1.
5. Altieri, M. A., Nicholls, C. I., Henao, A., & Lana, M. A. (2015). Agroecology and the design of climate change-resilient farming systems. *Agronomy for Sustainable Development*, 35, 869-890. <https://doi.org/10.1007/s13593-015-0285-2>
6. Arik, H., & Arik, M. (2009). Is It Economic Growth or Socioeconomic Development? A Cross-Sectional Analysis of the Determinants of Infant Mortality. *The Journal of Developing Areas*, 42(1), 31-55. <https://doi.org/10.1353/jda.0.0027>
7. Bowles, T. M., Mooshammer, M., Socolar, Y., Calderón, F., Cavigelli, M. A., Culman, S. W.,...Grandy, A. S. (2020). Long-term evidence shows that crop-rotation diversification increases agricultural resilience to adverse growing conditions in North America. *One Earth*, 2, 284-293. <https://doi.org/10.1016/j.oneear.2020.02.007>
8. Central Bank of Nigeria (CBN), *Statistical Bulletin 2005*, Abuja.
9. Central Bank of Nigeria (CBN). (2003). *Budgetary Allocations to Agriculture (Volume 14, December)*. Statistical Bulletin.
10. Coelli, T., Rahman, S., & Thirtle, C. (2002). Technical, Allocative, Cost and Scale Efficiencies in Bangladesh rice cultivation: A non-parametric approach. *Journal of Agricultural Economics*, 53, 607-626.
11. Department for International Development. (2004). *Agricultural sustainability*. Retrieved Nov. 17, 2012, from [www.dfid.agriculture-consultationnri.org/summaries/wp12.pdf](http://www.dfid.agriculture-consultationnri.org/summaries/wp12.pdf)

12. Dethier, J., & Effenberger, A. (2011). Agriculture and Development: A brief Review of the Literature. World Bank Policy Research Working Paper No 5553, Development Economics, Research Support Units, Jan.
13. Douillet, M., & Grandval, F. (2011). Nigeria's Agricultural Policy: Seeking coherence within strategic frameworks. Retrieved from [http://www.inter-reseaux.org/IMG/pdf/p16-18\\_Agric\\_Policy.pdf](http://www.inter-reseaux.org/IMG/pdf/p16-18_Agric_Policy.pdf)
14. Egli, L., Mehrabi, Z., & Seppelt, R. (2021). More farms, less specialized landscapes, and higher crop diversity stabilize food supplies. *Environmental Research Letters*, 16, 055015. <https://doi.org/10.1088/1748-9326/abf529>
15. Ekpebu, I. D., & Ukpong, I. G. (2012). Rethinking Agricultural Development in Nigeria: Paradox of Oil Wealth. Bloomington, USA: Authorhouse Publishing.
16. Emenyonu C.A., & Nwosu A.C (2021) A manual of Economic policy and analysis for students and practitioners in developing countries
17. Espinoza, R., Fornari, F., & Lombardi, M. (2009). The role of financial variables in predicting economic activity. Working Paper 1108, European Central Bank.
18. Eze, C. C., Amanze, B., & Nwankwo, O. (2010). Resource Use Efficiency in Arable Crop Production among Smallholder Farmers in Owerri Agricultural Zone of Imo State, Nigeria. *Researcher*, 2(5), 14-20. <http://www.sciencepub.net/researcher>.
19. FAO. (2016). Agriculture in Sub-Saharan Africa: Prospects and challenges for the next decade.
20. Fosu, A.K. (2015). Growth, inequality and poverty in Sub-Saharan Africa: recent progress in a global context. *Oxford Development Studies*, 43(1), 44-59. Ibitoye, S. J. (2012). Assessment of the levels of awareness and use of Agricultural Insurance Scheme among Rural Farmers in Kogi State, Nigeria. *International Journal of Agricultural Science Research and Technology*, 2(3), 143-148.
21. Hufnagel, J., Reckling, M., & Ewert, F. (2020). Diverse approaches to crop diversification in agricultural research: A review. *Agronomy for Sustainable Development*, 40, 14. <https://doi.org/10.1007/s13593-020-00617-4>
22. IFAD. (2013). Rural Poverty in Nigeria. Rural Poverty Portal. Retrieved from <http://www.ruralpovertyportal.org/country/home/tags/nigeria>
23. Iganinga, B., & Unemhili, D. (2011). The impact of government agricultural expenditure on agricultural output in Nigeria. *Journal of Economics*, 2(2), 81-88.
24. Iloh, E., & Nwokedi, M. (2016). Budget processes and participatory budgeting in Nigeria: Lessons from Latin America. *ANSU Journal of Arts and Social Sciences*, 5(1), 135-154.
25. International Institute of Sustainable Development. (2012). What is sustainable development? Environmental, Economic and Social well-being for today and tomorrow. Retrieved Nov. 20, 2012, from [www.iisd.org/sd/](http://www.iisd.org/sd/)
26. Iruo, F. A., Sogo, T. C., & Ukpong, I. G. (2010). Effect of rural-urban migration on Fisheries development in Bayelsa State, Nigeria: A Case of Yenagoa Agricultural Zone. *International Journal of Agricultural Economics and Extension*, 2(1), 6-16.
27. Isbell, F., Adler, P. R., Eisenhauer, N., Fornara, D., Kimmel, K., Kremen, C., Letourneau, D. K., Liebman, M., Polley, H. W., Quijas, S., & Scherer-Lorenzen, M. (2017). Benefits of increasing plant diversity in sustainable agroecosystems. *Journal of Ecology*, 105, 871-879. <https://doi.org/10.1111/1365-2745.12789>
28. Iverson, L., Echeverria, C., Nahuelhual, L., & Luque, S. (2014). Ecosystem services in changing landscapes: An introduction. *Landscape Ecology*, 29, 181-186. <https://doi.org/10.1007/s10980-014-9993-2>
29. Izuaka, M. (2021). Nigeria's agric spending plan highest in four years but still far below AU benchmark. Retrieved from: <https://www.premiumtimesng.com/agriculture/agric-news/490001-nigerias-agric-spending-plan-highest-in-four-years-but-still-far-below-au-benchmark.html?tztc=1> (Accessed January 11, 2024).
30. Jacho, D., & Salau, E. (2015). Social mobilisation: The missing link in Nigeria's search for food security. *Nasarawa Journal of Political Science*, 3(3), 45-54.
31. Kalirajan, K. (2007). Technical Efficiency of Major Food and Cash Crops in Karnataka, India. Crawford, 2(1). Measuring Agricultural Productivity Using the Average Productivity Index (API) by Lal Mervin Dharmasiri [1] Archived 2013-10-20 at the Wayback Machine.

32. Kilic, T., Palacios-Lopez, A., & Goldstein, M. (2021). Examining the impact of government spending on agricultural productivity in Ethiopia. *Journal of Agricultural Economics*, 72(2), 314-334. <https://doi.org/10.1111/1477-9552.12447>
33. Kremen, C., & Merenlender, A. M. (2018). Landscapes that work for biodiversity and people. *Science*, 362. <https://doi.org/10.1126/science.aau6020>
34. Kremen, C., & Miles, A. (2012). Ecosystem services in biologically diversified versus conventional farming systems: Benefits, externalities, and trade-offs. *Ecology and Society*, 17. <https://doi.org/10.5751/ES-05035-170440>
35. Marini, L., St-Martin, A., Vico, G., Baldoni, G., Berti, A., Blecharczyk, A., ... Bommarco, R. (2020). Crop rotations sustain cereal yields under a changing climate. *Environmental Research Letters*, 15, Article 124011. <https://doi.org/10.1088/1748-9326/abc651>
36. Ngadi, N., Zaelany, A.A., Latifa, A., Harfina, D., Asiati, D., Setiawan, B., Ibnu, F., et al. (2023). Challenge of Agriculture Development Indonesia: Rural Youth Mobility and Aging Workers in Agriculture Sector. *Sustainability*, 15(2), 922. <https://doi.org/10.3390/su15020922>
37. Nhemachena, C., Matchaya, G., Nhlengethwa, S., & Muchara, B. (2020). Impact of public agricultural spending on crop productivity in Southern Africa. *Development Southern Africa*, 37(1), 58-73. <https://doi.org/10.1080/0376835X.2019.1609917>
38. Nwibo, S., Umeh, G., Ezeh, A., Nwofoke, C., & Mbam, B. (2018). Contributions of homestead agriculture to food security among urban households in Abakaliki metropolis of Ebonyi, state, Nigeria. *Journal of Agriculture*, 49(2), 68-75.
39. Ogundari, K., Ojo, S. O., & Ajibefun, I. A. (2006). Economics of Scale and Cost Efficiency in Small Scale Maize Production: Empirical Evidence From Nigeria. *Journal of Social Science*, 13(2), 131-136.
40. Ogunlade, I., Oladele, O. I., & Ogunsola, M. B. (2009). Impact of Green River Project on Livelihood of Farmers in Rivers State, Nigeria. *J. Hum. Ecol.*, 26(2), 81-84.
41. Ogunyemi, O., & Adedokun, A. (2012). Annual budgetary allocation to agriculture, rural income distribution and agricultural growth and development. Retrieved from <https://www.semanticscholar.org/paper/ANNUAL-BUDGETARY-ALLOCATION-TO-AGRICULTURE%2C-RURAL-Ogunyemi-Adedokun/a5cee924bd676074d6...>
42. Ojabello, O. (2023). Nigeria's 2024 Budget: Assessing "Renewed Hope" for Agriculture. Retrieved from: [https://businessday.ng/opinion/article/nigerias-2024-budget-assessing-renewed-hope-for-agriculture/#:~:text=In%20comparison%20to%20the%202023,more%20than%20the%20previous%20year.\(Accessed January 12, 2024\).](https://businessday.ng/opinion/article/nigerias-2024-budget-assessing-renewed-hope-for-agriculture/#:~:text=In%20comparison%20to%20the%202023,more%20than%20the%20previous%20year.(Accessed%20January%2012,%202024).)
43. Ojekunle, A. (2020). Despite ₦592.9 Billion Budget on Agriculture in the Last Five Years – There's Less to Show For It. Retrieved from: <https://www.dataphyte.com/latest-reports/agriculture/despite-%E2%82%A6592-9-billion-budget-on-agriculture-in-the-last-five-years-theres-less-to-show-for-it/> (Accessed January 11, 2024).
44. Oserei, M., Abdulquadri, A., Muhammed, B., & Daramolas, R. (2022). Impact analysis of budgetary allocation on Nigerian agricultural sector performance. Retrieved from <https://www.researchgate.net>
45. Ozor, N., Chukwuone, N. A., Madukwe, M. C., & Garforth, C. J. (2007). Cost-sharing of Agricultural Technology transfer in Nigeria: Perceptions of Farmers and Extension Professionals. *Journal of Agricultural Education and Extension*, 13(1), 23-37. <http://dx.doi.org/10.1080/13892240601162072>
46. Paudel, P., & Matsuoka, A. (2009). Cost Efficiency Estimates of Maize Production in Nepal: A case study of the Chitwan District. *Journal of Agricultural Economics-CZECH*, 55(3), 139-148.
47. Petershie, B. E. K. (2008). *Management Economics (Revised Edition)*. Terror Publications, Accra, Ghana.
48. Ponisio, L. C., M'Gonigle, L. K., Mace, K. C., Palomino, J., de Valpine, P., & Kremen, C. (2015). Diversification practices reduce organic to conventional yield gap. *Proceedings of the Royal Society B: Biological Sciences*, 282, 20141396. <https://doi.org/10.1098/rspb.2014.1396>
49. Popova, Y., & Podolyakina, N. (2014). Pervasive Impact of Corruption on Social System and Economic Growth. *Procedia-Social and Behavioral Sciences*, 110, pp.727-737. <https://doi.org/10.1016/j.sbspro.2013.12.917>
50. Preckel, Paul V.; Hertel, Thomas W.; Arndt, Channing; Nin, Alejandro (2003-11-01). "Bridging the Gap between Partial and Total Factor Productivity Measures Using Directional Distance Functions".

- American Journal of Agricultural Economics, 85(4), 928–942. doi:10.1111/1467-8276.00498. ISSN 0002-9092. S2CID 154456202
51. Renard, D., & Tilman, D. (2019). National food production stabilized by crop diversity. *Nature*, 571, 257-260. <https://doi.org/10.1038/s41586-019-1316-y>
  52. Ryckman, M.L. (2019). What is Budgetary Allocation? Retrieved from: <https://smallbusiness.chron.com/budgetary-allocation-31340.html> (Accessed January 10, 2024).
  53. Segura, J. A. (2010). The contribution of agriculture to sustainable development in Jamaica. Inter-American Institute for Cooperation on Agriculture (IICA). ISBN 13:978-92-9248-284-8. Retrieved Nov. 18, 2012, from [www.iica.int/Esp/regrones/andina/peru/Publications%20de](http://www.iica.int/Esp/regrones/andina/peru/Publications%20de)
  54. Taiwo, I. O. (2001). Review and Appraisal of the Year 2000. Federal Government Budget performance. *Central Bank of Nigeria Bullion*, 25(1).
  55. Tamburini, G., Bommarco, R., Wanger, T. C., Kremen, C., van der Heijden, M. G. A., Liebman, M., & Hallin, S. (2020). Agricultural diversification promotes multiple ecosystem services without compromising yield. *Science Advances*, 6, eaba1715. <https://doi.org/10.1126/sciadv.aba1715>
  56. Tanko, L., & Jirgi, A. J. (2008). Economic Efficiency among Smallholder Arable Crop Farmers in Kebbi State, Nigeria. *Continental Journal of Agricultural Economics*, 2, 14-22.
  57. The World Bank. (2023). Agriculture and Food. Retrieved from: <https://www.worldbank.org/en/topic/agriculture/overview> (Accessed January 11, 2024).
  58. Tilman, D., Reich, P. B., & Knops, J. M. H. (2006). Biodiversity and ecosystem stability in a decade-long grassland experiment. *Nature*, 441, 629-632. <https://doi.org/10.1038/nature04742>
  59. Uzomba, P. C., Imoisi, A. I., & Somiari, S. (2012). The Impact of Macroeconomic variables on non-oil exports performance in Nigeria, 1986-2010. *Journal of Contemporary Research*, 9(1), 1-17.
  60. Workneh, M.A. (2020). Gender Inequality, Governance, and Poverty in Sub-Saharan Africa. *Poverty & Public Policy*, 12(2), 150-174.
  61. Yeboah, F.K., & Jayne, T.S. (2018). Africa's evolving employment trends. *J. Dev. Stud.*, 54(5), 803-832, 10.1080/00220388.2018.1430767.
  62. Zalkuwi, J., Maurice, D. C., & Yusuf, C. (2014). Determinant of Cost Efficiency in Cowpea Production: A Case Study of Adamawa State, Nigeria. *International Journal of Science and Research*, 3(9), 407-410.