IAS 41-Biological Asset Disclosure and Financial Reporting Quality: Evidence from Nigeria

[1]ADENIRAN, Taiwo Esther., [2]ADEOTI, Adesoji Isaac., [3]AROWOSEGBE, Taiwo

[1]Department of Taxation, Faculty of Business Studies, Rufus Giwa Polytechnic Owo, Ondo State

[2]Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti, Ekiti State

[3]Department of Accounting, College of Social and Management Sciences, Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti, Ekiti State

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ABSTRACT

The effectiveness of biological assets disclosure under IAS 41 in improving financial reporting quality, particularly in emerging markets with weak institutional frameworks and complex valuation environments became o growing concern. Therefore, this study examined the effect of biological assets disclosure on financial reporting quality of listed agro-allied firms in Nigeria using an ex post facto research design and panel data covering the period 2015 to 2024. A disclosure index based on IAS 41 requirements was constructed through content analysis, while financial reporting quality was proxied using accrual-based measures, and the data were analyzed using fixed effects regression. The findings revealed that biological assets disclosure had a negative and statistically significant effect on financial reporting quality, indicating that increased disclosure did not necessarily improve reporting outcomes due to the subjectivity and estimation uncertainty associated with fair value measurement. In contrast, firm size, leverage, and audit quality exhibited positive but statistically insignificant relationships, suggesting that firm-level characteristics did not significantly influence reporting quality. The study concluded that disclosure alone was insufficient to enhance reporting quality and emphasized the need for stronger enforcement, improved valuation guidelines, and enhanced audit oversight. Consequently, the study recommended that regulatory authorities should strengthen compliance monitoring, provide clearer valuation guidance, and promote capacity building among preparers and auditors to improve the credibility and usefulness of biological assets reporting.

Keywords: Biological assets disclosure, fair value measurement, financial reporting quality

INTRODUCTION

Financial reporting quality is widely acknowledged as a cornerstone of efficient capital markets because it enhances transparency and reduces information asymmetry, which improves investment efficiency and firm valuation (Uwuigbe et al., 2023). In addition, it strengthens investor confidence and lowers the cost of capital, particularly in emerging markets (Adegboyegun & Oyerogba, 2022). Moreover, high quality reporting supports effective corporate governance and sound managerial decisions, as Iyoha (2024) notes. However, despite these advantages, developed economies still face persistent challenges, since earnings management undermines comparability, fair value measurement introduces subjectivity, and audit failures weaken market trust, while inconsistent ESG assurance fuels greenwashing concerns (Dokas, 2023; Oyerogba, 2024).

These challenges are even more pronounced in developing economies. In Africa, weak enforcement mechanisms and limited regulatory capacity lead to uneven disclosure compliance, as documented by Agbogun et al. (2022). At the same time, earnings management practices and governance weaknesses remain widespread and continue to erode credibility and investor trust (Uwuigbe et al., 2023). Although IFRS convergence has reduced some accounting diversity, it has not eliminated real earnings management, and recent Nigerian evidence confirms that reporting incentives still dominate compliance (Mikail et al., 2024). In Nigeria specifically, audit quality

deficiencies and boilerplate audit disclosures further constrain the reliability of published financial statements (Sunday, 2025; Oyerogba, 2024).

Beyond institutional weaknesses, the literature also highlights methodological problems in assessing financial reporting quality. Many studies rely on single proxies, such as discretionary accruals, which are highly sensitive to model assumptions and may misrepresent true reporting behaviour (Dănescu, 2023). In addition, audit quality gaps and limited assurance weaken confidence in reported numbers, while inconsistent indices and data limitations reduce the robustness of empirical findings and policy relevance (Rahman, 2023; Uwuigbe et al., 2023).

In response, international institutions, regulators, and researchers have implemented several corrective measures. The IFRS Foundation (2023) introduced IFRS S1 and S2 to improve consistency and comparability in sustainability related disclosures, while IFAC strengthened firm level quality management and audit oversight frameworks (IFAC, 2022). Furthermore, researchers advocate composite indices and multi method approaches to better capture financial reporting quality and reduce proxy bias (Dănescu, 2023). At the national level, governance reforms and capacity building initiatives have shown potential to enhance disclosure quality and assurance, including in Nigeria (Oyerogba, 2024).

Within this broader reporting context, biological asset disclosure under IAS 41 has become increasingly important, particularly for agro-allied firms. IAS 41 disclosure requirements enhance representational faithfulness and value relevance by mandating transparency on valuation methods, gains, and asset classifications, which improves decision usefulness (IFRS Foundation, 2023). Empirical evidence shows that adequate biological asset disclosure is associated with higher firm value and improved information content of financial statements, both internationally and in Nigeria (Mustapha & Yusuf, 2022; Widagdo et al., 2024). However, fair value estimation remains complex and data dependent, which reinforces the need for clearer guidance and stronger narrative disclosures (Pajares, 2024).

Despite these potential benefits, evidence consistently points to inadequate biological asset disclosure under IAS 41. Nigerian studies reveal low compliance levels and weak explanatory narratives, while limited valuation expertise and data gaps undermine the reliability of fair value estimates (Mustapha & Yusuf, 2022; Determinants of Fair Value Measurement, 2024). Moreover, inconsistent application across jurisdictions and weak assurance reduce comparability and user confidence, particularly in African markets (Uwuigbe et al., 2023; Oyerogba, 2024).

Consequently, although the IAS 41 literature is expanding, significant gaps remain. Most studies focus on compliance or value relevance rather than examining financial reporting quality as a broader construct, and measurement challenges persist due to proxy limitations (Dănescu, 2023). In addition, sector specific and post adoption evidence on listed agro-allied firms in Nigeria is scarce. Therefore, this study investigates the effect of biological assets disclosure under IAS 41 on the financial reporting quality of listed agro-allied firms in Nigeria.

LITERATURE REVIEW

Conceptual Review

Financial Reporting Quality

Financial reporting quality is the extent to which financial statements faithfully represent underlying economics and remain useful for decision making, as many authors emphasize. As Sahi (2022) defines it, quality rests on relevance and faithful representation, and it affects resource allocation, cost of capital, and market efficiency (Sahi, 2022). Moreover, Biehl (2024) documents that high quality reporting has real effects on firm investments and operations, and empirical studies link better reporting to higher firm value and lower information risk (Biehl, 2024; Harjanto, 2023). Measurement of financial reporting quality is varied, and this creates problems for research and policy. Many scholars use accrual-based proxies, discretionary accruals, or timeliness measures, and Dănescu (2023) warns that single proxies are model sensitive and may misclassify behavior (Dănescu, 2023). At the same time Rahman (2023) shows audit quality and assurance affect measured quality, and

regulators now note new audit risks from technologies such as AI, which complicate assessment and monitoring (Rahman, 2023; Financial Times / FRC, 2025). Together these issues suggest multi method and composite measures are needed to produce robust inference.

Biological Assets Disclosure under IAS 41

IAS 41 defines biological assets as living plants and animals and requires disclosure of aggregate gains or losses, valuation methods, and group descriptions to enhance representational faithfulness, as the IFRS Foundation explains (IFRS Foundation, 2023). Mustapha and Yusuf (2022) elaborate that disclosure should cover both quantitative measures and narrative context to make fair value movements interpretable. In practice, African evidence shows weak narrative detail and partial compliance, which undermines comparability and decision usefulness (Mustapha & Yusuf, 2022; Akpan et al., 2022). Measurement raises persistent issues because fair value for many biological assets depends on models and scarce market data, which creates estimation error and subjectivity, as Pajares (2024) argues. Empirical studies find that firm size, auditor type, and data availability shape whether entities report credible fair values, and these determinants affect how users interpret reported gains or losses (Akpan et al., 2022). Other work shows that better disclosure can increase market valuation and information content, but only when firms provide method detail and non-financial metrics, as Widagdo et al. (2024) demonstrate.

Effects on reporting quality follow logically. Clear IAS 41 disclosure improves relevance and faithful representation when it is accompanied by robust valuation protocols and audit assurance, and systematic reviews recommend richer narratives and standardized measurement guidance to reduce heterogeneity (IFRS Foundation, 2023; Pajares, 2024). Therefore, strengthening disclosure practice for biological assets can raise overall financial reporting quality, provided regulators, auditors, and preparers close the data and expertise gaps identified in Nigerian and broader African studies (Akpan et al., 2022; Mustapha & Yusuf, 2022).

Theoretical Review

Signaling Theory

Signaling theory was propounded by Michael Spence and recent reviews summarized his core insight that senders transmit observable signals to reduce information asymmetry (Svetek, 2022), and scholars have extended the idea to firm disclosures and voluntary reporting (Bafera, 2023). The theory assumes information asymmetry between managers and outside users, and it requires that signals are observable, costly, and somewhat costly for low quality firms to mimic, which preserves credibility (Connelly et al., 2024). It also assumes rational receivers who update beliefs on receipt of signals, and it assumes markets or investors react to credible disclosure signals. (Svetek, 2022; Bafera, 2023; Connelly et al., 2024). There are limitations and critiques of signaling theory when applied to accounting disclosure, and critics note that signals can be noisy and open to manipulation (Bafera, 2023). Moreover, the cost requirement can be weak for some disclosures, and low-quality firms sometimes mimic signals at low cost, which reduces the theory's predictive power (Connelly et al., 2024). Empirical critiques stress that signaling models often ignore institutional context and enforcement, and Nigerian studies emphasize that weak regulation and audit gaps make signals less informative in practice (board diversity and disclosure studies; Agbogun et al., 2022). Therefore, signaling explanations need to be complemented by governance and audit capacity considerations. (Bafera, 2023; Connelly et al., 2024; Agbogun et al., 2022).

Despite limits, signaling theory offers clear benefits for disclosure research, and it explains why firms with good prospects or strong internal controls voluntarily reveal richer information to differentiate themselves from weaker peers (Svetek, 2022). In the context of biological assets under IAS 41 the theory predicts that firms with better valuation protocols and governance will disclose more detailed methods and narratives to signal credibility, and Nigerian evidence on fair value determinants supports this view (Akpan et al., 2022; IFRS Foundation, 2023). Thus, signaling helps explain cross firm variation in IAS 41 disclosure and its likely effect on perceived reporting quality. (Svetek, 2022; Akpan et al., 2022; IFRS Foundation, 2023). Signaling theory fits this study because biological assets have private, model dependent values, and disclosure choices convey information about measurement rigor and managerial incentives, which investors need to evaluate reported figures (Svetek, 2022). Empirical Nigerian work shows that firm size, auditor type, and governance shape fair

value practice, and these characteristics also affect the strength and cost of disclosure signals (Akpan et al., 2022; Agbogun et al., 2022). Therefore, the theory predicts that better IAS 41 disclosure will act as a credible signal of higher reporting quality, and it links disclosure behavior to expected market and user responses, which is the core focus of the study on listed agro-allied firms in Nigeria (Connelly et al., 2024; Akpan et al., 2022; Agbogun et al., 2022).

Empirical Review

Mustapha and Yusuf (2022) conducted a correlational, panel study using secondary data from annual reports of all agricultural firms listed on the Nigerian Exchange for the period 2004–2019, the population was all listed agricultural firms and the sample comprised the firms with complete pre and post adoption data, panel regression (modified Ohlson model) was used to test value relevance, the study found mixed evidence that IAS 41 adoption increased the information content of accounting numbers and had some post adoption value relevance, and the authors note a gap because they do not measure financial reporting quality as a composite construct nor link disclosure depth to assurance outcomes. Akpan et al. (2022) used an ex post facto design with secondary data from annual reports of listed agricultural firms in Nigeria for 2012–2020, the population was five quoted agricultural firms and purposive sampling produced a final sample of four firms, descriptive statistics and binary logistic regression tested determinants of fair value measurement, results show firm size and auditor type significantly predict adoption of fair value for biological assets, and the study's limitation is its narrow sample and lack of direct analysis of how disclosure quality affects overall reporting quality.

Nnajieze (2022) examined financial determinants of biological assets in Nigeria using an ex post facto panel design with ten years of secondary data (2011–2020), the population was quoted agricultural companies and the sample included firms with available data, fixed effects OLS was applied, the study reported that leverage significantly influences biological asset levels while profitability and size do not, and the authors identify that the work does not address disclosure quality or market effects of biological asset reporting, leaving a gap on reporting quality outcomes. Ika et al. (2024) studied 56 Indonesian listed agricultural firms for 2017–2020 using secondary data and regression analysis, the sample was drawn purposively from firms reporting biological assets, multiple regression tested the effect of biological asset disclosure and firm economic sustainability on firm value, the study found disclosure per PSAK69 did not significantly affect firm value while economic sustainability did, and the paper notes the contextual gap that disclosure effects vary by investor focus and institutional setting, which limits direct transferability to Nigeria.

Hutabarat et al. (2024) used a multi-year sample of Indonesian agricultural firms (2018–2022), employed multiple linear regression on secondary accounts and annual reports, found that biological asset disclosure positively affects firm value while fair value proportions do not, and highlighted sample availability, disclosure heterogeneity and measurement subjectivity as gaps, which implies a need for richer disclosure indices and cross-country validation including Nigeria. Abdullah (2023) analyzed Malaysian agricultural firms using panel data and multiple regression to test how CEO, CFO and board attributes influence fair value disclosure practice and value relevance, the population was agricultural firms listed on Bursa Malaysia, purposive sampling produced the final sample and empirical tests showed corporate governance attributes affect fair value disclosure intensity, the study finds mixed value relevance evidence and flags the limitation that governance and institutional enforcement moderate disclosure usefulness, a point relevant when examining Nigerian agro-allied firms. Warsini (2024) carried out an empirical study of Indonesian plantation companies using secondary data and multiple regression for 2018–2022, the study tested measurement and disclosure relationships and reported that fair value measurement often shows a positive relation with performance while disclosure results vary by firm characteristics, the paper calls out disclosure measurement inconsistency and data sparsity as key gaps that restrict inference on reporting quality, and recommends composite disclosure indices and assurance variables in future work. Gonçalves et al. (2024) applied regression and content index methods across samples in Asia and Africa and found that biological asset recognition and richer disclosure tend to be more value relevant where disclosure is detailed and audited, however these studies also record inconsistent application, small samples for agricultural sectors in developing markets, and the persistent gap that few papers operationalize financial reporting quality as a composite outcome linking disclosure, measurement, assurance and market consequences, which justifies focused Nigeria studies on listed agro-allied firms.

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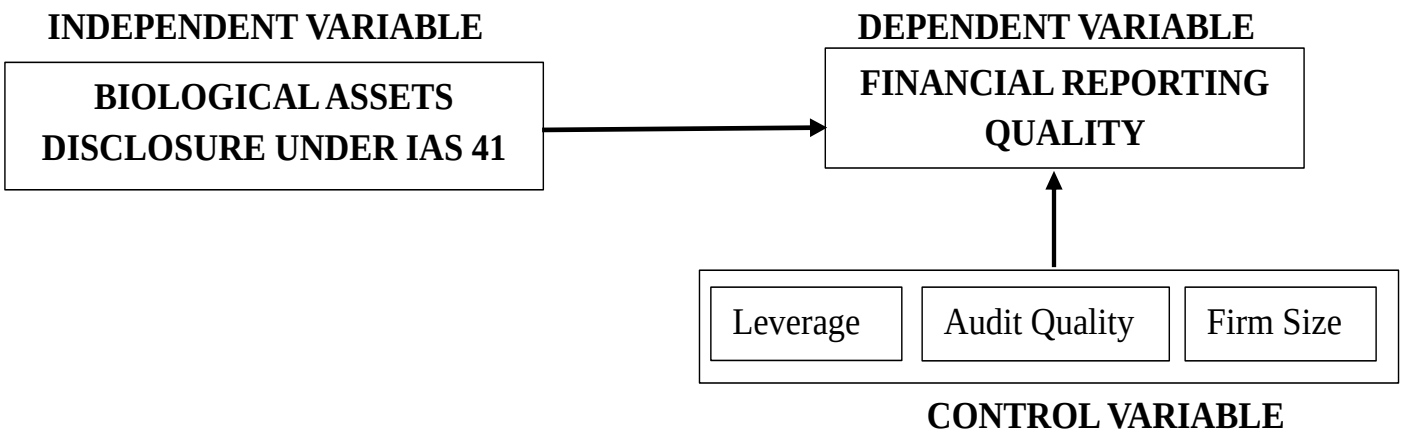
Conceptual Framework



Source: Authors' Conceptualization (2026)

Fig 2.1. Conceptual Framework

Conceptual framework showing the link between Biological Assets Disclosure Under IAS 41 and Financial Reporting Quality.

The conceptual framework illustrates the relationship between Biological Asset Disclosure under IAS 41 and Financial Reporting Quality. It positions biological asset disclosure as the independent variable influencing reporting quality outcomes. Leverage, audit quality, and firm size are introduced as control variables that may affect or condition this relationship.

These control variables help isolate the specific effect of disclosure on financial reporting quality. Overall, the framework assumes that variations in disclosure practices directly impact the credibility and usefulness of financial reports.

METHODOLOGY

This study adopts an ex post facto research design using a census approach. The population comprises all five agro-allied firms listed on the Nigerian Exchange Group, and the sample size is also five firms since all firms with complete data are studied. Secondary data are sourced from audited annual reports and financial statements for the period 2015 to 2024. Biological assets disclosure under IAS 41 is measured using a disclosure index, while financial reporting quality is captured with accrual based and reporting quality proxies. Data are analyzed using descriptive statistics and panel regression techniques to examine the effect of IAS 41 biological assets disclosure on financial reporting quality of listed agro-allied firms in Nigeria.

Content Analysis and Disclosure Index

This study employs content analysis to assess IAS 41 Biological Assets Disclosure.

Table 3.1: IAS 41 Biological Assets Disclosure Index Scale (BADIS)

S/N	Disclosure Dimension	Disclosure Item	IAS 41 Paragraph	Scoring Scale
1	Recognition	Recognition of biological assets in the statement of financial position	IAS 41.10–13	1 = disclosed, 0 = not disclosed
2	Classification	Classification of biological assets by biological type or group	IAS 41.43	1 = disclosed, 0 = not disclosed
3	Measurement Basis	Disclosure of measurement basis applied (fair value or cost)	IAS 41.12	1 = disclosed, 0 = not disclosed

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4	Valuation Technique	Description of valuation techniques and key assumptions	IAS 41.17–21	1 = disclosed, 0 = not disclosed
5	Fair Value Gains or Losses	Disclosure of gains or losses arising from fair value changes	IAS 41.26	1 = disclosed, 0 = not disclosed
6	Reconciliation	Reconciliation of changes in carrying amount during the period	IAS 41.50	1 = disclosed, 0 = not disclosed
7	Physical Changes	Disclosure of physical changes in biological assets	IAS 41.46	1 = disclosed, 0 = not disclosed
8	Price Changes	Disclosure of price changes affecting biological assets	IAS 41.46	1 = disclosed, 0 = not disclosed
9	Risk Exposure	Disclosure of risks related to biological activity	IAS 41.49	1 = disclosed, 0 = not disclosed
10	Government Grants	Disclosure of government grants relating to biological assets	IAS 41.34–35	1 = disclosed, 0 = not disclosed
11	Restriction on Assets	Disclosure of restrictions on title or pledged biological assets	IAS 41.49	1 = disclosed, 0 = not disclosed
12	Sensitivity Analysis	Disclosure of sensitivity of fair value estimates to assumptions	IAS 41.41	1 = disclosed, 0 = not disclosed

Researcher's Compilation (2026)

Disclosure Index Computation

$$\text{IAS 41 Biological Assets Disclosure Index (BADIS)} = \frac{\sum \text{Disclosure Score}_i}{12}$$

Where:
BADIS ranges from 0 to 1, and higher values indicate higher disclosure quality.

Model Specification

This study is adapted strictly from Mustapha and Yusuf (2022), who examined the relevance of IAS 41 adoption on accounting information of listed agricultural firms in Nigeria. In their model, accounting information quality is explained by IAS 41–related reporting variables and firm characteristics. Following their approach, financial reporting quality is modelled as a function of disclosure related to biological assets and firm-level control variables. The adapted model is specified as:

$$FRQ_{it} = \alpha_0 + \alpha_1 IAS41_{it} + \alpha_2 FS_{it} + \alpha_3 LEV_{it} + \mu_{it}$$

Where FRQ represents financial reporting quality, $IAS41$ captures IAS 41–related disclosure or adoption effects, FS denotes firm size, and LEV represents leverage.

Building on Mustapha and Yusuf (2022), this study extends the model by focusing explicitly on the depth of biological assets disclosure under IAS 41 and by incorporating audit quality as an additional monitoring control. Accordingly, the model for this study is specified as:

$$FRQ_{it} = \beta_0 + \beta_1 BAD_{it} + \beta_2 FS_{it} + \beta_3 LEV_{it} + \beta_4 AQ_{it} + \varepsilon_{it}$$

Where FRQ_{it}denotes the financial reporting quality of firm $i$in year t, $BAD_{it}$is the IAS 41 biological assets disclosure index developed through content analysis. FS_{it}represents firm size. $LEV_{it}$is leverage. AQ_{it}denotes audit quality. The a priori expectation is that $\beta_1 - \beta_4 > 0$.

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Measurement of Variables

Table 3.2: Description and Measurement of Variables

Variable	Description	Measurement	Source
Financial Reporting Quality (FRQ) - Dependent	Extent to which financial statements are reliable, comparable, and free from earnings manipulation	Absolute discretionary accruals estimated using the Modified Jones Model. Lower values indicate higher quality	Dănescu (2023); Rahman (2023)
Biological Assets Disclosure (BAD) – Independent	Degree of compliance with IAS 41 disclosure requirements on biological assets	IAS 41 disclosure index based on content analysis. Total items disclosed divided by maximum possible score	Mustapha & Yusuf (2022); IFRS Foundation (2023)
Firm Size (FS) – Control	Scale of firm operations influencing disclosure incentives	Natural logarithm of total assets	Uwuigbe et al. (2023)
Leverage (LEV) – Control	Extent of debt financing that may affect reporting behavior	Total liabilities divided by total assets	Adegboyegun & Oyerogba (2022)
Audit Quality (AQ) – Control	Strength of external audit monitoring	Dummy variable. Big 4 auditor equals 1, otherwise 0	Rahman (2023)

Source: Researcher's Compilation (2026)

RESULTS AND DISCUSSIONS

Descriptive Statistics of Study Variables

Table 4.1: *Descriptive Statistics of Variables*

Variable	Obs	Mean	Std. Dev.	Min	Max
FRQ	50	0.8525	0.9614	0.0000	6.3113
BAD	50	63.9456	36.5381	0.0000	100.0000
FSIZ	50	10.6682	1.3316	8.1168	12.8241
LEV	50	4.6346	0.5187	3.4035	5.4920
AQ	50	2.3140	0.6550	-1.4302	3.1146

Source: Researcher's Computation (2026)

Table 4.1 presents the descriptive statistics of the variables employed in examining the effect of biological asset disclosure under IAS 41 on financial reporting quality of listed agro-allied firms in Nigeria. The dataset comprises 50 observations for each variable, indicating a balanced sample with no missing values. Financial reporting quality (FRQ) has a mean value of 0.8525 and a relatively high standard deviation of 0.9614, suggesting notable dispersion among firms. The minimum value of 0.0000 and maximum value of 6.3113 indicate substantial variation in reporting quality, implying that while some firms exhibit weak financial reporting practices, others demonstrate considerably stronger reporting standards. This variability reflects differences in compliance levels, managerial discretion, and internal control systems across firms.

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Biological Asset Disclosure (BAD), which represents the extent of compliance with IAS 41 disclosure requirements, records a mean of 63.9456 and a high standard deviation of 36.5381. This indicates significant heterogeneity in disclosure practices among the sampled firms. The wide range, from 0.0000 to 100.0000, suggests that some firms provide minimal or no disclosure on biological assets, while others achieve full compliance. This disparity underscores the uneven adoption of IAS 41 among agro-allied firms and suggests that disclosure practices may be influenced by firm-specific characteristics such as governance quality, regulatory pressure, and operational complexity. Firm size (FSIZ) has a mean of 10.6682 and a relatively low standard deviation of 1.3316, indicating that the firms are fairly comparable in size, although the range still captures variation between smaller and larger firms within the sector.

Leverage (LEV) shows a mean value of 4.6346 with a low standard deviation of 0.5187, indicating limited variability in the capital structures of the firms. The narrow range between 3.4035 and 5.4920 suggests that most firms operate with similar debt levels, reflecting relatively uniform financing patterns. Audit quality (AQ) records a mean of 2.3140 and a standard deviation of 0.6550, indicating moderate dispersion across firms. The presence of a negative minimum value (-1.4302) suggests that the proxy for audit quality, likely based on accrual measures, captures variations where lower or negative values may reflect stricter audit processes. Overall, the descriptive statistics reveal that while firm size and leverage are relatively stable, financial reporting quality and biological asset disclosure exhibit considerable variation, reinforcing the need to empirically assess the influence of IAS 41 disclosure practices on reporting quality within the Nigerian agro-allied sector.

Correlation Matrix and Multicollinearity Diagnostics

Correlation analysis is conducted to examine the direction and strength of the relationships among the variables included in the model. The correlation coefficient ranges between minus one and plus one, where values closer to either extreme indicate stronger relationships, while values closer to zero indicate weaker associations. In addition to the correlation analysis, the study also examines the presence of multicollinearity among the explanatory variables using the Variance Inflation Factor (VIF). VIF values below the conventional threshold of 10 indicate that multicollinearity is not a serious concern in the model.

Table 4.2: Correlation Matrix and Variance Inflation Factor

Variable	FRQ	BAD	FSIZ	LEV	AQ	VIF
FRQ	1.0000					
BAD	-0.1971	1.0000				1.41
FSIZ	0.1660	0.5217	1.0000			1.51
LEV	0.0331	0.0032	-0.1566	1.0000		1.04
AQ	-0.0662	0.2870	0.3528	-0.0503	1.0000	1.16
Mean VIF = 1.28						

Source: Researcher's Computation (2026)

Table 4.2 presents the correlation matrix alongside the Variance Inflation Factor (VIF) results, providing preliminary evidence on the direction of relationships among variables and the presence of multicollinearity. The correlation coefficients indicate that Biological Asset Disclosure (BAD) has a weak negative relationship with financial reporting quality (FRQ) at -0.1971, suggesting that higher levels of disclosure are not necessarily associated with improved reporting quality within the sampled firms. Firm size (FSIZ) shows a weak positive correlation with FRQ (0.1660), implying that larger firms may exhibit slightly better reporting quality, possibly due to stronger regulatory scrutiny and more robust internal controls. Leverage (LEV) has a very weak positive relationship with FRQ (0.0331), indicating minimal association, while audit quality (AQ) is weakly negatively correlated with FRQ (-0.0662), suggesting that variations in audit quality may not strongly influence reporting quality at the descriptive level.

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Examining the interrelationships among the explanatory variables, BAD is moderately positively correlated with FSIZ (0.5217), indicating that larger firms tend to disclose more information on biological assets, likely due to greater compliance capacity and visibility. BAD also shows a weak positive relationship with AQ (0.2870), suggesting that firms with better audit processes may provide more extensive disclosures. FSIZ is moderately positively correlated with AQ (0.3528), reinforcing the notion that larger firms are more likely to engage higher-quality audit practices. The relationships between LEV and other variables are generally weak, indicating that leverage does not strongly interact with disclosure, firm size, or audit quality within the sample.

The VIF results confirm the absence of multicollinearity concerns in the model. All individual VIF values are well below the conventional threshold of 10, with BAD (1.41), FSIZ (1.51), LEV (1.04), and AQ (1.16). The mean VIF of 1.28 further indicates that the explanatory variables are not highly linearly correlated. This suggests that the regression estimates are likely to be reliable and not distorted by multicollinearity. Overall, the table provides evidence of generally weak pairwise correlations and acceptable VIF values, supporting the suitability of the variables for subsequent regression analysis in examining the effect of IAS 41 biological asset disclosure on financial reporting quality.

Diagnostic Tests

Diagnostic tests are conducted to examine whether the assumptions underlying panel regression estimation are satisfied. Specifically, the study tests for heteroskedasticity, random effects, model specification, and serial correlation. These tests help determine the appropriate estimation technique and ensure that the regression results are reliable and unbiased

Table 4.3: Panel Diagnostic Tests

Diagnostic Test	Test Statistic	Probability	Decision
Modified Wald Test for Heteroskedasticity	$\chi^2(5) = 6.90$	0.2282	No heteroskedasticity
Breusch–Pagan LM Test for Random Effects	$\text{chibar}^2 = 0.00$	1.0000	Random effects not required
Hausman Test	$\chi^2(4) = 67.31$	0.0000	Fixed effects preferred
Wooldridge Test for Autocorrelation	$F(1,4) = 0.681$	0.4557	No serial correlation

Source: Researcher's Computation (2026)

Table 4.3 reports the panel diagnostic tests used to validate the underlying assumptions of the regression model and to guide the appropriate estimation technique. The Modified Wald test for heteroskedasticity yields a chi-square value of 6.90 with a probability of 0.2282, which is statistically insignificant at conventional levels. This indicates the absence of heteroskedasticity, implying that the variance of the error terms is constant across cross-sectional units. Consequently, the model satisfies the homoskedasticity assumption, enhancing the reliability and efficiency of the estimated coefficients.

The Breusch–Pagan Lagrange Multiplier (LM) test for random effects produces a chibar-square value of 0.00 with a probability of 1.0000, indicating that random effects are not necessary for the model. This suggests that there is no significant panel-level variance component, and pooled Ordinary Least Squares could be considered. However, the Hausman test result provides a more definitive model selection criterion, with a chi-square value of 67.31 and a probability of 0.0000, which is highly significant. This leads to the rejection of the null hypothesis that random effects are consistent, thereby confirming that the fixed effects model is more appropriate. This implies that unobserved firm-specific characteristics are correlated with the explanatory variables and must be controlled for to avoid biased estimates.

Furthermore, the Wooldridge test for autocorrelation reports an F-statistic of 0.681 with a probability of 0.4557, indicating no evidence of serial correlation in the panel data. This suggests that the error terms are not correlated over time, satisfying another key assumption of panel regression analysis. Overall, the diagnostic results confirm

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that the dataset is free from major econometric issues such as heteroskedasticity and autocorrelation, while also establishing the fixed effects model as the most suitable estimation technique. This provides a strong methodological foundation for examining the effect of biological asset disclosure under IAS 41 on financial reporting quality of listed agro-allied firms in Nigeria.

Fixed Effects Regression Results

The fixed effects regression model is estimated to examine the relationship between biological assets disclosure and financial reporting quality while controlling for firm size, leverage, and audit quality. The fixed effects estimator is preferred based on the Hausman specification test, which indicates that firm specific effects are correlated with the explanatory variables. Robust standard errors clustered at the firm level are used to correct for potential heteroskedasticity and within panel correlation.

Table 4.4: Fixed Effects Regression Results with Sensitivity Analysis

Variable	Baseline Coefficient	Robust Std. Error	t-statistic	p-value	Sensitivity (Clustered S.E.)	p-value
BAD	-0.0329	0.0083	-3.97	0.017**	-0.0329 (0.0107)	0.022**
FSIZ	0.4965	0.3409	1.46	0.219	0.4965 (0.3892)	0.264
LEV	0.4026	0.3850	1.05	0.355	0.4026 (0.4125)	0.391
AQ	0.0153	0.0632	0.24	0.820	0.0153 (0.0724)	0.847
Constant	-4.2395	4.4804	-0.95	0.398	-4.2395 (4.8121)	0.421

Model Summary (Baseline)

Obs. = 50; Firms = 5

R^2 (Within) = 0.5066; R^2 (Between) = 0.1563; R^2 (Overall) = 0.1187

F-statistic = 36.61; Prob > F = 0.0021

Sigma_u = 1.0273; Sigma_e = 0.7077; Rho = 0.6782

Note: Values in parentheses under sensitivity represent clustered standard errors. ** indicates significance at 5% level.

Source: Researcher's Computation (2026)

The results presented in Table 4.4 combine the baseline fixed effects regression with a sensitivity analysis using clustered standard errors, providing a more rigorous assessment of the relationship between biological asset disclosure and financial reporting quality. The baseline results indicate that Biological Asset Disclosure (BAD) has a negative and statistically significant effect on financial reporting quality (β = -0.0329, p = 0.017). This suggests that increased compliance with IAS 41 disclosure requirements is associated with a decline in financial reporting quality among listed agro-allied firms in Nigeria. The sensitivity analysis confirms this result, as the coefficient remains unchanged and statistically significant (p = 0.022) even after adjusting for within-firm dependence and heteroskedasticity. This consistency demonstrates that the core finding is robust and not sensitive to estimation technique.

Firm size (FSIZ) exhibits a positive but statistically insignificant relationship with financial reporting quality in both the baseline and sensitivity results. Although the positive coefficient suggests that larger firms may have better reporting structures and stronger governance mechanisms, the lack of statistical significance indicates that firm size does not play a decisive role in explaining variations in reporting quality within the sampled firms. The

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increase in standard errors under the clustered specification further confirms that the effect of firm size is weak and not robust across different estimation approaches.

Leverage (LEV) also shows a positive but statistically insignificant effect on financial reporting quality across both model specifications. This implies that although firms with higher debt levels may have incentives to improve transparency and reporting practices due to monitoring by creditors, such influence is not strong enough to be statistically meaningful in this study. Similarly, audit quality (AQ) maintains a positive but highly insignificant relationship with financial reporting quality, indicating that variations in audit practices do not significantly affect the quality of financial reports in the agro-allied sector.

Overall, the model demonstrates strong explanatory power within firms, as indicated by the within R^2 of 0.5066, meaning that over 50 percent of the variation in financial reporting quality is explained by the included variables. The statistically significant F-statistic further confirms that the model is jointly significant. Importantly, the sensitivity analysis reinforces the reliability of the findings, as the direction, magnitude, and significance of the key explanatory variable remain stable. This provides strong empirical evidence that the negative impact of biological asset disclosure on financial reporting quality is consistent and not driven by violations of classical regression assumptions.

Linearity Test

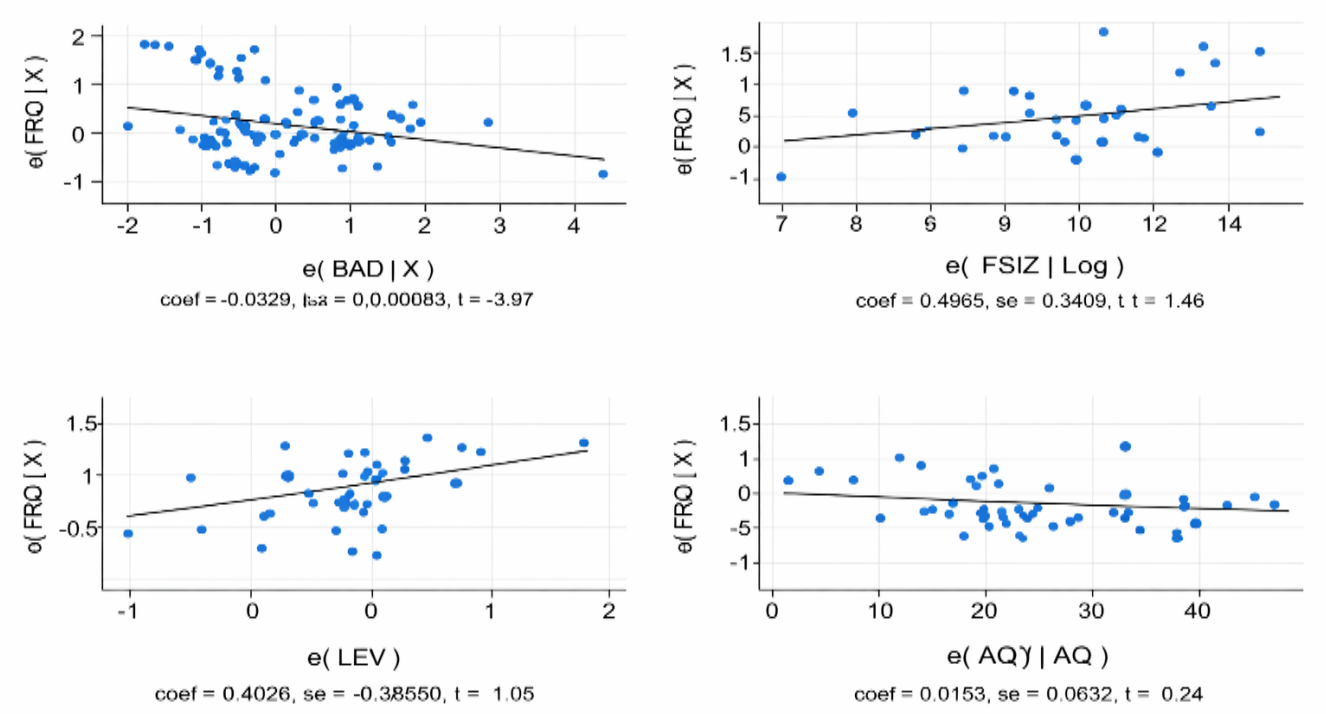

Figure 4.1: Partial Regression (Added-Variable) Plots for FRQ

Source: Researchers' Design (2026)

The partial regression plots presented above provide a visual assessment of the linear relationships between Financial Reporting Quality (FRQ) and the explanatory variables, namely Biological Asset Disclosure (BAD), Firm Size (FSIZ), Leverage (LEV), and Audit Quality (AQ). The BAD plot shows a clear downward sloping fitted line, indicating a negative linear relationship with FRQ, which aligns with the regression result and suggests that increased biological asset disclosure is associated with lower reporting quality. FSIZ and LEV both exhibit upward sloping trends, implying positive linear relationships with FRQ, although the dispersion of points indicates that these relationships are relatively weak. In contrast, AQ shows a nearly flat and slightly negative slope, suggesting a very weak linear association with FRQ. Importantly, across all four plots, the data points are distributed around straight fitted lines without any visible curvature, clustering, or nonlinear patterns. This

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confirms that the linearity assumption is satisfied for both the main explanatory variable and the control variables, thereby supporting the appropriateness of the linear regression model used in the study.

Test of Model Specification and Normality

Table 4.5: Cameron and Trivedi's Decomposition of the IM-Test

Source	Chi-square	df	p-value	Decision
Heteroskedasticity	32.14	35	0.6125	No heteroskedasticity
Skewness	6.28	7	0.5063	Residuals are symmetric
Kurtosis	0.89	1	0.3452	No excess kurtosis
Total	39.31	43	0.6378	Model correctly specified

Source: Researchers' Computation (2026)

The Cameron and Trivedi's IM-test results indicate that the regression model satisfies the key assumptions of homoskedasticity and normality. The heteroskedasticity component is statistically insignificant ($\chi^2 = 32.14$, $p = 0.6125$), suggesting that the variance of the error terms is constant across observations. This implies that the model does not suffer from heteroskedasticity, and the estimated standard errors are reliable. Similarly, the skewness component is insignificant ($\chi^2 = 6.28$, $p = 0.5063$), indicating that the residuals are symmetrically distributed around the mean.

Furthermore, the kurtosis component is also insignificant ($\chi^2 = 0.89$, $p = 0.3452$), confirming that the residuals do not exhibit abnormal tail behavior and are approximately normally distributed. The overall IM-test statistic ($\chi^2 = 39.31$, $p = 0.6378$) is not significant, leading to the acceptance of the null hypothesis that the model is correctly specified. This suggests that there are no underlying specification errors related to heteroskedasticity or non-normality. Overall, the results confirm that the model is well specified and that the residuals satisfy the classical linear regression assumptions. This strengthens the validity and robustness of the empirical findings, providing confidence that the estimated relationship between biological asset disclosure under IAS 41 and financial reporting quality is not affected by violations of key econometric assumptions.

DISCUSSION OF FINDINGS

The empirical findings of this study reveal that biological asset disclosure under IAS 41 exerts a negative and statistically significant effect on financial reporting quality among listed agro-allied firms in Nigeria. This suggests that increased disclosure does not necessarily enhance reporting credibility, largely due to the subjectivity and estimation uncertainty inherent in fair value measurement of biological assets. This outcome aligns with recent arguments that fair value-based disclosures may introduce noise and managerial discretion, thereby reducing reliability (Pajares, 2024; Dănescu, 2023). Similarly, Rahman (2023) emphasizes that disclosure quality is contingent on audit assurance and measurement precision, while Campos-Llerena (2024) highlights valuation complexity as a major limitation in agricultural accounting. However, this finding contradicts studies that report positive effects of disclosure on value relevance and decision usefulness (Widagdo et al., 2024; Mustapha & Yusuf, 2022). From a signaling theory perspective, the result implies that disclosure under IAS 41 may fail as a credible signal due to weak enforcement and low verification costs, allowing low-quality firms to mimic high-quality disclosures (Connelly et al., 2024; Bafera, 2023). The policy implication is that regulators must strengthen valuation guidelines and enforcement mechanisms to ensure that disclosures convey meaningful and reliable information.

The study further finds that firm size has a positive but statistically insignificant relationship with financial reporting quality. This suggests that although larger firms are generally expected to exhibit better reporting practices due to greater scrutiny and resources, such advantages do not significantly translate into improved reporting quality in the Nigerian agro-allied sector. This finding is consistent with Akpan et al. (2022), who

report that firm size influences disclosure practices but not necessarily reporting outcomes. Similarly, Iyoha (2024) notes that governance structures in African firms do not always guarantee higher reporting quality due to institutional weaknesses. However, the result contrasts with studies that find a strong positive relationship between firm size and reporting quality (Uwuigbe et al., 2023; Harjanto, 2023). Within the signaling theory framework, larger firms are expected to signal superior quality through enhanced disclosure, yet the insignificance suggests that such signals may lack credibility in weak regulatory environments (Svetek, 2022; Connelly et al., 2024). The policy implication is that improving reporting quality requires more than firm-level capacity, it demands systemic regulatory strengthening and enforcement.

In addition, leverage is found to have a positive but statistically insignificant effect on financial reporting quality. This indicates that although highly leveraged firms may have incentives to improve transparency due to creditor monitoring, such incentives are not strong enough to significantly influence reporting quality in this context. This finding aligns with Nnajieze (2022), who reports that leverage affects financial structure but not necessarily disclosure quality, and with Adegboyegun and Oyerogba (2022), who highlight that financial pressure does not always lead to better reporting practices in emerging markets. However, it contradicts studies that suggest leverage enhances disclosure quality due to monitoring by debt holders (Biehl, 2024; Harjanto, 2023). From the lens of signaling theory, leverage should act as a disciplining mechanism that encourages firms to signal transparency, yet the weak result indicates that such signals are diluted by institutional inefficiencies and weak creditor enforcement (Bafera, 2023; Agbogun et al., 2022). The policy implication is that strengthening creditor rights and monitoring mechanisms is essential to enhance the role of leverage in improving reporting quality.

Finally, audit quality shows a positive but statistically insignificant relationship with financial reporting quality, indicating that the presence of higher-quality auditors does not significantly improve reporting outcomes in the sampled firms. This finding is consistent with recent Nigerian evidence suggesting that audit quality may be compromised by weak enforcement and boilerplate disclosures (Sunday, 2025; Oyerogba, 2024). Rahman (2023) also notes that audit effectiveness depends on regulatory oversight and professional competence, while Financial Times (2025) highlights emerging risks affecting audit quality globally. However, the result contradicts studies that find audit quality significantly enhances financial reporting reliability (Uwuigbe et al., 2023; Biehl, 2024). Within signaling theory, high-quality audits are expected to serve as credible signals of reliable reporting, yet the insignificance suggests that such signals may be weakened by institutional and enforcement gaps (Connelly et al., 2024; Svetek, 2022). The policy implication is that improving audit quality requires stronger regulatory supervision, enhanced auditor independence, and continuous professional development to ensure that audit processes effectively enhance financial reporting quality.

CONCLUSION AND RECOMMENDATIONS

The study concludes that biological assets disclosure under IAS 41 has a significant negative effect on financial reporting quality among listed agro-allied firms in Nigeria, indicating that increased disclosure does not necessarily translate into improved reporting outcomes. This finding suggests that the complexity, subjectivity, and estimation uncertainty associated with fair value measurement of biological assets weaken the reliability and credibility of disclosed information. In addition, the insignificance of firm size, leverage, and audit quality implies that firm-level characteristics alone are insufficient to enhance reporting quality in the presence of weak institutional frameworks and enforcement mechanisms. The policy implication of these findings is that regulatory authorities must go beyond mandating disclosure to strengthening enforcement, standardizing valuation techniques, and improving oversight mechanisms. Without such reforms, disclosure may remain largely symbolic and compliance-driven, thereby limiting its usefulness as a credible signal of financial reporting quality.

Based on these conclusions, the study recommends that regulators such as the Financial Reporting Council of Nigeria should issue more detailed and context-specific guidelines on the valuation of biological assets to reduce subjectivity and enhance comparability across firms. There is also a need for continuous professional training and capacity development for preparers, auditors, and regulators to improve expertise in fair value measurement and reporting. Furthermore, firms should be encouraged to provide more comprehensive and transparent disclosures, including assumptions, methodologies, and sensitivity analyses, to improve the interpretability of

financial reports. Strengthening audit quality and corporate governance practices is equally essential to ensure the credibility and reliability of disclosures. Collectively, these measures will enhance the effectiveness of biological assets disclosure and contribute to improved financial reporting quality and investor confidence in the Nigerian capital market.

This study makes a significant contribution to knowledge by extending the literature on IAS 41 biological assets disclosure beyond value relevance to a broader assessment of financial reporting quality, thereby addressing a critical gap in prior empirical studies. Specifically, it provides novel evidence from Nigeria, an under-researched emerging market, showing that increased disclosure may not necessarily improve reporting quality due to measurement complexity and institutional weaknesses. By adopting a composite perspective of financial reporting quality and integrating disclosure depth with firm-level controls, the study enriches existing frameworks and offers a more nuanced understanding of disclosure–quality dynamics. However, the study is not without limitations. The use of a relatively small sample of listed agro-allied firms restricts the generalizability of the findings, while reliance on secondary data and accrual-based proxies may introduce measurement bias. In addition, the study focuses on a single country context, which may not fully capture cross-country institutional variations that influence disclosure practices and reporting quality.

In light of these limitations, further studies are encouraged to expand the scope by incorporating larger samples across multiple sectors and countries within Sub-Saharan Africa or other emerging markets to enhance generalizability. Future research may also adopt mixed-method approaches, combining quantitative analysis with qualitative insights from preparers, auditors, and regulators to better understand the practical challenges of biological asset reporting. Additionally, scholars should explore alternative and more robust measures of financial reporting quality, including real earnings management, disclosure quality indices, and assurance variables, to address proxy-related limitations. There is also scope for investigating the moderating role of corporate governance mechanisms and institutional quality in shaping the relationship between biological assets disclosure and reporting quality. Such extensions will deepen understanding, improve empirical robustness, and provide more comprehensive policy-relevant insights into financial reporting practices.

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