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Green Sustainability Strategies and Firm Performance of Nigerian Listed Firms

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ABSTRACT

The creation of the Sustainable Development Goals by the United Nations is a response to the present issues in corporate sustainability activities and the socio-economic interaction in the world; business environments in Nigeria are also harmed by lack of sustainable frameworks for pollution control by firms. The effect of green sustainability initiatives on the performance of listed agricultural firms in Nigeria is therefore examined in this study. Five agricultural firms listed on the Nigerian Exchange Group as of December 31st, 2024, made up the study population. Descriptive statistics and Dynamic Ordinary Least Square (DOLS) regression analysis were used to evaluate data collected between 2016 and 2024. The results confirm that environmental pollution control practices have a positive and significant effect on firm performance. The study concludes that a percentage change in green sustainability strategies will have an equal variation on firm performance. Based on this, the study recommends that agricultural firms should continue to invest more funds in reducing pollution in the environment.

Keywords: Environment pollution control practice, firm performance, green sustainability

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1 INTRODUCTION

Environmental sustainability policies are crucial to be considered because there is a global dispute regarding how much of the world's environmental issues can be traced to the corporate sector. According to Buckler et al. (2023), incorporating environmental activities into business choices is an important method of producing strategic benefits that will enhance competitive advantage and positively affect financial performance. The relationship between companies and employees' exposure to sustainability is becoming more widely acknowledged globally (Nwaobia and Omoniyi, 2025). Concerns about resource depletion, environmental harm, and business practices that contribute to ozone layer depletion and upset the ecosystem's equilibrium have raised this awareness (Ernst & Young, 2022). The 2030 global sustainable development goals (SDGs) were created in response to the worldwide environmental concerns originating from business activities and other sources, these have made companies to add additional environmental risks to numerous economies, particularly Africa (Cheska et al., 2022).

Although, in South Africa and Ghana, efforts have been made on effective sustainability dynamics, however, due to the focus on financial success for the benefit of shareholders, environmental sustainability measures are getting less attention in the African continent (Tanko et al. 2024). In the modern world, where significant stakeholders make legitimate demands on firms and ignoring their interests could jeopardize the businesses' continued survival, this school of thought is no longer feasible (Akerele, et al. 2024). If businesses want to protect their going concern and reach their long-term objectives without endangering the long-term survival, they must implement environmental initiatives and programs that enable them to achieve sustainable performance (Damieibi, 2023). In order to guarantee sustainable development, stakeholders in Africa have been pushing for environmental pollution control practices in recent years.

Nigeria also has low business performance, which has been linked to ineffective pollution control and environmental strategy rules. The National Policy on Environment, the National Environmental Standards and Regulations Enforcement Agency (NESREA), and the Nigerian Climate Change Response Strategy and Action Plan (NCCRSAP) are just a few of the laws and policies that the Nigerian government has implemented recently to encourage environmentally sustainable practices. Environmental sustainability measures in Nigeria are greatly aided by the laws and regulations of the Nigerian government. Environmental issues such increasing pollution, global warming, deforestation, and desertification are the outcome of economic growth initiatives (Onyali & Okafor, 2018). Additionally, there is a growing social consciousness that puts more pressure on corporations to be environmentally conscious in their operations. Nonetheless, this indicates that the issues of subpar company performance and inefficient green practices continue to exist.

A company's capacity to make wise decisions and take the required steps to safeguard the business environment may be hampered by inefficient green sustainability strategies. Additionally, it has led to conflicts of interest regarding environmental matters, aggravating pollution, health concerns, and other detrimental effects on the company and its host communities (Lusiana, 2021). It has been determined that there is a lack of study on the relationship between listed agricultural enterprises' performance and environmental pollution management strategies in Nigeria. Previous research has identified the impact of environmental pollution control strategies on business success. Nevertheless, there are very few studies that examine this link in respect to Nigeria's agricultural sector. In light of this, it is crucial to carry out more research to examine how environmental pollution control strategies impact Nigerian agricultural companies' business performance.

Amosun and Akintoye (2021) and Benson et al. (2021) found a positive and significant correlation between sustainable accounting and financial performance; however, Oti et al. (2017) and Cheska et al. (2022) presented contradictory findings, indicating a negative and insignificant relationship between sustainable accounting and financial performance. It has been noted that few studies conducted

in Nigeria have focused primarily on energy strategies and have largely aggregated environmental strategies. Because of this, environmental pollution management practices a crucial component of green sustainability compliance have not gotten enough attention.

The main objective of this study is to examine the effect of green sustainability strategies on firm performance of listed agricultural firms in Nigeria. The study specifically intends to explore the effect of environmental pollution control practices on performance of listed agricultural firms in Nigeria. To achieve the objective of this study, the following null hypothesis was formulated:

H_{O1}: Environmental pollution control practices has no significant effect on firm performance of listed agricultural firms in Nigeria.

2 LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Firm performance

Firm performance represents the prosperity of business owners. The management of companies has the responsibility of maximizing the wealth of shareholders optimally (Oyedokun, et al., 2019). Okafor et al. (2021) affirmed that performance measures can be used to support continuous improvement by focusing attention on the areas where managers want a certain level of performance. Accounting based measurement is generally considered as an effective indicator of the company's profitability. The increasing awareness of the benefits of environmental responsibility has prompt investment institutions to consider environmental responsibility as one of the factors for investments. The return on equity (ROE) is considered as a measure of company's performance. Firm performance was proxied by Return on Capital Employed (ROCE), which is a long-term profitability ratio measuring how efficiently a company uses its capital (equity and debt) to generate operating profit (EBIT). It is calculated as earnings before income tax (EBIT) divided by capital employed. Capital employed is typically total assets minus current liabilities. A higher ROCE indicates efficient capital utilization. Return on Capital Employed is a good measure of firm's performance as managers of business are to increase the wealth of the shareholders which are their contributed equities.

2.1.2 Green Sustainability Strategies and Firm Performance

The ultimate objective of green accounting techniques is to help businesses accomplish sustainable development and take part in successful conservation initiatives while preserving good relations with the community and employees. This process aids organizations in calculating the costs of taking part in conservation initiatives, measuring the advantages of doing so, and successfully informing stakeholders of the evaluation's findings (Endiana, et al., 2020). It is a part of sustainability engagements that focuses on analyzing how corporate activities affect the values of a going concern.

Nigeria is a member of the United Nations, and sustainability accounting practices are comprehensive and essential to achieving the 2030 sustainable development goals. By evaluating environmental activities from the perspective of costs (environmental costs) and benefits or effects (economic benefits), as well as creating environmental protection effects, the goal of implementing sustainable accounting is to increase the effectiveness of staff members' direct involvement on sustainability matters (Aifuwa, 2020). To put it briefly, the application of green sustainability methods reveals how much a business or organization contributes positively or negatively to the environment and human well-being (Lusiana et al., 2021). For the purpose of this study, environmental pollution control practice is adopted as a proxy of green sustainability strategy.

2.1.2.1 Environmental Pollution Control Practice

Green pollution is more than just a health issue; it is a wider social issue in that pollution has the potential to destroy homes, communities and to make the endangered species go extinct. Pollution problems are also closely tied to the mode of operations and development in Agricultural industry, in the developing countries. Despite this, many industries either have not developed green pollution control strategies, or have not provided adequate implementation structures to ensure the policies are effective. In the assertions of Effiong & Akpan, (2019), improper environmental pollution control strategy can have a high rate of adverse effect on the financial performance of the firm. This is also supported by Effendi, (2021). Green pollution control strategies are a cornerstone of sustainability strategies, therefore, the risk management structure is the structure created to manage strategic and business risks, and serves as culture, structure and processes with singular aim to take advantages of possible opportunities and avoidance of all unwanted risks (Hichri, 2022).

Pollution control management is a topic related to firm sustainability practices. It shows the responsibility of the board of directors to ensure the security of the company's assets and to guard the shareholders' investments from reduced value while considering the impact of its activities on the environment. It therefore argued that it is the responsibility of firms to keep strategic risk management within the firm's appetite and control operational risk for optimum firm performance (Saygili, et al., 2022). Green pollution control can assist firms to manage change and minimize the cost of capital (Albasteki, 2021). Firms' disclosures of risks and how these risks are identified, managed, analysed and evaluated, offer the stakeholders aptitude to recognize business and risk profiles. This can help stakeholders evaluate a company's financial situation and performance accurately (Saygili, et al., 2022).

According to Settembre-Blundo et al. (2021) effective pollution control in environmental activities is essential for addressing environmental risks and promoting sustainable practices. Firms can use it to evaluate the environmental effects that may result, discover areas that need work, and create plans to reduce potential dangers. It enables Firms to assess potential environmental impacts, identify areas of improvement, and develop strategies to mitigate risks. By understanding and managing these risks, Firms can make informed decisions, reduce their ecological footprint, and contribute to environmental preservation, sustainability and increase their performance.

2.2. Theoretical Review

2.2.1 Resources Dependency Theory

Resource Dependency was introduced by Pfeffer and Salancik in the 1970s. The theory serves as a substitute for the current focus on internal organizational dynamics. They maintained that businesses had to be seen as open systems that interact with their surroundings and are influenced by outside forces (Lant, 2017). Nonetheless, the relationships between firms and their external contexts are understood using this theoretical framework. It implies that firms' behavior and decision-making processes are impacted by their reliance on outside resources for survival and growth (Saha, et al., 2017). Furthermore, an organization may use environmental reporting as a strategic response to stakeholder expectations and demands if it depends on resources linked to sustainability or environmental performance (Herremans, et al., 2016). High-quality environmental reporting can enhance the organization's reputation, attract investors, gain regulatory compliance, and maintain relationships with environmentally conscious stakeholders (Nguyen, 2020). However, the extent and quality of environmental reporting can also be influenced by the organization's resource dependencies.

Albasteki (2021) claims that in order to safeguard its resource base or reduce potential hazards, an organization may use selective or opportunistic reporting techniques when faced with resource limitations or competing demands (Moussa, 2019). Additionally, businesses that are dependent on resources act opportunistically to safeguard their interests by selectively disclosing information or using

flimsy tactics to keep access to resources without actually resolving the underlying social or environmental issues. Stakeholder trust may be damaged by this opportunistic behavior, which compromises the credibility of environmental reporting and sustainability projects.

In order to maintain organizational stability, RDT strongly emphasizes dependency management (Noah, 2017). Although stability is essential for life, an overemphasis on stability may make an organization less flexible and responsive to shifting external circumstances. Businesses may grow resistive to innovation, change, and investigating new resource dependencies, which could limit their long-term sustainability and competitiveness. Through ethical leadership, stakeholder involvement, open reporting, and a comprehensive approach that takes into account both internal and external factors influencing organizational behavior, it is critical to identify these possible negative consequences and solve them (López, et al., 2022).

2.3 Empirical Review

A study conducted by Nwaobia (2025), used Cadbury Nigeria Plc and Nestlé Nigeria Plc. as case studies, the study examines the connection between stated Nigerian manufacturing companies' financial performance and environmental sustainability measures. The study, which is based on stakeholder theory, uses an ex post facto design to assess whether sustainability measures affect two important financial metrics, Return on Assets (ROA) and Earnings Per Share (EPS), while adjusting for business size, liquidity, and leverage. Data from sustainability and annual reports covering 2015–2024 were taken out and subjected to panel-corrected standard errors (PCSEs), fixed effects, random effects, and pooled OLS regression models. PCSEs were required because diagnostic testing showed cross-sectional dependency and heteroskedasticity. The results show that while firm size and debt have little bearing on financial performance, environmental sustainability policies and liquidity have a large and beneficial impact. In terms of ROA and EPS, Nestlé did better than Cadbury, demonstrating a more deliberate incorporation of sustainability into its business practices. Both companies, however, showed only mediocre adherence to GRI4 (Global Reporting Initiative) guidelines. The findings validate stakeholder theory and confirm the significance of sustainability in raising firm value, but they also highlight how inadequate current financial models are at explaining the full range of sustainability's effects.

Amosun and Akintoye (2021) conducted a study to investigate the effect of sustainability accounting on the financial performance of Nigerian enterprises. The study discovered that environmental accounting (environmental conservation cost) has a major impact on the financial performance of natural resources companies based on data taken from the annual reports of two companies listed on the Nigerian exchange group for five years (2015–2019) and analyzed using ordinary least square (OLS) regression. The authors came to the conclusion that organizations' financial performance could be impacted by accurate reporting of sustainability accounting. Since OLS won't address the issue of data outliers internally, the Dynamic Ordinary Least Square (DOLS) should have been used instead. This current study will improve on Amosun and Aintoye (2023) study by employing the Dynamic Ordinary Least Square for the data analysis.

Olonite et. al. (2024), investigated the relationship between environmental training and financial performance in Nigeria. The study investigates the effect of sustainability accounting on financial performance of quoted agricultural companies in Nigeria. The study population consists of five agricultural companies, quoted on the Nigerian Exchange Group as at December 31st, 2023 Data were retrieved between 2012 and 2023 and analyzed using descriptive statistics and Dynamic Ordinary Least Square (DOLS) regression analysis. The findings affirms that staff sustainability training play a significant role in company’s financial performance and should be managed properly. The study recommends that agricultural companies should regularly conduct sustainability training for staff. This

study offers more insights for management of companies, investors, academia and community on sustainable accounting engagements. Although this study is current, it is expected that core green sustainability dynamics are considered in a more recent study.

According to Benson *et al.* (2021), study, they looked at how sustainable accounting affected oil and gas businesses' financial performance between 2010 and 2020, according to Benson et al. (2021). The study used an ex post facto research strategy and a quantitative approach. The companies' annual reports and accounts for the years 2010 through 2020 provided the data. The findings demonstrated that environmental cost accounting significantly affects oil and gas firms' financial performance. Additionally, the study discovered that the financial performance of oil and gas companies is significantly impacted by sustainability management accounting. The obtained data were anticipated to have started before 2010 because in the western countries, as Benson et al. (2021) did not take a pre-post view into consideration. This current study will improve on (2021) study by capturing data from 2012, which serve as the starting point for IFRSs adoption in Nigeria.

Sumiati et al. (2021) collected actual data regarding the impact of environmental performance and sustainability accounting on profitability, either independently or in tandem. 107 firms in the mining and consumer products industries that were listed on the Indonesia Stock Exchange made up the study's population. To sample as much as feasible, purposeful sampling was employed with parameters specified to provide 77 observational data. The study's conclusions led to the conclusion that, although sustainability accounting is optional, its influence on profitability outweighs that of environmental performance. Sumiati et al. (2021) did not cover a precise year range for the investigation, according to the evaluation.

The impact of using environmental management accounting on raising firm value in Tangerang Raya was investigated in the study of Effendi (2021). 2,579 manufacturing businesses in the province of Banten were included in this study. The samples were chosen using quantitative techniques and preset parameters. The material input aspect and the environmental complaint system aspect have a considerable beneficial impact on company value, according to the results of the multiple linear regression testing. Additionally, firm value is significantly impacted negatively by the outcomes of non-output components of products and aspects of compliance. Firm value is significantly impacted simultaneously by the use of environmental management accounting, which is represented by material input, environmental complaint mechanisms, non-product output, compliance, transportation, supplier evaluation, and other factors. The direct impact of environmental management accounting on business value would have been better understood if a single regression analysis had been taken into consideration.

Huang and Fu (2022) conducted a more thorough investigation of the connection between the financial and environmental performance of corporations that have implemented the environmental accounting system in Taiwan. The study's data, which were analyzed using ANOVA, came from the annual reports of 32 companies that were listed on the Taiwan Stock Exchange. The study's findings demonstrated a favorable correlation between the companies' financial success and environmental accounting. It was anticipated that Huang and Fu's (2022) study would have taken into account a regression analysis using the Dynamic Ordinary Least Square (DOLS), rather than merely the analysis of variance (ANOVA). ANOVA should not be utilized for continuous data, but rather for comparing two distinct periods. Regression analysis will yield a different result than what Huang and Fu (2022) submitted. Regression analysis will be used in this study to enhance Huang and Fu's (2022) research.

Osemene et al. (2021) used an ex post facto research approach to compare environmental accounting reporting and corporate governance systems in selected African listed corporations. Listed businesses in six industries spread across four African nations—Nigeria, Egypt, South Africa, and Kenya—were the subject of the study. Environmental disclosure and reporting scores were acquired by a content analysis, and the data was evaluated using a static panel regression model. According to this study, board

independence had a significant impact on environmental accounting reporting (EAR) in Egypt, board committees had a significant impact on EAR in African nations, and board size had a significant impact on EAR in South Africa and Nigeria. These findings imply that current corporate governance laws and guidelines should be followed, and most importantly, other economies should follow South Africa's lead by adopting integrated reporting and using the GRI index score in their corporate reporting.

Emmanuel (2021) examined the impact of sustainability accounting disclosure on the financial performance of Nigerian listed industrial companies. The study specifically looked at how sustainability accounting disclosure affected the ROA, ROE, and share price of Nigerian manufacturing companies. The study design used was ex post facto. Forty of the sixty-six manufacturing businesses listed on the Nigerian Stock Exchange as of December 31, 2019, provided data from their annual reports covering the years 2010 through 2019. For the data analysis, panel regression techniques and descriptive statistics were used. To guarantee the parameter's robustness, the Arellano and Bond (1991) GMM estimator, which accounts for possible endogeneity issues, was used. The results of the study showed that both ROA and ROE were significantly improved by sustainability accounting disclosure. Nonetheless, there is a negative correlation between the share price of Nigerian manufacturing companies and sustainability accounting disclosure. It was determined that 2012 was not the starting point for data gathering, and this meant that the pre-effect of IFRS was considered, which impaired the study scope. The study did not do a research for triangulation.

The impact of sustainability disclosures on the cash flow return on investment of Nigerian oil and gas company shareholders was studied by Akpan and Simeon (2021). Ex post facto research design was employed, and secondary sources of data were utilized. For a seven-year period from 2014 to 2020, the study used time series and cross-sectional analysis of specific oil and gas companies listed on the Nigeria Stock Exchange as of December 31, 2020. Data for the sustainability parameters was obtained using content analysis techniques. The study's findings show that social sustainability disclosure significantly improves the cash flow return on investment of Nigerian listed oil and gas companies, while environmental and health and safety disclosures have negligible effects. Since the data spanned multiple years, a longitudinal research strategy rather than an ex post facto should have been taken into consideration.

The Panel Least Squared (PLS) method of data analysis was employed in a study conducted by Okeke et al. (2021) to examine the impact of carbon emission disclosure on economic value added of oil and gas firms in Nigeria stock exchange during the periods of 0f 2018 and 2019. The relevant variables were taken from the annual reports of the mentioned oil and gas companies, which were secondary sources of data. The variables listed below were used: Economic value added, disclosure of waste treatment and effluent costs, firm size, and revenue growth. The study analyzes the included variables using the Hausman Test, Causality Test, Fixed Effect, and Random Effect. According to the study's analysis, the disclosure of waste treatment and effluent costs significantly affects economic value added, and the firm's revenue growth significantly increases economic value added. Economic value added is positively and negatively impacted by firm size.

2.4 Gap in Literature

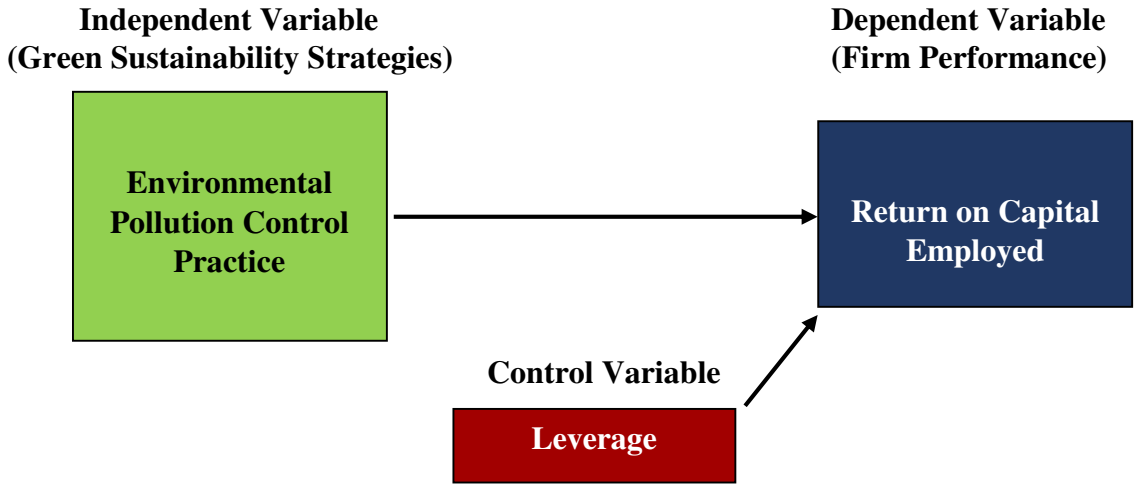
There are identified gaps in the conceptualization of green sustainability strategies in previous studies. Existing studies like Tanko et al. (2024), Akerele et al. (2024) and Nwaobia and Omoniyi (2025) and have only focused on other sustainability dynamics such as: biodiversity disclosure, carbon emission disclosure, waste management, water and effluents, compliance to environmental laws and regulations, environmental complain mechanism, supplier’s assessment, environmental degradation and many others but have ignored environmental pollution control practice. This study considers environmental pollution control practice important and hereby considered it in the study’s variable. Also, past studies have only considered financial performance proxies such as return on assets, return on investment, earnings per

share, and shareholder's value added. Not much studies have focused on return on capital employed. It was also observed that have only focused on the consumer goods, multinational corporations, manufacturing companies, oil and gas, petrochemical and natural resources industry. It seems as if concentration has not yet been on the agricultural industry. Likewise, there is an observed gap in the methodology of previous studies in the data scope. Previous studies have only considered 2010-2022 as submitted by Tanko et al. (2024), and Akerele et al, (2024) considered the use of questionnaire. It was expected that data are captured up to 2024 and a secondary data is employed, for a more recent study.

2.5. Conceptual Framework

The conceptual framework was illustrated to explore the relationship green sustainability strategies and firm performance.

Figure 2.1. A Conceptual Model Demonstrating the Relationship between Green Sustainability Strategies and firm Performance.



Source: Author's Design (2025)

3 METHODOLOGY

In light of the study's focus, an *ex post facto* research design was used. Five (5) quoted agricultural firms on the Nigerian Exchange Group as of December 31st, 2024, made up the study's population. Due to the small numbers of the listed agricultural firms in Nigeria, all the listed agricultural firms made up the study's sample size. The annual reports and sustainability reports of the agricultural firms between 2012 and 2024 served as secondary sources of data. Also, information was gathered from the Nigerian Exchange Group's (NGX) fact book and the official websites of these agricultural firms. This research was based on the models outlined in Akerele et al. (2024) study which focused on sustainability accounting practices and firm value of quoted manufacturing companies in Nigeria. The models used in the study were adapted for this purpose of this study. The model is stated thus:

$$ROA_{it} = \beta 0 + \beta_1 EVI_{it} + \beta_2 SOI_{it} + \beta_3 ETI_{it} + \beta_4 SIZE_{it} + e_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where:

EVI = Environmental Sustainability Index
SOL = Social Sustainability Index
ETI = Ethical Sustainability Index
SIZE = Firm Size

In the extension of the basic model, to focus on the cost value of environmental practices, the model was modified to suit this current study thus we have:

$FP = f(GSS)$ ……2

$ROCE_{i,t} = \alpha_o + \beta_1 EPCP_{it} + \beta_2 LVG_{i,} + e_{it}$ ……3

Where: FP = Firm Performance

ROCE = Return on Capital Employed

LVG = Leverage (Control Variable)

α = Constant; i = i^{th} firm; t = Time Period; β_1, = Regression of the Independent Variable; β_2 = Regression of the Control Variable; e = Error term.

The apriori expectation of this study are stated as follow: $\beta 1 > 0$, (the implication means that environmental pollution control practices is expected to have a positive impact on firm performance). Both descriptive and inferential statistics were used to analyze the data produced by the study's parameters. Standard deviation, mean, median, and mode are examples of descriptive statistics that were used. Regression analysis, which took into account the variables' random or fixed effect characteristics, served as the foundation for inferential statistics. Pairwise correlation, panel unit root, and variance inflation factors were used to evaluate the variables' reliability. Additionally, serial correlation, residual normality, and heteroskedasticity tests were used for post-estimation diagnostic testing. To assess the model's applicability, additional Hausman and individual effect tests were carried out. Regression analysis was used to analyze the data in this study.

3.1 Measurement of Variables

Table 3.1 Measurement of Variables

S/N	VARIABLES	DESCRIPTION	MEASUREMENT	SOURCES
1.	**Dependent Variable** (Firm Performance) Return on Capital Employed	This is a measure of the profitability of a business in relation to its capital employed.	Earnings Before Interest and Taxes divided by capital employed.	Rizal & Yatminiwati, (2020) and Liu (2017)
2.	**Independent Variable** Environmental Pollution Control Practices	This is the strategies employed in limiting or eradicating the release of harmful substances into the environment	The total amount spent on environmental pollution control in the financial statement for each year under study.	Onyebuenyi, U. & Ofoegbu, O. (2022)
3.	**Control Variable** Leverage	This refers to how much a company uses debt to finance assets and operations.	The Total Debt divided by Total Shareholders' Equity in the financial statement for each year under study.	Akpan and Nkanta (2023).

Source: Author's Compilation, 2025

4 DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Descriptive Statistics

Table 4.1 provides the summary statistics for the variables under study. It is clear that the statistics show the characteristics common with most time series.

Return on capital employed (ROCE) average is 1.226 million with standard deviation of 1.034. The standard deviation value shows that there is low variability in the return on equity across the sampled quoted agricultural companies. The quoted agricultural companies with the least return on equity is 0.206 while the maximum return on equity recorded in the industry is 3.241. The total sum of return on equity for the sampled agricultural companies is 13.49. Data for the study positively skewed and normally peaked having skewedness value of 0.515 and kurtosis of 1.896. Further test for data normality through Jarque-Bera test shows statistics of 5.221, and probability value of 0.000. This imply that data for return on capital employed is not normally distributed.

In addition, environmental pollution control practices (EPCP) average is 4.363 million with standard deviation of 0.6426. The standard deviation value shows that there is low variability in the environmental pollution control practices across the sampled quoted agricultural companies, with the least value of 3.000 while the maximum recorded in the industry is 5.000. The total sum of the sampled agricultural companies is 48.00. Data for the study is negatively skewed and normally peaked having skewedness value of -0.501 and kurtosis of 2.324. Further test for data normality through Jarque-Bera test shows statistics of 3.422 and probability value of 0.001. This imply that data for environmental pollution control practices is not normally distributed.

Lastly on table 4.1, leverage (LEV) average is 5.000 million with standard deviation of 0.000. The standard deviation value shows that there is extremely low variability in the company's size across the sampled quoted agricultural companies. The quoted agricultural companies with the least leverage is 5.000 while the maximum recorded in the industry is 5.000. The total sum of leverage for the sampled agricultural companies is 55.00. Data for the study is positively skewed and normally peaked having skewedness value of 0.000 and kurtosis of 0.000 Further test for data normality through Jarque-Bera test shows statistics of 20.62 and probability value of 0.000. This imply that data for leverage is not normally distributed.

Table 4.1: Descriptive Statistics

Variables	ROCE	EPCP	LVG
Observations	55	55	55
Mean	1.226	4.363	5.000
Std. Deviation	1.034	.6426	.0004
Minimum	.2061	3.000	5.000
Maximum	3.241	5.000	5.000
Sum	13.49	48.00	55.00
Skewness	.5152	- .501	.0009
Kurtosis	1.896	2.324	.0003
Jarque-Berra	5.221	3.422	20.62
Probability	0.000	0.001	0.000

Source: Eviews 13 Result, 2025.

4.2 Test of Variables

4.2.1 Pairwise Correlation Matrix

The pairwise correlation coefficient was used to test the linear relationship between environmental pollution control practices and leverage. It is demonstrated that there is a positive correlation between environmental pollution control practices and firm performance. The coefficient value is 0.1984 while its probability value is 0.0000 making the correlation significant. From the same table, it is revealed that leverage has coefficient value of -0.248 and probability value of 0.0043 and this imply that there is inverse and significant correlation between leverage and firm performance. The explanatory variable is positive except the relationship with leverage as the control variable which is observed to be negative. The overall implication of this relationship is that the function of environmental

pollution control strategy on firm performance of quoted agricultural companies in Nigeria is direct as it seems the firm performance reacts based on the activities of environmental pollution control practices.

Table 4.2: Correlation Analysis of the Variables

Variables	Pairwise Correlation	ROCE	EPCP	LVG
ROCE	Coefficient	1.0000		
	Sig.	-		
EPCP	Coefficient	0.1984*	1.0000	
	Sig.	0.0000	-	
LVG	Coefficient	-0.248*	-0.190*	1.0000
	Sig.	0.0043	0.0113	-

Source: Eviews 13 Result, 2025

4.2.2 Panel Unit Root Test of the Variables

Augmented Dickey-Fuller (ADF) and Phillips- Perron (PP) test for unit root were used to determine the order of integration. Schwarz Information Criterion (SIC) and Akaike Information Criterion (AIC) are used for determination of appropriate lag order selection for each test. The results of unit root tests indicate all the variables are integrated of order I(I). The stationarity tests were performed first in levels and then in first difference to establish the presence of unit roots and the order of integration in all the variables. The results of the ADF and PP stationarity tests for each variable show that both tests fail to reject the presence of unit root for the variables under study.

Table 4.3: Unit Root Test

Variables	In-Level I(0)		First Difference I(I)		Order of Integration	
	Augmented Dickey Fuller	Phillips-Perron	Augmented Dickey Fuller	Phillips-Perron	Augmented Dickey Fuller	Phillips-Perron
ROCE	-1.5365	-1.2594	-2.5865*	-2.5902*	I(I)	I(I)
EPCP	-2.1955	-2.1569	-1.0907*	-1.9782*	I(I)	I(I)
LVG	-1.5351	-1.2954	-3.0143*	-7.7430*	I(I)	I(I)

Source: Eviews 13, 2025

4.2.4 Multicollinearity Test

Post estimation tests are conducted to verify the validity of the assumptions of the regression model, such as the presence of multicollinearity. This occurs when two or more explanatory variables are highly correlated, making it possible to predict one variable from the other with some degree of accuracy. The Variance Inflation Factor (VIF) is used to assess the independence of the explanatory variables. According to the evidence in Table 4.4, it appears that there is no multicollinearity issue. The VIF values for all the variables are less than 10 and the tolerance values for all the variables are greater than 0.10. These values meet the criteria to use the regression coefficient to confidently predict the impact of independent variables on dependent variables, so the results of the study can be considered valid.

Table 4.4. Tolerance and VIF Value

Variable	VIF	1/VIF
Environmental Pollution Control Practice		
EPCP	1.00	0.946459
Mean VIF	1.02	

Source: Authors' Computation 2025

4.2.5 Post-Estimation Test

Error test for model specification is conducted using Ramsey RESET test. It evaluates the suitability of the functional model specified for the regression. The study assess if a non-linear version of the connection between the dependent variable and the independent factors would be more suitable. The results shows probability of 0.2615 and this indicate that the model has no omitted variable bias and misspecification. The heteroscedasticity test was conducted to check the validity of homoscedasticity assumption that variance in the residuals are constant as the absence of homoscedasticity violate the assumption and may lead to wrong inference. Heteroscedasticity test was conducted using Breusch-Pagan/Cook-Weisberg test and the result revealed an absence of heteroscedasticity given the probability value of 0.5614 which is higher than 0.05. Likewise, variables for the study is also tested for auto-correlation using Wooldridge test for autocorrelation in panel data. Autocorrelation depicts how closely variable value is correlated across time. The result as presented in table 4 shows the probability of 0.0000 which is significant indicating that there is problem of auto-correlation hence the null hypothesis that there is no first-order correlation is rejected.

Furthermore, the cross-sectional dependence test is carried out and the result is presented in Table 4.5 The result indicate that null hypothesis which implied there is no cross-sectional dependence is strongly rejected as the statistics shows 10.341 with probability value indicated 0.0000. Hence, there is sufficient evidence to conclude that environmental pollution control practices under random effect condition exhibits cross-sectional dependence. However, all the observed estimation problems are to be corrected using the Dynamic Ordinary Least Square (DOLS) with the option that the standard error is independent- corrected. The Hausman test was also conducted to specify the appropriate model between fixed-effect model and random effect model and the result favour the fixed effect model as the probability shows 0.0000 implying that difference in coefficient is not systematic.

Table 4.5: Summary of Post Estimation Test Results

Ramsey Reset Test		
Null Hypothesis	F-Statistics	Probability
H_0: Model has no omitted variables (P>0.05)	1.25	0.2615
Tolerance and VIF Value		
Null Hypothesis	VIF	Mean VIF
There is no multicollinearity among the variables (1/VIF>0.10)	-	1.22
Breusch-Pagan / Cook-Weisberg Test for Heteroscedasticity		
Null Hypothesis	Chi^2 Statistics	Probability
Constant variance across the variables residuals (P>0.05)	0.19	0.5614
Wooldridge Test for Autocorrelation		
Null Hypothesis	F-Statistics	Probability
No first-order autocorrelation (P>0.0)	275.253	0.0000
Pesaran's Test of Cross Sectional Independence		
Null Hypothesis	F-Statistics	0.0000
There is no cross-sectional dependence (P>0.05)	10.341	0.0000
Hausman Test		
Null Hypothesis	F-Statistics	Probability
Difference in coefficients not systematic (P>0.05)	28.34	0.0000

Source: Eviews 13 Result, 2025

4.3 Data Analysis

4.3.1 Grren Sustainability Strategies and Firm Performance

As revealed in Table 4.6, the Coefficient of environmental pollution control practices (EPCP) confirmed the study apriori expectation, as it signed a positive coefficient of 0.1204. This implies a 12% increase in return on capital employed for a 1 unit change in environmental pollution control practices. The p-value is 0.0052 making environmental pollution control practice statistically significant in explaining the variation change in return on capital employed of the quoted agricultural companies in Nigeria.

The coefficient of determination as revealed by R-square (R^2) indicates that 69.4% of the volatility observed in the model were explained by the influence and variations in the explanatory variable (environmental pollution control practice) while the remaining 30.6% is attributed to other factors not included in the model. The Prob (F-statistic) which test the goodness of fit suggest that the model employed in the study is statistically significant given the value of 0.0011 which denotes at 5 percent level of significance, the equation in use is statistically valid. This implies the equation is useful in explaining a unit change in company's performance of quoted agricultural companies in Nigeria. The Durbin-Watson (DW) statistics is equal to 1.95, thus implying the absence of serial auto-correlation. This is because when the DW value is above 2.5, it is an evidence of serial auto correlation.

The findings of the study corroborate the results of similar study in Akerele et al. (2024) and Nwaobia and Omoniyi (2025) sustainability practices and financial performance and the findings suggest that environmental pollution control practices positively affects firm performance. However, this study disagrees with the study of Tanko et al. (2024) who found a negative relationship and insignificant effect of firm green characteristics on firm performance.

Table 4.6. Regression Analysis

Method: Dynamic Ordinary Least Square
Dependent Variable: ROCE
Control Variable: LVG
Date: 25/04/25 Time: 06:03
Sample: 1 55 (2012 2024)
Included Observations: 55

	Coefficient	Indep-corrected Std. Error	t-Statistic	Prob.
Const.	1.3849	1.0402	1.09203	0.0003
EPCP	0.1204	0.3438	-0.7482	0.0043

R-Squared	0.6948	Mean dependent var.	1.4294
Adjusted R-squared	0.5935	S.D. dependent var.	1.0420
S.E. of regression	0.3205	Akaike info criterion	4.4010
Sum squared resid.	4.0453	Schwarz criterion	4.3094
Log likelihood	10.291	Hannan-Quinn criter.	4.7826
F-statistic	0.0011	Durbin-Watson stat.	1.9541
Prob(F-statistic)	0.0052		

Source: Eviews 13, 2025

5 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study explored the effect of green sustainability strategies on firm performance of quoted agricultural companies in Nigeria. Specifically, the study evaluated the impact of environmental pollution control practices on firm performance of quoted agricultural companies in Nigeria. The study reviewed existing literature from both developed and developing countries, as well as studies from Nigeria. Additionally, the theoretical literature reviewed is the resources dependency theory. The methodology employed was the Dynamic ordinary least squares regression was used to analyze the effect of green sustainability strategies on firm performance of quoted agricultural companies in Nigeria. The regression analysis showed that environmental pollution control practices has a positive and significant effect on firm performance of quoted agricultural companies in Nigeria.

The coefficient of determination as revealed by R-square (R^2) indicates that 69.4% of the volatility observed in the model were explained by influence and variations in the explanatory variable (environmental pollution control practices) while the remaining 30.6% is attributed to other factors not included in the model. The Prob. (F-statistic) which test the goodness of fit suggest that the model employed in the study is statistically significant given the value of 0.0023 which denotes at 5 percent level of significance, the equation in use is statistically valid. This implies the equation is useful in explaining a unit change in company performance of quoted agricultural companies in Nigeria. The Durbin-Watson (DW) statistics is equal to 1.9, thus implying the absence of serial auto-correlation. This is because when the DW value is above 2.5, it is an evidence of serial auto correlation.

5.2 Conclusion

The study is motivated from the fact that there are mixed results on the effect of green sustainability strategies on firm performance of quoted agricultural companies in Nigeria. The study concludes that environmental pollution control practices has a positive and significant effect on firm performance of quoted agricultural companies in Nigeria. From the findings, this study rejects hypothesis 1. This study contributes to knowledge by providing evidence of the effect of green sustainability strategies on firm performance of listed agricultural firms in Nigeria.

5.3 Recommendations

Based on the above conclusion, it is recommended that just as firm are striving to create sustained wealth, they should also increase their focus on environmental pollution control practices. This will help the companies to plan for the business going concern value in ever changing business world.

5.4. Contribution to knowledge

The study focuses on the specific context of Nigerian agricultural companies, contributing to knowledge by examining how green sustainability strategies influence firm performance within an emerging market environment. The study's findings are specific to Nigerian agricultural companies, providing stakeholders in the region with contextually relevant information for decision-making and policy development.

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