



## EFFECTS OF AGRO-PROCESSING, PRODUCTIVITY ENHANCEMENT AND LIVELIHOOD SUPPORT (APPEALS) PROJECT ON THE LIVELIHOOD OF PARTICIPATING YOUTH CROP FARMERS IN KOGI STATE, NIGERIA

<sup>1</sup>Ahmed, S. O., Yusuf, H. O. and Omokore, D. F.

Department of Agricultural Extension and Rural Development, Faculty of Agriculture,  
Ahmadu Bello University, Nigeria

**Corresponding Author's E-mail:** ahmedsalih6495@gmail.com, **GSM:** 07035595612

### ABSTRACT

The research analysed the effects of Agro-Processing, Productivity Enhancement and Livelihood Support (APPEALS) Project on the livelihood of participating youth crop farmers in Kogi State, Nigeria. A multi-stage sampling techniques was used to select 235 respondents for the study. Data were collected through the administration of structured questionnaire and analyzed using descriptive statistics and inferential statistics. The results revealed that, the youth crop farmers were in their active age with the mean age of 33 years. The results also, revealed that 71.9% of the respondents were male. While 43.8% have spent 1-5 years in cooperative societies with a mean of 3 extension visits in a month. The results of Z-test revealed that cassava farmers had a mean differences on yield of 50.8tons with Z-value of 14.297 ( $P<0.01$ ), rice farmers had mean differences of 6.15 tons and Z-value of 6.365 ( $P<0.01$ ), and cashew farmers had mean differences of 2.84 tons with a Z-value of 13.042 ( $P<0.01$ ). On income, cassava farmers had a mean differences of ₦116769.2 with Z-value of 4.043 ( $P<0.01$ ), rice farmers had mean differences of ₦1389361.0 and Z-value of 3.572( $P<0.01$ ), and cashew farmers had mean differences of ₦494894.2 with a Z-value of 4.644 ( $P<0.01$ ). On level of living, the mean differences of youth crop farmers before and after participating in APPEALS project was ₦1509155.5 with Z-value of 4.215 ( $P<0.01$ ). Household assets such as furniture, school fees, knapsacks sprayer, planter and sewing machine were majorly increased with a percentage difference of 10.5%, 13.2%, 18.1%, 75% and 10% respectively. Livestock assets such as cow, ducks, chicken and rabbit were increased by 41.6%, 42.8%, 96.6% and 81.4% respectively, showing substantial livelihood improvement before and after participation in APPEALS project. It was concluded that, APPEALS project had a significant positive effects on the livelihood of youth crop farmers. Based on the findings of this study, the following recommendations are made: The government and relevant stakeholders should consider expanding the project to reach more youth crop farmers, ensuring broader participation and increased agricultural productivity and continued access to credit facilities, training, and modern farming equipment should be provided to farmers to sustain the yield and income growth observed in the study.

**Keywords:** Youth, Crop, Farmers, Livelihood, APPEALS,

### INTRODUCTION

The global population by 2050 is estimated to reach 9.7 billion. This increase puts immense pressure on the agriculture sector to produce more food (World Bank, 2023). African economies and African societies rely highly on agriculture not just for food production, but also for the livelihoods of the many Africans (AFDB, 2020). However, Nigerian agriculture which is characterised by smallholder and poor farmers needs consistent and effective agricultural programmes to meet the food demand for the teaming population (Lokpobiri, 2019).

To enhance the agricultural productivity of small and medium scale farmers and improve value addition along the priority value chains in Kogi State, agricultural development programme such as Agro-Processing, Productivity Enhancement and Livelihood Support (APPEALS) was put in place by World Bank in 2017, to provide all the necessary support to farmers in Kogi State which include provision of grants to many youth farmers. APPEALS project is a 6-year project designed in line with the Agricultural Promotion Policy (APP) of the Federal Government. It intends to build on the legacy of the Agricultural Transformation Agenda (ATA), and plans to support policy trusts on



food security, local production, job creation and economic diversification. The project is targeting 60,000 individuals as direct beneficiaries ie. 10,000 beneficiaries per State, and 300,000 farm household members as indirect beneficiaries. The participating States and value chains include Cross River (Rice, Cocoa, Poultry), Enugu (Rice, Cashew, Poultry), Kaduna (Maize, Ginger, Dairy) Kano (Rice, Wheat, Tomato), Kogi (Cassava, Cashew, Rice), Lagos (Rice, Aquaculture, Poultry).

The implementation of the Agro-Processing, Productivity Enhancement, and Livelihood Support (APPEALS) program in Kogi State plays a pivotal role in promoting youth participation in agriculture, which is crucial for enhancing their livelihoods. By providing grants and necessary support to young farmers, APPEALS empowers the youth to actively engage in agricultural activities, particularly in priority value chains (APPEALS, 2018). There is need to engage youths in agriculture to curb unemployment and its negative impact on the social wellbeing of the society (Joy-Uyo *et al.*, 2024). Despite various policies and programs implemented toward improving livelihood of farmers in the State, many farmers still have poor livelihood. Hence the evidence that Nigerian agricultural programmes are still under-implement. Oyetunde-Usman *et al.* (2021), emphasized the importance of agricultural programmes to famers livelihood.

Presently, there is little literature available with regards to effects of Agro-Processing, Productivity Enhancement and Livelihood Support (APPEALS) Project on the livelihood of youth crop farmers in the Kogi State. This has behoves this research to fill the empirical gap in order to provide useful information that addresses this topical issue. Therefore, this study seeks to address the following research objectives; describe the socioeconomic characteristics of the youth crop farmers in the study area and examine the effects of APPEALS project on the livelihood of youth crop farmers participant.

## **METHODOLOGY**

The study was carried out in Kogi State, Nigeria. The State lies on latitude 71' 49°North and longitude 61' 45°East with a geological feature depicting young sedimentary rocks and alluvium along the riverbeds, which promotes agricultural activities and has an average maximum temperature of 33.2°C and average minimum of 22.8°C (Nigerian Meteorological Agency, 2022). Kogi State occupies 29,833 square kilometers and has an estimated population of 218, 541, 212 in 2023 projected from 2006 census of 4,551,669 using 2.53% growth rate (National Population Commission, 2006; National Population Commission, 2023). It shares common boundaries with Niger, Kwara, Nassarawa and Federal Capital Territory to the north. To the east, the State is bounded by Benue State, to the south by Enugu and Anambra States, and to the west by Ondo, Ekiti and Edo States (Okeowo and Fatoba, 2022). The State is nicknamed the "Confluence State" due to the confluence of River Niger and River Benue occurs next to its capital, Lokoja. Economically, Kogi State is largely based around agriculture, mainly of cassava, cashew, ground nut, cocoa, oil palm, rice and yam crops.

### **Sampling Technique and Sample Size**

A multi-stage sampling procedure was used in determining the sample size for the study. In the first stage, Random sampling techniques was used to select three L.G.As (namely; Ofu, Kabba/Bunu and Okene) from the three senatorial districts of the state. In the second stage, simple random sampling was use to select five communities from each L.G.A selected above, making a total number of 15 communities for the study. Finally, The Kogi Agro-processing, Productivity Enhancement and Livelihood Support (APPEALS) Project has documented 572 youth crop farmers who are beneficiaries of agricultural credit in the selected communities form the sample frame. 41% i.e., 235 youth crop farmers were randomly selected as sample size using Taro Yamane formula (1967). Primary data was used for the study. Structured questionnaire was used to collect the necessary information in line with the objectives. Three Enumerators were used for data collection exercise which were supervised by the researcher. Descriptive statistics such as frequency mean and percentage was used to achieved objective (i) and Z-test analytical tool was used to achieved objective ii. Farmers yield and income are the indicators of livelihood for this study. The comparison using the difference in yield and income of youth crop farmers before and after acquiring credit.



$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where, Z is the calculated Z value

$\bar{x}_1$  = mean yield/income/level of living after participating in APPEALS project

$\bar{x}_2$  = mean yield/income/level of living before participating in APPEALS project

$\sigma_1$  = standard deviation after participating in APPEALS project

$\sigma_2$  = standard deviation before participating in APPEALS project

$n_1$  = number of youth farmers after participating in APPEAL project

$n_2$  = number of youth before participating in APPEALS project

## RESULTS AND DISCUSSION

### Socioeconomic and Institutional Characteristics of Crop Farmers

Results in Table 1 revealed that majority (71.9%) of the crop farmers were male and were involved in crop farming, while 28.1% were female. This implies that crop farming is dominated by male, this may be due to the fact that men had access to production resources more than their female counterparts. This is in line with the work of Mgbanya *et al.* (2019) who revealed that, most of the youth crop farmers were male in Ishielu Local Government Area of Ebonyi State, Nigeria. The results also revealed that 46.8% of the crop farmers were within the age range of 26-35 year with a mean of 33 years, while 26.4% of the crop farmers were between the age of 36-45 years of age. This implies that crop farmers in the study area are in their productive age and could be ready to harness the potentials in agricultural sector. This agrees with the work of Muhammed *et al.* (2019) who found that participants in Survival Farming Intervention Programme in Kogi State were in their active age. The results presented in Table 1 revealed that a large number (65.5%) of the crop farmers had a household size ranging from 2-5 members with a mean of 5 members. This implies that most of the crop farmers in the study area could have a significant number of people contributing to family labour which may reduce the cost of production. This is consonance with the study of Reddy-sravanth and Sundaram (2023), who points out that majority of the farmers in India has a considerably large household size.

The results further revealed that, majority (86.8%) of the crop farmers had a farm size ranging from 1-2 hectares with a mean of 1.87 hectares, while 13.2% of the respondents has a land size of between 3-4 hectares for crop farming. This implies that, youth crop farmers in the study area were small-scale farmers. This is agrees with the work of Osabohien and Al-Faryan (2024), who reported that, most youth crop farmers in Nigeria are smallholder farmers. In addition, the results showed that majority (60.9%) of the crop farmers had a farming experience of 1-5 years, while 12.3% and 26.8% 11-15 and 6-10 years with a mean of 4.75 years of farming experience. This implies that, youth crop farmers in the study area had a considerable farming experience that could be useful to them in their routine decision making. This is in line with the work of Mbanasor *et al.* (2024), who in their study revealed that crop farmers in South-East Nigeria had plenty years of farming experience. The results revealed that, majority (61.7%) of the crop farmers had secondary education, while 9.8%, 11.6% and 16.6% had informal education, primary and tertiary education, respectively.

This implies that, youth crop farmers in the study area are liable to make good farming decision often. This is due to their ability to read and write and probably understand clearly new farming technologies, practices and ideas that can improve their production. This is consonance with the work of Osabohien *et al.* (2021), who found that majority of youths in the study area has formal education with less illiteracy level.

Furthermore, the results in Table 1 revealed that, majority (53.3%) of the crop farmers sourced their information about crop production from extension agents. 6.4% of the respondents sourced their information from Radio, 6.0% of the respondents from television, 12.8% of the respondents from newspapers, 11.9% of the respondents from family and friends. This implies that, youth crop farmers in the Kogi State could easily have access to reliable and viable information from extension agents to help improve their farming practices. This is aligned with the work of Akinbode *et*



*al.* (2024), we reported that farmers in Southwest Nigeria mostly rely on extension agents to get information.

Results in Table 1 revealed that, almost all (99.1%) all the crop farmers were in one cooperative society or the other. Also, 43.8% of the respondents had been a member of cooperative society for about 1-5 years with a mean of 4.68. This implies that youth crop farmers in the study area could have access to benefits from their cooperatives societies. This agrees with the work of Abdulwahab and Umar (2024), who found that, most farmers in Niger State were in cooperative societies. Results in Table 1 revealed that most (95.7%) of the crop farmers had extension contact with a mean extension visit of 3times in a month. This implies that, youth crop farmers in Kogi State had a reasonable number of extension visits that could help them improved their farming practices and further increase their yield and income. This is consonance with the work of Osabohien *et al.* (2021), who reported that, most of the youth farmers in Nigeria had extension contact.

**Table 1: Socioeconomic and Institutional Characteristics of the Respondents**

<b>Socioeconomic characteristics</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Mean</b>	<b>Std. dev.</b>
<b>Sex</b>				
Male	169	71.9		
Female	66	28.1		
<b>Age</b>				
18-25	52	22.1		
26-35	110	46.8	33.0	7.80
36-45	62	26.4		
46 above	11	4.7		
<b>Household size</b>				
11-15	154	65.5	5	4.03
6-10-	71	30.2		
2-5	10	4.3		
<b>Farm size</b>				
1-2	204	86.8	1.87	1.29
3-4	31	13.2		
<b>Farming experience</b>				
1-5	143	60.9	4.75	7.76
6-10	63	26.8		
11-15	29	12.3		
<b>Level of education</b>				
Informal education	23	9.8		
Primary education	28	11.9		
Secondary education	145	61.7		
Tertiary education	39	16.6		
<b>Sources of information</b>				
Radio	15	6.4		
Television	14	6.0		
Newspaper	30	12.8		
Social media	28	11.9		
Family and friends	18	7.7		
Extension agent	130	53.3		
<b>Membership of cooperative societies</b>				
Member	233	99.1		
Non member	2	0.9		
<b>Years of membership</b>				
1-5	103	43.8	4.68	2.99
6-10	99	42.1		
11-15	33	14.0		
<b>Extension contact</b>				
Yes	225	95.7		
No	10	4.3		
<b>Numbers of extension visits</b>				
1-3	223	94.9	2.66	1.30
4-6	12	5.1		

**Effect of APPEALS Project on Livelihood of Youth Crop Farmers’ Participants**  
**Effect of APPEALS Project on Youth Crop Farmers’ Yield**

Result in Table 2 revealed that, the mean differences on the yield of cassava before and after participating in APPEALS project was 50.8tons and was significant at 1% level of probability with Z-value of 14.297. This implies that, participating in APPEALS project has increase the yield of cassava farmers. Also, the result shows that, rice farmers had mean differences of 6.15 tons and Z-value of 6.365 which was significant at 1% level of probability. This implies that participating in APPEALS project increased the yield of rice farmers. In the same vein, cashew farmers had mean differences of 2.84 tons with a Z-value of 13.042. This is significant at 1% level of probability indicating that, after participating in APPEALS project, the yield of cashew farmers increased significantly. This was in line with the work of Etuk and Ayuk (2021), who reported that those who participated in Commercial Agricultural Development Project (CADP) had their income increased and were better off in terms of their welfare compared to those who did not participate in the program.

**Table 2: Effect of APPEALS Project on Youth Crop Farmers’ Yield**

Crops	Yield Before		Mean	Yield After		Mean	Mean diff.	Z-value
	Freq.	%		Freq.	%			
<b>Cassava (tons)</b>								
1-10	49	26.3	21.68	10	5.4	72.53	50.8	14.207***
11-20	51	27.4		2	1.1			
21-30	41	22.0		3	1.6			
31 above	45	24.2		171	91.6			
<b>Rice (tons)</b>								
1-3	27	67.5	3.35	2	5.0	5.53	6.15	6.365***
4-6	7	17.5		10	25			
7-9	4	10.0		11	27.5			
10 and above	2	5.0		17	42.5			
<b>Cashew (tons)</b>								
1-2	75	72.1	1.74	23	22.1	4.58	2.84	13.042***
3-4	27	26.0		29	27.9			
5 and above	2	1.9		52	50.0			

**Effect of APPEALS Project on Youth Crop Farmers’ Income**

Result in Table 3 revealed that, the mean differences on the income of cassava before and after participating in APPEALS project was ₦116769.2 and was significant at 1% level of probability with Z-value of 4.043. This implies that, participating in APPEALS projective has increase the income of cassava farmers. Also, the result shows that, rice farmers had mean differences of ₦1389361.0 and Z-value of 3.572 which was significant at 1% level of probability. This implies that participating in APPEALS project increases the income of rice farmers significantly. In the same vein, cashew farmers had mean differences of ₦494894.2 with a Z-value of 4.644. This was significant at 1% level of probability indicating that, after participating in APPEALS project, the income of cashew farmers increases significantly. This is in line with the work of Osabohien *et al.* (2020) who found that, households who had access to agricultural credit had yields three times more than the counterfactuals.

**Table 3: Effect of APPEALS Project on Youth Crop Farmers' Income**

Crops	Income Before			Income After			Mean diff.	Z-value
	Freq.	%	Mean	Freq.	%	Mean		
<b>Cassava (₦)</b>								
<100000-500000	131	70.4	361817.7	99	53.2	478586.9	116769.2	4.043***
500001-1000000	54	29.0		80	43.0			
1000001 above	1	0.5		7	3.8			
<b>Rice (₦)</b>								
<100000-300000	35	87.5		27	67.5			
300001-500000	2	5.0		6	15.0			
500001 above	3	7.5	335138.9	7	17.5	1565750.0	1389361.0	3.572***
<b>Cashew (₦)</b>								
<100000-500000	90	86.5		56	53.8			
500001-1000000	14	13.5	259067.3	37	35.6	753961.3	494894.2	4.644***
1000001 above	-	-		11	10.6			

**Effect of APPEALS Project on Youth Crop Farmers' Livelihood**

Result in Table 4 revealed that, the mean differences on the level of living of youth crop farmers before and after participating in APPEALS project was ₦1509155.5 and was significant at 1% level of probability with Z-value of 4.215. This implies that, participating in APPEALS projective has improved the level of living of youth crop farmers. This is in line with the work of Adi *et al.* (2022), who revealed that, Community and Social Development Project (CSDP) had impacted positively on rural development and the living standard of farmers.

**Table 4: Effect of APPEALS Project on Youth Crop Farmers' Livelihood**

Level of living (₦)	Level of living Before			Level of living After			Mean diff.	Z-value
	Freq.	%	Mean	Freq.	%	Mean		
<1000000-4000000	143	60.9		110	46.7			
4000001-6000000	29	12.3	6603456.3	32	13.5	8112611.7	1509155.5	4.215***
6000001-8000000	24	10.2		25	11.0			
8000001-10000000	6	2.6		11	4.6			
10000001 above	33	14.0		57	24.2			

**Assets Distribution among Youth Crop Farmers before and after Participating in APPEALS Project**

Results in Table 5 revealed that, household assets such as furniture, school fees, knapsacks sprayer, planter and sewing machine were majorly increased after participating in APPEALS project with a percentage difference of 10.5%, 13.2%, 18.1%, 75% and 10% respectively. In the same vein, livestock assets such as cow, ducks, chicken and rabbit were increased after participating in APPEALS project with a percentage difference of 41.6%, 42.8%, 96.6% and 81.4% respectively. This implies that, both the household and livestock assets of youth crop farmers increased after participating in APPEALS project has shown in the study area. This reflects on their improved livelihood as the effect of the project. This aligns with the work of Abdul-Wasiu (2021), who found that, Fadama III intervention project in the study area has significant positive effect on the livelihoods of the beneficiaries such as moderate success in individual ability to own assets.

**Table 5:** Asset's Ownership by Youth Crop Farmers before and after Participating in APPEALS Project

Assets	Before		After		Percentage diff.
	Freq.	Percentage	Freq.	Percentage	
House (new/renovation)	168	49.2	173	50.7	1.5
Furniture	139	44.8	171	55.2	10.5
Car	39	48.1	42	51.9	3.8
School fees (₦)	42541999	43.2	55547000	56.6	13.2
Motorcycle/tricycle	73	47.4	81	52.6	5.2
Cell phone	181	48.5	192	51.5	3
Television	135	47.9	147	52.1	4.2
Radio	86	49.4	88	50.6	1.2
Knapsack sprayer	159	40.9	229	59.0	18.1
Grinding machine	20	50	20	50	0.0
Planter	1	12.5	7	87.5	75
Land	347	47.6	382	52.4	4.8
Hoes	556	47.8	606	52.1	4.3
Wheel barrow	151	47.6	166	52.4	4.8
Cutlas	546	49.7	552	50.3	0.6
Sewing machine	20	44.4	25	55.6	10
Cow	28	29.2	68	70.8	41.6
Goat	483	49.1	501	50.9	1.8
Sheep	87	47.5	96	52.5	5
Ducks	6	28.6	15	71.4	42.8
Chicken	5815	1.7	336934	98.3	96.6
Rabbit	2	4.3	12	85.7	81.4

## CONCLUSION AND RECOMMENDATIONS

In conclusion, the study concludes that the APPEALS project has positive and significant effects on the livelihood of youth crop farmers in the study area. Also, the project led to substantial increase in yield, income and level of living of cassava, rice and cashew farmers after participation in APPEALS project, as evidenced by significant mean differences and Z-values at a 1% level of probability. Additionally, participants experienced improved asset ownership, including household and livestock assets, further enhancing their economic stability. These results align with previous studies, confirming that agricultural intervention programs contribute significantly to farmers' productivity, income and welfare. Therefore, continued investment in such projects is essential for sustaining agricultural growth and improving rural livelihood. Based on the findings of this study, the following recommendations were made:

1. The government and relevant stakeholders should consider expanding the project to reach more youth crop farmers, ensuring broader participation and increased agricultural productivity.
2. Continued access to credit facilities, training, and modern farming equipment should be provided to farmers to sustain the yield and income growth observed in the study.
3. Policies should be implemented to enhance market linkages for farmers, ensuring they get fair prices for their produce and maximizing the benefits of increased yield.
4. Regular assessments should be conducted to measure the long-term impact of the APPEALS project and make necessary improvements to further enhance its effectiveness.
5. Government agencies and NGOs should promote agricultural incentives and awareness campaigns to attract more young people into farming, ensuring food security and employment generation.
6. Beneficiaries should be encouraged to diversify into other high-value crops and livestock farming to further enhance their income and resilience against market fluctuations.
7. More extension officers should be deployed to provide continuous technical support, training, and innovative farming practices to maximize the impact of the project.



## REFERENCES

- Abdulwahab, A., & Umar, S. (2024). An Appraisal of Farmers' Knowledge Level on Information and Communication Technologies Utilization in Niger State, Nigeria. *Journal of Animal and Plant Research*, **1**(3): 22-29.
- Sanusi, W.A., and Gado, M.A. (2021). Impact of Fadama III development project on livelihoods in Kware Local Government are of Sokoto State. *International Journal of Management Studies and Social Sceince Research*, **3**(5): 194-206.
- Adi, S.S., Daniel, R.A, Sule, H., Samuel, H., John, M.A., and Gaisa, N.J. (2022) Department of Agricultural Extension and Management, College of AgricultureJalingo, Nigeria, *Journal of Community and Social Development Project*, **82**(1): 21-24.
- African Development Bank Group. (2020). African economic outlook 2020: Developing Africa's workforce for the future. Retrieved March 4, 2024, from <https://www.afdb.org/en/knowledge/publications/african-economic-outlook>
- Agro-Processing, Productivity Enhancement and Livelihood Support (APPEALS) Project. (2018). Project components. Retrieved April 17, 2024, from <https://lagosappeals.ng/About/Project-Components>
- Akinbode, S. O., Folorunso, O., Olutoberu, T. S., Olowokere, F. A., Adebayo, M., Azeez, S. O., ... & Busari, M. A. (2024). Farmers' Perception and Practice of Soil Fertility Management and Conservation in the Era of Digital Soil Information Systems in Southwest Nigeria. *Agriculture*, **14**(7): 1182.
- Etuk, E.A. and Ayuk, J.O. (2021). Agricultural commercialisation, poverty reduction and pro-poor growth: evidence from commercial agricultural development project in Nigeria, *Heliyon*, **7**(5): 1-11.
- Joy-Uyo, A. A., Adama, I., Sumaila, A., and Suleiman, R. (2024). Assessment of the Causes of Poverty and Unemployment in Omala Local Government Area, Kogi State, Nigeria. *International Journal of Democracy and Development Studies*, **6**(4): 34-42.
- Lokpobiri, H. (2019). Nigerian Agriculture Promotion Policy 2016–2020: towards a new paradigm for domestic food security and Foreign Exchange earnings in agricultural production. *Public Policy and Administration Research*, **9**(3): 47-57.
- Mbanasor, J. A., Kalu, C. A., Okpokiri, C. I., Onwusiribe, C. N., Nto, P. O., Agwu, N. M., &Ndukwu, M. C. (2024). Climate smart agriculture practices by crop farmers: evidence from south east Nigeria. *Smart Agricultural Technology*, **8**: 1-12.
- Mgbanya, J. C., Eze, A., Amuta, L. A., and Igwe E. O. (2019). Effect of Socioeconomic Characteristics of Youth Farmers on the Rice Production Project in Ishielu Local Government Area of Ebonyi State, Nigeria. *Direct Research Journal of Agriculture and Food Science*, **7**(4): 70-76.
- Muhammed, Y., Akpoko, J. G., Wamdzu, M. M., Oladipo, J. A., & Usman, M. H. (2019). Factors influencing participation of Cassava farmers in survival farming intervention programme in Kogi State, Nigeria. *Journal of Agricultural Extension*, **23**(2): 22-30.
- National Population Commission (2007). *Population and Development Review*. **33**(1): 206-210.
- National Population Commission (2023). *Population and Development Review*. **45**(2): 209-213. Retrieved from <https://nationalpopulation.gov.ng/2023-census>.
- Nigerian Meteorological Agency (NiMet). (2022). Climate data in Kogi State. Retrieved February 23, 2022, from <https://sciencenigeria.com/nimet-presents-2022-seasonal-rainfall-temperature-prediction/>
- Okeowo, G., & Fatoba, I. (2022). State of states 2022 edition. Retrieved February 23, 2024, from <https://www.budgit.org>
- Osabohien R, Osuagwu E, Osabuohien E, Ekhatior-Mobayode UE, Matthew O and Gershon O (2020). Households access to agricultural credit and agricultural production in Nigeria: A Propensity Score Matching model, *South African Journal of Economic and Management Sciences*, **23**(1):1-11.



- Osabohien, R., & Al-Faryan, M. A. S. (2025). Youth in agriculture and food security in Nigeria. *International Journal of Social Economics*, **52**(4): 501-514.
- Osabohien, R., Wiredu, A. N., Nguetzet, P. M. D., Mignouna, D. B., Abdoulaye, T., Manyong, V., ... & Awotide, B. A. (2021). Youth participation in agriculture and poverty reduction in Nigeria. *Sustainability*, **13**(14): 7795.
- Oyetunde-Usman, Z., Olagunju, K. O., & Ogunpaimo, O. R. (2021). Determinants of adoption of multiple sustainable agricultural practices among smallholder farmers in Nigeria. *International Soil and Water Conservation Research*, **9**(2): 241-248.
- Reddy Sai Sravanth, K., and Sundaram, N. (2023) Analysis of socioeconomic status of young migrant farmers in India using probit regression, *Economic Research/Ekonomski Istraživanja*, **36**(1): 2106267.
- World Bank. (2023). *Agriculture and food*. Retrieved October 10, 2024, from <https://www.worldbank.org/en/topic/agriculture>
- Yamane, T. (1967). *Statistics: An introductory analysis (2nd ed.)*. New York, NY: Harper & Row.