ECONOMIC EVALUATION OF ENTERPRISES SUPPORTED BY AGRO PROCESSING, PRODUCTIVITY ENHANCEMENT AND LIVELIHOOD IMPROVEMENT SUPPORT PROJECT IN CROSS RIVER STATE, NIGERIA

Peter O. Obuo, Susana B. Ohen, Gabriel N. Odok, Amarachi E. Uzoigwe, Joseph U. Ukpabiku, Uket I. Ofem
Department of Agricultural Economics, University of Calabar,
PMB, 115 Calabar, Nigeria
Corresponding author's email: obuopeter@gmail.com

Abstract

The study carried out an economic evaluation of rice, cocoa, and broiler production enterprises supported by the World Bank-Assisted Agro Processing, Productivity Enhancement and Livelihood Improvement Support (APPEALS) project in Cross River State, Nigeria''. Using a sample of 391 cooperatives, data were collected through questionnaires, records, and focus group discussions. Results from the study showed that, APPEALS-supported enterprises differ in scale, age and earnings, with cocoa most established and profitable, rice more labor-intensive but lower earning, and broilers younger, moderately profitable and better educated managers. Among the average total cost incurred by these enterprises per hectare, labour cost accounted for 64.70 percent of the average total costs for rice. Similarly, for a batch of 500 broilers enterprises, the cost of feed accounted for 63.9 percent of the average total costs while for cocoa enterprises, rent on farm accounted for 70.46 percent of the average total costs. The profit margin percentage of 25.3%, 26.9% and 38.5% was obtained for rice, broiler and cocoa enterprises respectively, while return on investment of 0.34, 0.63 and 0.37 for rice, cocoa and broilers were realized. This implies that for every one naira invested across the production of these three commodities, benefits of ₦ 0.34, ₦ 0.63 and ₦ 0.37 were achieved confirming the profitability of APPEALS-supported agribusinesses. The study recommended policy to promote cooperative development and cluster-based support for cocoa and rice, drawing on the broiler model to improve market access, input sourcing, and collective bargaining.

Key Words: Agribusinesses, Cost and returns, Donor Project

Introduction

Agriculture accounts for more than sixty percent of Nigeria's Gross Domestic Product (GDP), serving as a major source of employment, ensuring food availability, and sustaining rural communities. However, the agricultural sub-sector in Nigeria is under performing, due to low output levels, poor market access, inadequate infrastructure especially in rural areas, and support for Small Holder Farmers. Tackling these challenges, the Nigerian government, in collaboration with donor partners like the World Bank, Food and Agricultural

Organization (FAO), and International Fund for Agricultural Development (IFAD), have supported several agricultural development projects across the country with the view of strengthening agricultural value chains, increasing productivity, and improving incomes by farmers. One of such donor's funded project is the Agro-Processing, Productivity Enhancement and Livelihood Improvement Support (APPEALS) Project implemented across five States in Nigeria (Cross River, Enugu, Kaduna, Kano, Kogi and Lagos), in which the targets priority value chains, were; rice, cocoa, and poultry (broiler), with a core objective of increasing productivity and improving processing and marketing capacities.

Cross River State, blessed with rich fertile land and agro-ecological conditions supporting vast agricultural crops, is a key beneficiary of APPEALS project. The APPEALS project was design to mitigate barriers by providing specialized support, input subsidies, infrastructural support, and market linkages to promote the competitiveness of targeted value chains of cocoa, rice and poultry in the State.

Rice remains a strategic crop in Nigeria's agricultural policy due to its role in food security and import substitution. According to Akinyemi and Adeyemo (2019), rice production in Nigeria has expanded significantly since the implementation of interventions focused on input support and irrigation infrastructure. Their study in southwestern Nigeria found that access to improved seeds and fertilizers led to yield increases of over 30% among project beneficiaries. Ogunniyi *et al*. (2020) analyzed the impact of agricultural development programs on rice productivity in northern Nigeria, emphasizing that training and capacity building significantly influence farmers' adoption of best practices. Their econometric analysis revealed that extension services and access to credit positively correlated with rice yield per hectare. Alawode *et al*. (2021) conducted a cost-benefit analysis of rice farming under intervention programs and concluded that while gross margins increased, cost structures (especially labor and transport) remained high, affecting net profitability.

In terms of cocoa, Adedeji *et al*. (2018) noted that although Nigeria remains a major cocoa producer globally, yields per hectare are significantly lower than those in Ghana and Côte d'Ivoire. Their study linked low productivity to poor access to disease-resistant varieties and weak extension systems. To address these issues, intervention projects have promoted value chain integration and the adoption of Good Agricultural Practices (GAP). In Cross River State, Okon and Ogar (2019) assessed the effects of such initiatives on cocoa farmers' income and reported significant increases among those who adopted improved practices, supported by cooperative structures. According to Oyebanji *et al*. (2022), project beneficiaries often face delays in accessing support due to bureaucratic bottlenecks, their study of cocoa farmers in Edo and Cross River States indicated that sustained impacts require stronger monitoring frameworks and institutional coordination.

Furthermore, poultry industry, particularly broiler production, is one of the fastest-growing agricultural sectors in Nigeria. It offers a high return on investment and a short production cycle. Recent studies have explored the profitability and risks associated with broiler farming. For instance, Olagunju *et al*. (2019) found that broiler production is economically viable under semi-intensive systems, but feed costs and disease outbreaks significantly affect profitability. In a more focused study, Musa *et al*. (2021) examined the impact of donor-funded interventions on broiler farmers in Kaduna State. Their findings showed that access to subsidized feed and veterinary services improved profit margins by up to 40%.

Finally, a recent meta-analysis by Adekunle and Olatunji (2024) reviewed over 30 agricultural intervention programs in Nigeria and concluded that while donor-supported projects tend to show early success, their long-term impact is contingent on strong local ownership, capacity building, and institutional reforms. These insights are vital in assessing the full economic implications of the APPEALS project in Cross River State. This study focuses on conducting an economic evaluation of rice, cocoa, and broiler production enterprises supported by the APPEALS project in Cross River State. Specifically, the study describes the business profiles of the enterprises supported by the Project in terms of ownership type, number of permanent workers, revenue outlay and sources of income as well as determine the cost & returns of cocoa, rice and poultry production enterprises supported by APPEALS project.

Materials and Methods

Study area

The research was carried out in Cross River State, located in Nigeria's south-south geopolitical zone. The state, lying between latitudes 4°35'N and 7°5'N and longitudes 7°30'E and 9°45'E, comprises 18 Local Government Areas and three Agricultural Development Programme (ADP) zones, Calabar, Ikom and Ogoja. Each zone has distinct ecological and agricultural features.

Agribusiness activities in the State span across production, processing, and marketing. Under the APPEALS project, which operated across all three zones, a total of 6,921 beneficiaries were supported and organized into 710 cooperatives and SMEs. The intervention was demand-driven and tailored to the specific needs of each agricultural zone, enhancing agricultural productivity and enterprise development throughout the State.

Sampling procedure

A list of 710 agribusiness cooperatives supported by APPEALS project was obtained in the three value chain production segments of cocoa, rice and broilers from the project office for the study, appropriate sample size was calculated using Taro Yamane formula at 10% confidence level. A total of 391(Cocoa =81, Rice = 119, Broilers = 191) Cooperatives were drawn from the sample frame using simple random sampling techniques. The President or Managers of the cooperatives were purposively selected for the interview.

Data collection and analysis

Primary data proposed for this study were collected using questionnaire, records kept by the farmers and Focused Group Discussions (FGD) with the managers or highest decision maker of the sampled enterprises in the field. Data were collected on the enterprise profile such as; ownership type, employees, capital outlay, sources of income, business cost, output in terms of revenue, profit etc.

Descriptive statistics such as frequency distribution tables, percentages, means and standard deviation was used to describe the business profile of the enterprises. Profitability analysis was calculated to determine the profitability index, return on investment, rate of return on variable costs and operating ratio. These ratios provide information about the way the enterprises are operating and measure the profit or net earnings of the enterprises.

The costs - returns analysis comprised the following components and their measurements:

GM = TR – TVC ……. (1)

TC = TVC + TFC ……. (2)

NI = GM – TFC ……. (3)

Where GM = Gross Margin, TR = Total Revenue, TVC = Total Variable Cost, TC = Total Cost, TFC = Total Fixed Cost, NI = Net Income.

Profitability Ratios

In this study, four representative ratios were examined to gain insight into the profitability level of the businesses. They include operating ratio, return on sales, return on investment and rate of return on variable costs.

Operating Ratio

The operating ratio was examined to gain insight into the profitability of the firms. This ratio is an indicator of management skill and operating efficiency. An Operating ratio less than one indicate a good, efficient, and profitable business. The operating ratio is calculated as follows:

Operating Ratio (OR) = TVC/TR

Return on Sales

Return on Sales (ROS) is simply percentage of the net income to net sales. It is also called the profit margin (or net profit margin). It is a fundamental indication of the overall Profitability of the business as it measures the percentage net profit per one naira of sales. A Profitability index above zero indicates a profitable business. Return on sale = NI/TR

Return on Investment

Return on Investment (ROI) is represented as a ratio of the expected financial gains (benefits) of a project divided by its total costs. It takes an ROI ratio greater than zero for a program to be attractive, typically. The Return on Investment (ROI) = NI/TC

Results and discussion

Profile of the agribusinesses supported by the APPEALS project

The descriptive statistical analysis of the business profile of the enterprises supported

by Cross River State APPEALS project is presented in Table 1. The distribution of number of workers showed that, cocoa enterprises are mostly small to medium scale, as 44.4% employ 4 to 6 workers, while 34.6% operate with three or fewer workers. Only 21% have more than six workers. Rice enterprises appear relatively more labor-intensive, with the highest proportion (47.1%) employing more than six workers, suggesting larger operational size. In contrast, broiler enterprises are predominantly small-scale, with 68.1% employing three or fewer workers, reflecting the household-based nature of most poultry operations in the State.

Regarding age of business, cocoa enterprises are mostly well-established, as 54.3% have operated for over 15 years, indicating experience and stability in cocoa production. Rice enterprises showed a similar pattern, with 52.1% operating for more than 15 years. Broiler enterprises, however, are comparatively younger, with 48.2% existing for 6 to 10 years and 39.3% for 11 to 15 years, suggesting more recent expansion of poultry enterprises under APPEALS project. In terms of form of business, sole proprietorship dominates across the three value chains, 93.8% for cocoa, 82.4% for rice, and 67.0% for broilers. Cooperative participation is highest among broiler enterprises (33%), implying stronger joint stock in broiler enterprise, compared to cocoa (6.2%) and rice (17.6%) where enterprises operate independently and then come together to form cooperative for mutual benefit.

Average revenue per cycle indicates that, cocoa enterprises have relatively high-earning, as 81.5% earn above ₦1,000,000. Rice enterprises cluster at the lower revenue levels, with 60.5% earning ₦500,000 or less and none exceeding ₦1,500,000, suggesting tighter margins or higher production costs. Broiler enterprises showed moderate performance, with 42.9% earning ₦500,001 to ₦1,000,000 and 34.6% earning ₦1,000,001 to ₦1,500,000. Expenditure on salaries is highest at the ₦50,001 to ₦100,000 range, for cocoa (53.1%), rice (54.6%), and broilers (57.1%), reflecting similar labor cost structures. However, cocoa enterprises have a higher proportion (23.5%) spending ₦100,001 to ₦150,000, consistent with their larger and older operations.

Timeliness of grant support was rated positively, with 97.5% of cocoa, 84.0% of rice, and 95.3% of broiler enterprises confirming timely support, indicating effective project delivery, especially for cocoa and broilers. Security threats were generally low, though broilers recorded a relatively higher exposure (13.6%) compared to cocoa (7.4%) and rice (7.6%). Educational status showed that, managers are largely literate across enterprises. Broiler enterprises are better educated overall, with 41.9% holding B.Sc degrees and 7.3% M.Sc, compared to cocoa where 33.3% hold OND/NCE and only 3.7% M.Sc. This higher educational profile among broiler managers may partly explain their stronger cooperative participation and adoption of improved production practices.

Focused group discussion in the field revealed that grant support from donor support partners came in form of inputs and technologies relevant to the enterprises.

Major inputs and technologies to enhance productivity includes; Production enhancement technologies such as day-old chicks, point of lay, assorted feeds, rice seeds, herbicides, fungicides, insecticides and vaccines. Value addition technologies such as feathers plucking machines, blast freezers, rice milling machines, de-stoners, sorting machines, branded bags and cocoa bread baking machines. The timeliness in the support had impacted on the factors of production in terms of capital acquisition; this further reduced the cost of production.

The findings also revealed that, the consideration of managerial experience of the enterprises was a priority, however, as part of the effort to compliment the experiences of managers and other operational employees, specialized trainings such as group dynamics, good agricultural practices, standard operational procedure for products standardization, record keeping, biosecurity and environmental management have been conducted, the various trainings have enhanced their business performances. Some of the findings on business profiles of the enterprises supported by APPEALS project in Cross River State were similar with socio economic characteristics of respondents in Nakyejwe *et al.* (2021) studies on assessment of Sustainable entrepreneurship of small businesses in Uganda and Soto-Acosta *et al.* (2016) findings on Sustainable Entrepreneurship in SMEs.

Table 1: Profile of agribusiness enterprises supported by APPEALS project

Variable		Cocoa		Rice		Broilers	
		Freq n = 81	**%**	**Freq n=119**	**%**	**Freq n=191**	**%**
No of Workers	≤3	28	34.6	30	25.2	130	68.1
	4-6	36	44.4	33	27.7	42	22.0
	>6	17	21.0	56	47.1	19	9.9
Age of Business Enterprises	≤5	4	4.9	10	8.4	9	4.7
	6-10	12	14.9	19	16.0	92	48.2
	11-15	21	25.9	28	23.5	75	39.3
	>15	44	54.3	62	52.1	15	7.8
Form of Business	Cooperative	5	6.2	21	17.6	63	33.0
	Sole proprietorship	76	93.8	98	82.4	128	67.0
Ave. revenue per cycle (₦)	≤ 500,000	6	7.4	72	60.5	23	12.0
	500,001-1,000,000	26	32.1	35	29.4	82	42.9
	1,000,001-1,500,000	32	39.5	12	10.1	66	34.6
	>1,500,000	17	21.0	0	0	20	10.5
Expenditure on Salary (₦)	≤50,000	11	13.5	35	29.4	42	22.0
	50,001-100,000	43	53.1	65	54.6	109	57.1
	100,001-150,000	19	23.5	10	8.4	26	13.6
	>150,000	8	9.9	9	7.6	14	7.3
Timeliness of Grant Support	No	2	2.5	19	16.0	9	4.7
	Yes	79	97.5	100	84.0	182	95.3
Security threat	Yes	6	7.4	9	7.6	26	13.6
	No	75	92.6	110	92.4	165	86.4
Education Status of Manager	M.Sc	3	3.7	0	0	14	7.3
	BSC	12	14.8	28	23.5	80	41.9
	OND/NCE	27	33.3	43	36.2	67	35.1
	SSC	23	28.4	22	18.5	20	10.5
	FSLC	16	19.8	26	21.8	10	5.2

Source: Field data analysis, 2024

Cost and returns analysis of APPEALS supported enterprises

The estimates of the average annual costs and returns of rice per hectare, broilers per 500 birds and cocoa per hectare are presented in Tables 2, 3 and 4. The estimated cost and returns of the enterprises supported by the donor agency on the average were ₦481,712.67 and ₦645,050.00 for rice, ₦2,228,938.38 and ₦ 3,048,500.00 for broilers and ₦2,229,492.93 and ₦3,627,389.19 for cocoa production enterprises. Among the average total cost incurred by these enterprises per hectare, labour cost (₦311,690.14) constituted the bulk of the average total cost of rice

enterprise and accounted for 64.70 percent of the average total cost. Similarly, for a batch of 500 broilers enterprise, the cost of feed (₦1,423,421.08) constituted the bulk of the average total cost and accounted for 63.861 percent of the average total cost. For cocoa enterprise, rent on farm (₦1,571,111.11) constitutes the bulk of the average total cost and accounted for 70.46 percent of the average total cost. The findings in this work are in line with previous studies by Adewunmi *et al.* (2022) where feed cost accounted for the highest cost. The variable cost accounted for 89.46 percent, 97.66 percent and 29.53 percent of the average total cost of production in rice, poultry and cocoa enterprises, respectively.

Furthermore, from the result, it was revealed that, the agribusiness enterprises made an average gross margin per hectare of ₦ 214,111.97 and net income of ₦163,337.33 for rice enterprises. For broilers enterprises, the average gross margin per batch of 500 birds was ₦871,648.11 and net income of ₦819,561.62 was realized, while for cocoa production, the average gross margin per hectare of ₦2,969,007.36 and net income of ₦1,397,896.26 was obtained. The profit margin percentage 25.3 percent, 26.9 percent and 38.5 percent were obtained for rice, broilers and cocoa, respectively, while return on investment of 0.339, 0.627 and 0.368 for rice, cocoa and broilers were realized. This implies that for every one naira invested across the three commodities,

Table 2: Cost and returns analysis of rice production enterprises per Ha

Item	Average Amount (₦)	% of total Cost
Variable cost		
Rice seed/seedlings	38,339.446	7.96
Agro-chemical	35,845.070	7.44
Fertilizer	45,063.380	9.35
Labour	311,690.140	64.70
Total variable cost	430,938.026	89.46
Fixed cost		
Land Rent	50,774.64	10.54
Total cost	481,712.666	
Revenue (₦)		
Quantity harvested(50kg) / ha	12.901	
Average price per 50 kg bag	50,000	
Total Revenue	645,050.00	
Gross Margin (GM) = TR –TVC	214,111.974	
Net Farm Income (NFI) = TR-TC	163,337.334	
Farm Financial Ratio		
Return per naira investment (NI/TC)	0.339	
Profit margin = NI/TR	0.253	
Operating expense ratio = TVC/TR	0.668	

Source: Field data analysis, 2024

a profit of ₦ 0.34, ₦ 0.63 and ₦ 0.37 were achieved for each hectare of rice and cocoa as well as for every batch of 500 birds respectively.

Similar study investigated by Phiri *et al*., (2023) analysed the factors affecting profitability of broilers production in Mutare district, Manicaland Province, Zimbabwe found that feed costs constituted 56.8 percent of the total variable costs, and small-scale broiler production in this area was a profitable venture with gross margin of US$ 65.25 per batch of 100 broilers and a return per dollar variable costs invested of $1.15. Similar study by Adewumi *et al*., (2022) in Irepodun local government area of Kwara state, Nigeria, showed poultry farming to be profitable with a gross margin, net farm income and gross ratio of ₦204,692.76, ₦193,492.78 and 0.4923, respectively. This result is also similar to those of Bamiro *et al*. (2015) and Adewumi *et al*. (2021) who reported on the profitability of livestock farming in Nigeria. Also, several studies including Al-Mamum *et al*., (2013), Emokado and Eweka (2015), Zimunya and Dube (2021) have utilized gross margin analysis in assessing the profitability of agribusiness enterprises.

Table 3: Cost and returns analysis of broilers production enterprises per 500birds

Item	Average Amount (₦)	% of total Cost
Variable cost		
Feed	1,423,421.081	63.861
Day Old Chicks	350,733.513	15.755
Drugs/vaccines	7,894.594	0.354
Labour	198,562.16	8.888
Water	196,240.540	8.806
Total variable cost	2,176,851.89	97.663
Fixed cost		
Housing Rent	52,086.486	2.336
Total cost	2,228,938.38	
Revenue (₦)		
Ave. No of mature chicken/farm unit	500	
Average price per chicken/6weeks	6097	
Total Revenue	3,048,500	
Gross Margin (GM) = TR –TVC	871,648.11	
Net Farm Income (NFI) = TR-TC	819,561.62	
Farm Financial Ratio		
Rate of return per naira investment (NI/TC)	0.368	
Profit margin = NI/TR	0.269	
Operating expense ratio = TVC/TR	0.713	

Source: Field data analysis, 2024

Table 4: Cost and returns analysis of cocoa production enterprise per Ha

Item	Average Amount (₦)	% of total Cost
Variable cost		
Agro-chemical	18,622.222	0.835
Fertilizer	24,866.666	1.115
Haulage	329,181.818	14.764
Labour	285,711.111	12.815
Total variable cost	658,381.818	29.530
Fixed cost		
Farm Rent /year	1,571,111.111	70.469
Total cost	2,229,492.929	
Revenue (₦)		
Dry cocoa bean harvested(kg) / ha	846.18	
Average price per kg of dry cocoa bean	4286.782	
Total Revenue	3,627,389.178	
Gross Margin (GM) = TR –TVC	2,969,007.359	
Net Farm Income (NFI) = TR-TC	1,397,896.248	
Farm Financial Ratio		
Rate of return per naira investment (NI/TC)	0.627	
Profit margin = NI/TR	0.385	
Operating expense ratio = TVC/TR	0.181	

Source: Field data analysis, 2024

Conclusion

The findings showed that, APPEALS-supported enterprises in Cross River State differ markedly across value chains. Cocoa enterprises are relatively mature, moderately sized, and high earnings, reflecting long years of operation and stability. Rice enterprises are more labor-intensive but earn comparatively lower average revenues, suggesting tighter margins and possible cost inefficiencies. Broiler enterprises are largely small-scale and younger, yet demonstrate moderate revenue performance, stronger cooperative participation, and higher educational attainment among managers, which may support faster adoption of improved practices. Timely grant delivery across chains indicates effective project implementation, while generally low security threats create a favorable environment for enterprise growth. From the cost and returns analysis, the three enterprises rice, broilers, and cocoa proved to be economically viable, with positive net incomes and gross margins. High variable costs, especially in feed and labor, were consistent with trends observed in related studies, yet profitability remained strong across all enterprises. These outcomes affirm the importance of continued investment in agribusiness support programs to stimulate rural economies and enhance food security through productive and sustainable enterprise development.

Recommendations

1. Strengthen business upgrading and value addition, especially for rice enterprises, to improve efficiency, reduce costs, and enhance profitability.
2. Promote cooperative development and cluster-based support for cocoa and rice, drawing on the broiler model to improve market access, input sourcing, and collective bargaining.
3. Promote cost-reducing technologies and input support, since labour accounts for the highest cost in rice, feed dominates broiler production, and land rent is the major cost in cocoa, donor agency and government should support mechanization services for rice, encourage local feed formulation and bulk feed procurement for broilers, as well as improved land access or long-term leasing arrangements for cocoa farmers to significantly reduce production costs and improve profitability.
4. Scale up investment and enterprise-specific interventions, given the positive net incomes and attractive profit margins across all the three enterprises, support to these value chains can be expanded, with enterprise-specific capacity building, credit facilitation, and improved input delivery systems to enhance efficiency, encourage expansion, and maximize returns to participating agribusinesses.

References

Adedeji, I. A., Olowolafe, E. A., & Akinyemi, F. O. (2018). Comparative analysis of cocoa productivity in West Africa: The case of Nigeria, Ghana, and Côte d'Ivoire. *African Journal of Agricultural Research, 13*(17), 888–896. https://doi.org/10.5897/AJAR2018.13017

Adekunle, A. O., & Olatunji, K. A. (2024). Meta-analysis of agricultural intervention projects in Nigeria: Lessons for sustainable development. *Development Policy Review, 42*(1), 33–52. https://doi.org/10.1111/dpr.12784

Adewumi, M. O., Adebayo, O. O., & Fapojuwo, O. E. (2021). Profitability and efficiency of poultry egg production in Nigeria: A stochastic frontier production function approach. *Journal of Agricultural Sciences, 66* (1), 99–109. https://doi.org/10.2298/JAS2101099A

Adewumi, M. O., Aremu, A. O., & Abubakar, M. (2022). Economic analysis of broiler production in Irepodun Local Government Area of Kwara State, Nigeria. *Nigerian Journal of Agricultural Economics, 12* (2), 45–54.

Akinyemi, A. A., & Adeyemo, R. (2019). Impact of input support on rice productivity in southwestern Nigeria. *Journal of Agricultural Extension, 23* (3), 12–25. https://doi.org/10.4314/jae.v23i3.2

Alawode, O. O., Ibrahim, S. A., & Olaniyan, O. M. (2021). Cost-benefit analysis of rice farming under government intervention programs in Nigeria. *Nigerian Journal of Rural Economics and Development, 15*(1), 78–91.

Al-Mamun, A., Mazumder, M. N. H., &

Yusuf, A. H. M. (2013). Performance of agro-based enterprises: A study on rural micro-enterprises in Malaysia. *World Review of Business Research, 3*(1), 70–88.

Bamiro, O. M., Shittu, A. M., & Kolo, O. A. (2015). Profitability and resource-use efficiency of poultry egg production in Ogun State, Nigeria. *Nigerian Journal of Animal Production, 42*(2), 195–203.

Emokaro, C. O., & Eweka, E. O. (2015). Gross margin analysis and profitability of selected agribusinesses in Oredo Local Government Area of Edo State, Nigeria. *Journal of Agricultural Economics and Rural Development, 3*(2), 218–224.

Musa, S. M., Bello, A. G., & Abubakar, L. M. (2021). Donor-funded interventions and broiler profitability in Kaduna State, Nigeria. *Nigerian Journal of Livestock Production, 18*(2), 34–48.

Nakyejwe, M. M., Kibirige, D., & Mbowa, S. (2021). Assessing sustainable entrepreneurship of small businesses in Uganda: Evidence from agro-based enterprises. *African Journal of Business Management, 15*(3), 52–61. https://doi.org/10.5897/AJBM2020.9144

Ogunniyi, L. T., Ajao, A. O., & Akinyemi, S. O. (2020). Adoption of rice production technologies and productivity in Northern Nigeria: A policy impact evaluation. *Journal of Development and Agricultural Economics, 12* (5), 278–286. https://doi.org/10.5897/JDAE2020.1179

Okon, E. O., & Ogar, J. N. (2019). Effects of cocoa value chain development projects on farmers' income in Cross River State. *Nigerian Journal of Agricultural Policy, 4*(1), 22–35.

Olagunju, F. I., Omotosho, O. A., & Aremu, C. O. (2019). Economic analysis of broiler production under semi-intensive systems in southwestern Nigeria. *Nigerian Poultry Science Journal, 36*(2), 93–101.

Oyebanji, B. O., Onuoha, E. A., & Etuk, I. A. (2022). Institutional bottlenecks and the effectiveness of cocoa interventions in Edo and Cross River States. *Journal of Agricultural Policy and Administration, 10* (1), 15–29.

Phiri, S., Mavunganidze, Z., & Mudzonga, T. (2023). Analysis of factors influencing profitability of broiler production in Mutare District, Zimbabwe. *Journal of Agribusiness and Rural Development, 67* (1), 88–97. https://doi.org/10.17306/J.JARD.2023.0167

Soto-Acosta, P., Cismaru, D.-M., & Vătămănescu, E.-M. (2016). Sustainable entrepreneurship in SMEs": A business performance perspective. *Sustainability, 8*(4), 342. https://doi.org/10.3390/su8040342

World Bank. (2023). *Implementation status and results report: Agro-Processing, Productivity Enhancement and Livelihood Support Project (APPEALS)* (*P148616)*. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/743321676589237558

Zimunya, P., & Dube, L. (2021). Profitability analysis of smallholder broiler chicken production in Chegutu District, Zimbabwe. *International Journal of Agricultural Economics, 6* (3), 100–106. https://doi.org/10.11648/j.ijae.20210603.13