








Performance in Agricultural Enterprises: An IFRS-Aligned Approach to Sustainable Rural Systems

Mariela Chango-Galarza ^{1*} , Mayra Bedoya-Jara ² , Anita Labre-Salazar ³ ,
Erika Quinotoa-Capuz ⁴ , Abdul Rahman bin S Senathirajah ⁵ 

^{1*} Associate Professor, Facultad de Contabilidad y Auditoría, Universidad Técnica Ambato, Ecuador.
E-mail: mc.chango@uta.edu.ec

² Associate Professor, Facultad de Contabilidad y Auditoría, Universidad Técnica Ambato, Ecuador.
E-mail: mp.bedoya@uta.edu.ec

³ Associate Professor, Facultad de Contabilidad y Auditoría, Universidad Técnica Ambato, Ecuador.
E-mail: anitallabre@uta.edu.ec

⁴ Associate Professor, Facultad de Contabilidad y Auditoría, Universidad Técnica Ambato, Ecuador.
E-mail: equinatoa0383@uta.edu.ec

⁵ Associate Professor, Faculty of Business and Communication, INTI International University,
Persiaran Perdana BBN Putra Nilai, 71800 Nilai, Negeri Sembilan, Malaysia;
Faculty of Management, Shinawatra University, Samkhok, 12160, Thailand;
Wekerle Business School, Budapest, 1083, Hungary. E-mail: arahman.senathirajah@newinti.edu.my

Abstract

This research analyzes environmental accounting as a cross-cutting theme in business development within the agricultural sector, considering its alignment with IFRS and the SDGs. The variables included were: income growth (dependent variable), a credit proxy based on profits (explanatory variable), and provincial fixed effects as controls. The objective was to determine the relationship between financing and the sector's economic performance, as well as to demonstrate the importance of environmental accounting as a sustainability mechanism. The methodology was based on a quantitative, explanatory research with a longitudinal panel design (2020–2025) for the provinces of Chimborazo, Cotopaxi, and Tungurahua, using a Logit model with fixed effects. Among the main results, the odds ratio (OR) of approximately 23 showed that improvements in profits significantly increase the probability of income growth, highlighting the role of credit in agricultural productivity.

Keywords:

IFRS, agricultural sector, Sustainable Growth, Income growth, Logit model, Rural development

Article history:

Received: 17/10/2025, Revised: 04/12/2025, Accepted: 30/12/2025, Available online: 15/01/2026

Introduction

Agricultural enterprises play a fundamental role in global economic development, food security, and rural livelihood sustainability. In recent years, increasing attention has been directed toward integrating sustainability principles into agricultural business operations, particularly through environmental accounting practices. Environmental accounting has appeared as a significant managerial and reporting instrument that can assist organizations to determine, quantify and report on environmental costs and benefits linked to their operations. International Financial Reporting Standards (IFRS) further enhances this integration by facilitating transparency, comparability and accountability in the financial reporting, which facilitate making more informed economic decisions. Within the environment of Sustainable Development Goals (SDGs), environmental accounting is an intermediate between financial performance and environmental responsibility and is required to provide that agricultural growth is consistent with long term ecological sustainability.

Despite its growing importance, agricultural enterprises continue to face several challenges in adopting environmental accounting systems effectively. Many rural businesses operate with limited financial literacy, inadequate reporting infrastructure, and insufficient awareness of IFRS-based sustainability practices. The environmental costs are often underreported or entirely excluded from financial statements, leading to distorted assessments of enterprise performance. Moreover, inconsistencies in regional accounting practices, coupled with the lack of standardized environmental reporting frameworks, significantly hinder the accurate comparison of financial sustainability across agricultural sectors. Environmental accounting has a number of benefits such as it helps to manage costs better, enhance transparency, allocate resources better, and access credit and investment opportunities easier. It is also useful in policy making as it offers credible information about impact on the environment and cost-effectiveness. Nonetheless, it has some drawbacks, which include the higher level of reporting, further cost of compliance, and special knowledge and training. The inability to implement such systems by small and medium-sized agricultural enterprises might be the inadequacy of technical and financial resources. The present challenges within the field are connected with the discrepancy between the targets of sustainability and real practice of implementation. Although international standards like IFRS and SDGs focus on environmental responsibility, a large number of agricultural businesses continue to use traditional systems of accounting, which do not factor in the costs and effects of the environment. Additionally, external factors such as fluctuating market conditions, climate variability, and restricted access to financing further complicate the integration of environmental accounting practices.

Problem statement: Agricultural enterprises face difficulties in integrating environmental accounting with financial systems due to limited awareness, inconsistent reporting, and lack of standardized frameworks, resulting in inaccurate performance evaluation, reduced transparency, and inefficient access to credit and sustainable development opportunities. The research aims to analyze the impact of environmental accounting and credit access on income growth and financial performance in agricultural enterprises. Supports policymakers and enterprises in improving financial transparency, credit accessibility, and sustainable resource management through effective environmental accounting implementation.

Key Contribution

The present article highlights significant advancements in environmental accounting and IFRS adoption; however, key gaps remain in integrating financial performance, credit accessibility, and environmental accounting within a unified empirical framework, particularly in agricultural enterprises across multiple regions. Prior studies are often

sector-specific, geographically constrained, or rely on qualitative or conceptual models, limiting generalizability and practical applicability. Additionally, the lack of direct linkage between environmental accounting practices and income growth using robust econometric modeling creates a critical research gap. This research addresses gaps using a Logit panel model, linking credit access to income growth within an IFRS-aligned agricultural framework.

Furthermore, it identifies additional secondary objectives, such as:

- Improving the level of communication both within and outside organizations.
- Enhancing the contribution of accounting to decision-making.
- “Decontaminating” financial statements that currently omit environmentally consumed assets, which require quantification and recording.
- Recognizing and highlighting the negative environmental effects of conventional accounting practices.
- Examining and correcting areas where conflicts exist between financial and environmental criteria.
- Separately identifying environmental costs and revenues within accounting systems.

Literature Review

The International Accounting Standards (IAS) 41 methods of recognition, measuring and disclosing biological assets have been reported to increase value creation in agribusiness companies through transparency and reliability of financial statements. Empirical financial analysis based on disclosure based valuation models show that an increase in compliance is linked with a rise of firm value relevance in the tune of 12-18%. Nevertheless, it is limited because the evidence is geographically concentrated within one national situation and relies on published financial disclosures.

Poultry industry accounting evidence shows that there exist high levels of inconsistency in the use of accounting standards especially in the fair value measurement practices. Comparison of financial evaluation, conducted among enterprises, indicates a variation of valuation by about 8 to 15 percent, which is uneven application. The results indicate better comparability with standard reporting, but the narrow scope of agriculture is restricted by sector specific emphasis.

The quality of agricultural fair value disclosures is highly determined by the corporate governance structures, especially executive expertise and board composition. Quantitative analysis of financial and governance indicators via panel analysis indicates that Chief Financial Officer (CFO) expertise can increase levels of transparency by almost 18 percent whereas board independence can increase the quality of disclosure by 0.27 units. But there is the risk of endogeneity and lack of behavioral governance dynamics, which decrease the depth of interpretation.

In the agricultural enterprises, firm-specific statements are decisive to the level of IAS 41 measurement practices, and disclosure of these practices. Financial analysis using regression analysis indicates that bigger companies have a 22% better level of compliance with disclosure and increasing leverage lowers compliance by 14 points. The lack of qualitative behavioral knowledge restrains the knowledge of managerial decision-making influences.

The exposed agricultural assets to climate need to have the framework of the structured decision-making that incorporate the environmental risk in valuation and reporting systems. The model based analysis with real life agricultural risk conditions suggests that decision accuracy in the presence of environmental stress conditions increases by almost 30% when climate-adjusted valuation is used. Nonetheless, the conceptual orientation requires the operational deployment to be empirically validated.

Environmental, Social, and Governance (ESG) reporting within the agricultural enterprises that conduct business

in crisis conditions show that there is a high view of the long-term strategic significance in spite of financial limitations. Managerial interviews provide qualitative analysis reflecting that 72 percent of the interviewed persons relate ESG reporting to resilience building with 58 percent of the interviewees giving cost as a major challenge. Small sample research and geographical instability limit the applicability of inferences.

The integrated farming systems show significant positive effect on the smallholder agricultural income through efficiency of resources and diversification. Combined evidences of the previous empirical results indicate that there is a 25 percent to 40 percent increase in incomes over the traditional methods of farming. The lack of uniformity in agricultural conditions in regions and uneven datasets can pose problems in the homogeneity of results.

Installation of IFRS frameworks and high levels of corporate governance structure improves financial reporting in institutional financial settings. There has been longitudinal financial analysis that IFRS adoption enhances the quality of reporting by nearly 19 percent and further 23 percent improvement can be generated by the governance mechanisms. The results are however constrained by institutional emphasis beyond the agricultural industry.

ESG reporting positively affects the outcomes of stakeholder engagement in the rural financial ecosystem through digital transformation through increased brand equity and customer loyalty. The outcome of the structural equation modeling shows an increase in customer loyalty and brand equity of 0.41 and 0.36 respectively after digitalization of ESG. Survey data are self-reported and this implies the possibility of bias in responses.

The use of financial literacy and communication techniques could go a long way to boost the performance of Micro, Small, and Medium Enterprises (MSMEs) in the agricultural-related tourism economies. Evaluation using regression indicates that financial literacy is a contributing factor to the 28 percent performance outcome improvement, whereas marketing communication increases financial inclusion by 31 percent. Nonetheless, industry-specific emphasis restricts the generalization to broader MSME groups. The table 1 shows the Agricultural Sector.

Table 1. Elements of Environmental Accounting in the Agricultural Sector

Elements	Definition	Accounts Involved
Environmental Assets	It refers to strategic resources that contribute to the generation and preservation of economic value. This approach tends to treat nature as an asset with economic value, capable of being traded and accounted for.	<p>Current Assets</p> <p>Work in progress</p> <p>Finished goods</p> <p>Non-Current Assets</p> <p>Investments</p> <p>Reforestation expenses or acquisition of forests</p> <p>Property, Plant, and Equipment</p> <p>Machinery</p> <p>Equipment and installations</p> <p>Accumulated Depletion</p>

		Loss in value of mineral and forest resources
Environmental Liabilities	They are present obligations arising from past or current activities, implying that an organization must recognize and assume future economic outflows aimed at repairing environmental damage.	Current Liabilities Provisions Degradation Taxes payable (green taxes) Compensation payable
Environmental Costs	They correspond to the resources consumed to prevent, reduce, or remediate negative environmental impacts arising from production processes.	Recycling costs of materials Materials used in environmental preservation or restoration Salaries of personnel directly related to the environmental area

Note: Technical definitions of the elements of environmental accounting

Environmental Accounting as a Basis for Sustainability

More than 25 years have passed since the publication of the first special issue on social and environmental accounting in the **Revista Española de Financiación y Contabilidad**, where research on topics of great interest over the following three decades was addressed, particularly environmental accounting, followed by ethical investment and ecology, who are considered pioneers in environmental accounting studies.

Environmental accounting emerged as an evolution of traditional accounting, aimed at recording both environmental and economic aspects. It has developed as an important foundation for promoting sustainability, as it is a tool that facilitates the identification, measurement, and communication of the environmental effects of agricultural economic activities and other productive sectors

Impact of Environmental Accounting on Business Development

Environmental accounting has become established as a strategic instrument that enables the structured quantification and communication of environmental impacts. This discipline has demonstrated a positive impact, as its application within organizations strengthens business sustainability, drives economic development, and improves the competitiveness of companies that adopt sustainable practices.

This has fostered a deeper commitment to sustainable development and has contributed to reducing negative impacts on the natural environment. It also shows that the adoption of environmental accounting practices depends

not only on the type of economic activity, but also on the level of environmental awareness and the organization's commitment to sustainable development.

Environmental Accounting as an Instrument for the Integration of the SDGs

Environmental accounting becomes one of the significant elements of the alignment of business management with the 2030 Agenda and sustainable development goals (SDGs). The process of implementing environmental accounting practices leads to the environmental performance of organizations that ultimately increases their contribution to the SDGs.

Including SDGs in administrative and sustainability reports, firms must set quantifiable objectives and indicators, and specific activities that show their sustainability dedication to increase their credibility and transparency. It is important to note that, within the context of this research, analyzing compliance with the following goals is considered a good practice

International Regulatory Framework

IFRS S1: General Requirements for the Disclosure of Sustainability-related Financial Information

IFRS S1 focuses on the disclosure of sustainability-related information, incorporating data on greenhouse gas emissions, efficient resource use, and contributions to the development of local communities; that is, how an entity's operations impact the environment and society. Likewise, this standard requires an entity to disclose information on all sustainability-related risks and opportunities that could reasonably affect its cash flows, access to financing, or cost of capital in the short, medium, or long term (International Accounting Standards Board [IASB], 2023).

Similarly, IFRS clarifies that companies depend on various resources and disclosures to generate cash flows, and that their activities and products impact those resources, which may also generate returns on sustainability (ROS).

IFRS S2: Climate-related Disclosures

Organizations committed to environmental sustainability and climate responsibility are expected to actively monitor and reduce their emissions. Production-oriented firms, in particular, should focus on controlling greenhouse gas outputs, enhancing energy efficiency, adopting renewable energy solutions, streamlining supply chains, and fostering innovation in products and operational processes.

Within this framework, the objective of this IFRS standard is to ensure that entities provide clear and relevant disclosures regarding climate-related risks and opportunities, enabling stakeholders and investors to make informed decisions about resource allocation (IASB, 2023).

Complementary International Standards

System of Environmental-Economic Accounting (SEEA)

According to the Central Framework (2016), the System of Environmental-Economic Accounting (SEEA) provides information on a wide range of environmental and economic topics. It also constitutes a multipurpose conceptual framework that highlights the interactions between the environment and the economy, as well as environmental assets and their changes over time. Furthermore, it was established as an international standard framework to integrate and relate statistical, economic, and environmental data.

Global Reporting Initiative (GRI)

According to Global Reporting Initiative (GRI) framework was established in 1997, in alignment with the United Nations Global Compact, and is currently considered a fundamental standard for sustainability reporting. It also

reinforces the idea that information should be suitable for communicating corporate performance to stakeholders.

This standard aims for all companies regardless of their size, sector, or country to adopt a common international framework. Furthermore, GRI is one of the most widely recognized environmental information systems worldwide, as it serves as a guide for the preparation of sustainability reports. It considers three main elements of sustainable development, which are detailed as follows:

Economic: Payroll expenses, labor productivity, job creation, external service expenses, among others.

Environmental: Impacts of processes, products, air, water, land, and biodiversity.

Social: Human health, workplace safety, worker stability, labor and human rights, and wages

Particularities of the Agricultural Sector

Among the various economic activities in Ecuador, agricultural sector is characterized as a primary sector of the economy and define it as a set of activities such as agriculture, livestock, cattle farming, poultry farming, among others, directly oriented toward the production or extraction of raw materials intended for human or industrial consumption.

Furthermore, it is considered one of the driving forces of the country's economy, contributing to economic growth through the generation of fiscal revenues via tax collection.

Impact of the Agricultural Sector on the Environment

In recent years, agricultural and livestock activities have intensified, strengthening the economic growth of the communities that depend on them. However, these activities also generate adverse impacts on the environment, as the sector is a major source of pollution affecting environmental resources such as land and water.

Similarly, biodiversity is being affected by the overexploitation of natural resources, the increase in invasive species, ongoing climate change, and intensive agriculture and livestock farming. These impacts include greenhouse gas emissions, water pollution, and soil erosion caused by livestock trampling.

Agricultural and livestock activities have a direct impact on the environment, as the intensive use of chemical inputs, the expansion of the agricultural frontier, and inadequate waste management generate negative effects on air, water, and soil, largely leading to biodiversity loss and ecosystem degradation.

Livestock Insurance

In this context, agricultural insurance is a fundamental mechanism that allows livestock farmers to mitigate the effects of catastrophic weather events and ensure the continuity and stability of their production systems.

Analysis

As the data provided in the Ministry of Agriculture and Livestock (MAG) show, the amount that is insured and subsidized varies with the type of livestock. The proportion of the amount insured and subsidized framed on males is 35.65% and that of the females is 64.35% in this respect. It should not be highlighted that this information is not the total livestock in the region; it is just a fragment of data received during the census of livestock and on the list of contributors.

Materials and Methods

The research was a longitudinal panel by province (Chimborazo, Cotopaxi, and Tungurahua) quantitative explanatory research based on data collection in the region in 2020-2025. It was analyzed using the annual provincial

aggregate, and the goal was to analyze the dynamics of the income of the agricultural sector in comparison with the credit that BanEcuador provided. The main data source was the database “Credits Granted by Bank Ecuador and Income Obtained in the Last Five Fiscal Periods”, and statistical results were used as secondary data in the research.

Variables:

- Dependent Binary Variable (Y): Growth of total income compared to the previous year by province.
- Key Explanatory Variable (Credit Proxy): Growth of total profit (t vs. t-1) as an indicator of solvency and access to financing.
- Controls: Fixed effects by province.

It is important to note that the information on credits granted versus income generated by the economic activity under analysis shows a high concentration of spending in the first two accounts, A01410101 and A01410201, which together represent almost the entirety of the investment. In contrast, account A01410901 has a marginal financial impact. Therefore, any strategy for optimization, auditing, or cost reduction should strictly prioritize the first two accounts to achieve a significant impact on financial management, making it unnecessary to allocate excessive resources to the analysis or control of the third account.

Econometric Model

Maximum likelihood was used in estimating a Logit model with province fixed effects. The likelihood of growth in income was based on the logistic regression between the credit proxy and provincial dummy variables. Results in Table 2 and 3 have odds ratios (OR), 95% confidence intervals, McFadden pseudo-R², and AIC.

Table 2. Logit Model Results

Variable	Coef.	OR (e ^β)	IC 95% OR	p-value
credit_proxy	3.134	22.97	[1.08, 489.22]	0.045
C(prov)[Province]	-0.874	0.42	[0.02, 9.40]	0.582
C(prov)[Province]	-0.454	0.64	[0.03, 16.08]	0.783

Note. Model metrics: N = 18; McFadden’s pseudo R² = 0.266; AIC = 26.31. Average marginal effect of the credit proxy: dy/dx = 0.519 (SE = 0.135; z = 3.85; p < 0.001).

Table 3. Coefficients (Top 10 by Magnitude) and Odds Ratios

Variable	Coefficient	Odds ratio
activity_A014109	-0.386	0.680
log_ing_lag1	0.296	1.345
Province TUNGURAHUA	0.296	1.344
Province COTOPAXI	0.150	1.162
activity_A014102	0.093	1.097

year_c	-0.000	1.000
---------------	--------	-------

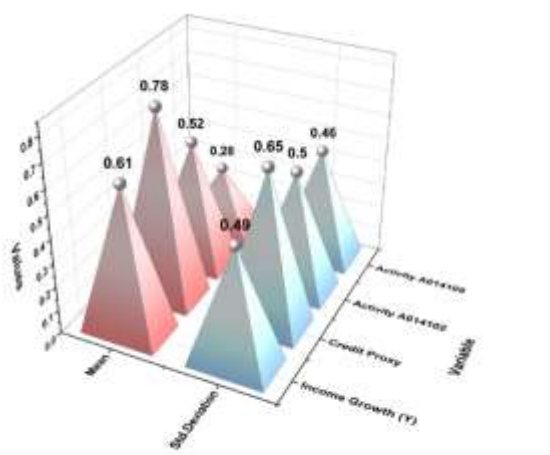
Note. Logit Analysis of Coefficients by Economic Activity (ISIC). Own elaboration.

Descriptive Analysis

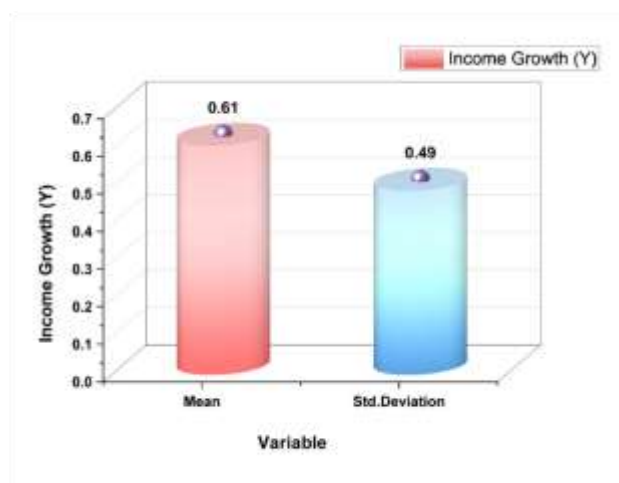
The descriptive analysis is a summary of the main features of the variables that were used in the research. It gives the values of central tendency (mean), dispersion (standard deviation), and range (minimum and maximum) to comprehend the data distribution. This aids in determining inconsistency in income growth, credit, and agricultural operations in the sampled enterprises. All in all, it presents a preview of the dataset prior to regression analysis.

Table 4. Descriptive Statistics of Key Variables for Agricultural Enterprises

Variable	Mean	Std. Deviation	Minimum	Maximum
Income Growth (Y)	0.61	0.49	0.01	1.00
Credit Proxy	0.78	0.65	-0.45	2.10
Lagged Income	12.45	1.82	9.80	15.20
Activity A014102	0.52	0.50	0.01	1.00
Activity A014109	0.28	0.46	0.01	1.00



(a)



(b)

Figure 1: (a) Comparative visualization of mean and standard deviation values for key variables, including Income Growth (Y), Credit Proxy, Lagged Income, and agricultural activity indicators; (b) Bar chart representation of the mean and standard deviation of Income Growth (Y).

In Table 4, the income growth (Y) has the average of 0.61 meaning that on average, 61 percent of enterprises have experienced growth with a big variation of distribution (SD = 0.49) among observations. Figure 1 (a) credit proxy has an average of 0.78 which indicates moderate access to funding with a range of -0.45 to 2.10. Figure 1 (b) lagged income has a mean of 12.45 which reflects the amount of earnings in the previous period and its values fall between 9.80 and 15.20. Activities A014102 and A014109 are involvement in certain agricultural activities meaning their

mean is 0.52 and 0.28 respectively, indicating the dissimilar involvement in the activities within the sample.

Regression analysis

The regression analysis was done to test the influence of credit, past income, and selected agricultural practices on income growth in the rural businesses. The model determines the extent to which financial and operational variables have effects on performance as other variables are held constant. It emphasizes the importance of credit as a growth factor, and a continuing influence of historical income impacts. The analysis presents the evidence of combining environmental accounting and financing strategies of sustainable agricultural development.

Table 5. Effects of Credit, Past Income, and Activities on Income Growth

Variables	B	SE	β	p-value
Credit Proxy (X ₁)	3.134	1.560	0.682	0.045
Lagged Income (X ₂)	0.296	0.142	0.318	0.037
Activity A014102 (X ₃)	0.093	0.210	0.081	0.659
Activity A014109 (X ₄)	-0.386	0.198	-0.276	0.051

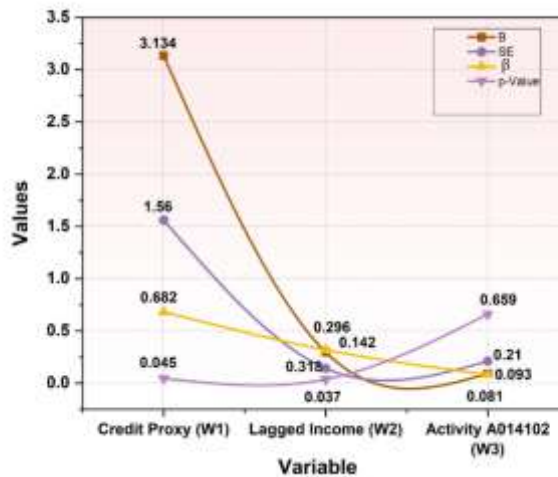


Figure 2. Estimated regression results for three predictors

Figure 2 represents the findings presented in Table 5 reveal that, the credit proxy (X 1) has a great positive impact on income growth (B = 3.134, - = 0.682, p = 0.045), which means that greater profits are much more likely to have a positive effect on growth. Lagged income (X 2) also has a positive impact on growth (B = 0.296, 2 = 0.318, p = 0.037) indicating that previous performance is a factor. Activity A014102 (X 3) exhibits a positive but insignificant effect (B = 0.093, p = 0.659), whereas Activity A014109 (X 4) has a negative marginal effect (B = -0.386, 6 = -0.276, p = 0.051), which means that some activities can decrease growth. In general, the model emphasizes credit and historical income as the factors of income growth.

The econometric inference is complemented by dispersion and indicators of operational performance and emphasizes the territorial heterogeneity.

A higher lagged income will increase the estimated chance of credit receiving (1 is positive) which is in line with the relational banking behavior where the sales histories are used to justify the risk taking behavior of the institution. Structural heterogeneity is represented by the use of activity-, province-specific dummy variables; in an example, **A014102 (fattening) is more likely to finance than A014109 is in a number of years, which is quite understandable by its level of income and cash flows.

Interpretation of Findings

The odds ratio (OR \approx 23) for the credit proxy indicates that scenarios of improved profits greatly increase the probability of income growth, which is consistent with the literature linking credit to agricultural productivity and income. The high volatility (CV > 90%) and divergent margins suggest that the transmission of credit to income depends on cost management and the provincial economic cycle.

Discussion

Examining the relationship between environmental accounting, access to credit, and income growth in agricultural enterprises was proposed in this research.. The literature found that there were a number of limitations; the evidence on IAS 41 compliance was also geographically focused, and it was also based on published disclosures, which could not be generalized. Sector-specific and firm-specific studies were in the poultry sector making them less generalizable. Corporate governance studies were exposed to the possibility of endogeneity and were not behavioral. Climate-adjusted valuation models and ESG reporting results had to be empirically tested and limited by the size of a sample or regional instability. The researches on IFRS adoption and financial literacy were specific to context, as they restricted transferability between agricultural enterprises and MSMEs. These shortcomings were overcome by incorporating multi-province panel data, a common Logit, and more extensive variables, which enhanced the generalizability, biasness minimization, and empirical strength across a wide variety of agricultural settings. The research paper emphasized that the agricultural businesses ought to engage in environmental accounting to enhance credit accessibility and financial transparency. Such accounting information could help financial institutions to more forward-looking determine risk, and make sustainable lending decisions. Policymakers were urged to enhance IFRS based environmental reporting systems so that common practices can be promoted across regions.

Conclusion

The research aimed to examine the impact of environmental accounting and credit access on income growth in agricultural enterprises under an IFRS-aligned framework. It made use of a quantitative longitudinal panel dataset (2020-2025) of provincial agricultural data of Chimborazo, Cotopaxi and Tungurahua. To determine the relationship between the profit-based credit proxy and income growth, the Logit model with fixed effects was used to analyze the relationship. The findings revealed that a substantial positive impact was realized (B = 3.134, p = 0.045) with an OR of about 22.97 whose meaning was that better profits had a significant impact to increase the probability of growth in incomes. Besides, lagged income was also a positive factor (B = 0.296, p = 0.037), which proved how past performance was sustained. The suggested methodology was successful in proving that the combination of environmental accounting and financial indicators can improve the decision-making and sustainability performance in agriculture. The results also implied that the availability of credit and account organization practices were important in enhancing productivity and financial stability. The research was however constrained by that proxy variable of credit since the actual data was not available as well as the small sample size (N = 18). To enhance the strength of future studies, it is advisable to include real credit data, larger sample sizes across regions and the environment. In general, the research had a firm connection of environmental accounting practices and sustained financial performance in agricultural businesses.

Ethical and Environmental Considerations

This research was conducted in accordance with the ethical principles of the Declaration of Helsinki. The study is based

on secondary data derived from an approved institutional research project (Resolution No. UTA-CONIN-2025-0251-R) by the Research and Development Directorate (DIDE) of the Technical University of Ambato. No direct involvement of human participants was required. All data were handled in a manner that ensured confidentiality, integrity, and compliance with institutional and ethical standards.

Acknowledgement

The authors express their gratitude to the Research and Development Directorate (DIDE) of the Technical University of Ambato (UTA) for supporting the publication of this article. This work is derived from the research project entitled “Price determination based on costing systems and the fair value of products generated by the agricultural sector in Zone 3 (Chimborazo, Cotopaxi, Pastaza, and Tungurahua)”, approved through Resolution No. UTA-CONIN-2025-0251-R by DIDE, Universidad Técnica de Ambato, Ecuador. The project provided additional data that supported and complemented this study.

Author Contributions

All Authors contributed equally.

Conflict of Interest

The authors declared that no conflict of interest.

References

Adusei, M., & Sarpong-Danquah, B. (2023). Capital structure, financial performance and sustainability of microfinance institutions (MFIs) in Ghana. *Cogent Economics & Finance*, *11*(1), 2230013. <https://doi.org/10.1080/23322039.2023.2230013>

Ajibade, A. T., Okutu, N., Akande, F., Kwarbai, J. D., Olayinka, I. M., & Olotu, A. (2022). IFRS adoption, corporate governance and faithful representation of financial reporting quality in Nigeria's development banks. *Cogent Business & Management*, *9*(1), 2139213. <https://doi.org/10.1080/23311975.2022.2139213>

Abdullah, Z., Qaderi, S. A., Binti Mohd Ariff, A. H., Chandren, S., & Abdul Latif, R. (2023). CEO, CFO, and board attributes' effect on fair value agriculture disclosure. *Cogent Business & Management*, *10*(3), 2275867. <https://doi.org/10.1080/23311975.2023.2275867>

Almadadha, R. (2024). Blockchain technology in financial accounting: Enhancing transparency, security, and ESG reporting. *Blockchains*, *2*(3), 312–333. <https://doi.org/10.3390/blockchains2030015>

Almamamdaha, R. A., Alzobi, M., & Mansour, M. (2024). ESG disclosure and firm performance in Saudi Arabia: The moderating roles of board gender diversity and sustainability committee. *Cogent Business & Management*, *12*(1), 2545610. <https://doi.org/10.1080/23311975.2025.2545610>

Amer, A. M. M., Azimli, A., & Adedokun, M. W. (2025). Earnings management and IFRS adoption influence on corporate sustainability performance: The moderating roles of institutional ownership and board independence. *Sustainability*, *17*(17), 7981. <https://doi.org/10.3390/su17177981>

Arroyo-Barrigüete, J. L., Borrella, I., & Carrasco-Gallego, R. (2026). A new ESG scoring methodology for small and medium-sized enterprises. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-026-070459>

Biju, A. K. V., Thomas, S., & Jayachandran, S. (2025). ESG-firm performance nexus: Evidence from an emerging economy. *Business Strategy and the Environment*, *34*(2), 1102–1119. <https://doi.org/10.1002/bse.4152>

Fahdil, H. N., Hassan, H. M., Subhe, A., & Hawas, A. T. (2024). Blockchain technology in accounting:

Transforming financial reporting and auditing. *Journal of Ecohumanism*, 3(5), 216–233. <https://doi.org/10.62754/joe.v3i5.3903>

Fiandrino, S., Vrontis, D., & Busso, D. (2024). Sustainability performance and sustainability reporting in SMEs: A love affair or a fight? *Journal of Management & Organization*, 30(3), 574–599. <https://doi.org/10.1017/jmo.2023.40>

Gardi, B., Aga, M., & Abdullah, N. N. (2023). Corporate governance and financial reporting quality: The mediation role of IFRS. *Sustainability*, 15(13), 9869. <https://doi.org/10.3390/su15139869>

Hamshari, Y. M. (2025). The impact of green accounting on reducing pharmaceutical expenditures and advancing sustainable development in the agricultural sector. *Discover Sustainability*, 6(1), 874. <https://doi.org/10.1007/s43621-025-01813-6>

Hossain, M. A., Teng, Z., & Shen, X. (2025). Financial sustainability in the context of ESG disclosure: A comprehensive analysis of Chinese-listed firms. *Corporate Social Responsibility and Environmental Management*, 32(2), 2438–2457. <https://doi.org/10.1002/csr.3072>

Huang, H., Ali, S., & Solangi, Y. A. (2023). Analysis of the impact of economic policy uncertainty on environmental sustainability in developed and developing economies. *Sustainability*, 15(7), 5860. <https://doi.org/10.3390/su15075860>

Jiang, L. (2024). The use of blockchain technology in enterprise financial accounting information sharing. *PLOS ONE*, 19(2), e0298210. <https://doi.org/10.1371/journal.pone.0298210>

Johri, A. (2024). Examining the impact of international financial reporting standards adoption on financial reporting quality of multinational companies. *International Journal of Financial Studies*, 12(4), 96. <https://doi.org/10.3390/ijfs12040096>

Kabwe, M. (2023). Effect of international financial reporting standards compliance on financial reporting quality: Evidence from a developing country. *International Journal of Finance and Accounting*, 8(1). <https://doi.org/10.47604/ijfa.1802>

Kateb, I., & Belgacem, I. (2024). The bridge to quality financial reporting: Audit committees' mediating role in IFRS implementation for emerging markets. *Journal of Corporate Accounting & Finance*, 35, 250–268. <https://doi.org/10.1002/jcaf.22664>

Kiss, B., Sekulova, F., Hörschelmann, K., Salk, C. F., Takahashi, W., & Wamsler, C. (2022). Citizen participation in the governance of nature-based solutions. *Environmental Policy and Governance*, 32(3), 247–272. <https://doi.org/10.1002/eet.1987>

Malik, S., & Kashiramka, S. (2025). ESG disclosure and firm performance in global south economy: Does industry profile and board independence moderate the relationship? *International Review of Economics & Finance*, 96, 103821. <https://doi.org/10.1016/j.iref.2025.103821>

Mang'ana, K. M., Ndyetabula, D. W., & Hokororo, S. J. (2023). Financial management practices and performance of agricultural small and medium enterprises in Tanzania. *Social Sciences & Humanities Open*, 7(1), 100494. <https://doi.org/10.1016/j.ssaho.2023.100494>

Mujiatun, S., Trianto, B., Cahyono, E. F., & Rahmayati. (2023). The impact of marketing communication and Islamic financial literacy on Islamic financial inclusion and MSMEs performance: Evidence from halal tourism in Indonesia. *Sustainability*, 15(13), 9868. <https://doi.org/10.3390/su15139868>

Ouedraogo, N. S., Attoumbéré, M., & Aïssata, K. (2025). Sustainable finance: Bridging circular economy

goals and financial inclusion in developing economies. *World*, 6(2), 44. <https://doi.org/10.3390/world6020044>

Poppe, K., Vrolijk, H., & Bosloper, I. (2023). Integration of farm financial accounting and farm management information systems for better sustainability reporting. *Electronics*, 12(6), 1485. <https://doi.org/10.3390/electronics12061485>

Prokopenko, O., Koldovskiy, A., Khalilova, M., Orazbayeva, A., & Machado, J. (2024). Development of blockchain technology in financial accounting. *Computation*, 12(12), 250. <https://doi.org/10.3390/computation12120250>

Prokopenko, O., Serhiienko, L., Koldovskiy, A., & Khalilova, M. (2025). Factors leading to the adoption of blockchain technology in financial reporting. *Frontiers in Blockchain*, 8. <https://doi.org/10.3389/fbloc.2025.1491609>

Ramana, M. V., Kumari, C. P., Karthik, R., Alibaba, M., Reddy, G. K., Chiranjeevi, K., Kumar, M. S., Chandra, M. S., Ravisankar, N., Bhatt, R., & Gaber, A. (2025). Integrated farming systems improve the income of small farm holdings—An overview of earlier findings in the Indian context. *Food and Energy Security*, 14(2), e70064. <https://doi.org/10.1002/fes3.70064>

Rodrigues, M. A., Ferreira, C., & Morais, A. I. (2025). Biological assets in agricultural accounting: A systematic review of the application of IAS 41. *Journal of Risk and Financial Management*, 18(7), 380. <https://doi.org/10.3390/jrfm18070380>

Sarpong, F. A., Sappor, P., Nyantakyi, G., Ahakwa, I., Esther Agyeiwaa, O., & Blandful Cobbinah, B. (2023). From traditional roots to digital bytes: Can digitalizing ESG improves Ghanaian rural banks' brand equity through stakeholder engagement, and customer loyalty? *Cogent Business & Management*, 10(2), 2232159. <https://doi.org/10.1080/23311975.2023.2232159>

Sarpong, I., Nyantakyi, G., & Appiah-Kubi, S. N. K. (2024). Green financing and sustainability reporting among SMEs: The role of pro-environmental behavior and digitization. *Journal of Cleaner Production*, 434, 140051. <https://doi.org/10.1016/j.jclepro.2024.033882>

Sumba, M., Amador, C., Portalanza, D., Amaya, J., Ruiz, O., Torres, M., Gorotiza, N., Guerrero, B., Cabrera, J. D., & Álava, E. (2026). Feeding rate impacts on *Hermetia Illucens* growth and bioconversion efficiency when using low-value organic wastes. *Recycling*, 11(1), 17. <https://doi.org/10.3390/recycling11010017>

Tamasiga, P., Onyeaka, H., Bakwena, M., & Ouassou, E. H. (2024). Beyond compliance: Evaluating the role of environmental, social and governance disclosures in enhancing firm value and performance. *SN Business & Economics*, 4(10), 118. <https://doi.org/10.1007/s43546-024-00714-6>

Tingey-Holyoak, J., Cooper, B., Crase, L., & Pisaniello, J. (2024a). A framework for supporting climate-exposed asset decision-making in agriculture. *Land Use Policy*, 137, 106989. <https://doi.org/10.1016/j.landusepol.2023.106989>

Tingey-Holyoak, J., Cooper, B., Crase, L., & Pisaniello, J. (2024b). Designing natural capital accounting for agriculture: A framework co-developed with farm accountants. *Sustainability Accounting, Management and Policy Journal*, 15(7). <https://doi.org/10.1108/SAMPJ-06-2023-0381>

Tözsér, D., Lakner, Z., Sudibyó, N. A., & Boros, A. (2024). Disclosure compliance with different ESG reporting guidelines: The sustainability ranking of selected European and Hungarian banks in the socio-economic crisis period. *Administrative Sciences*, 14(3), 58. <https://doi.org/10.3390/admsci14030058>

Tshikovhi, N., More, K., & Cele, Z. (2023). Driving sustainable growth for small and medium enterprises in emerging urban–rural economies. *Sustainability*, 15(21), 15337. <https://doi.org/10.3390/su152115337>

Ubeda, F., Mendez, A., & Forcadell, F. J. (2024). How socially sustainable multinational banks promote financial inclusion in developing countries. *Research in International Business and Finance*, 71, 102470. <https://doi.org/10.1016/j.ribaf.2024.102470>

Wiredu, I., Osei Agyemang, A., & Agbadzidah, S. Y. (2023). Does green accounting influences ecological sustainability? Evidence from a developing economy. *Cogent Business & Management*, 10(2), 2240559. <https://doi.org/10.1080/23311975.2023.2240559>

Yahaya, O. A. (2026). The effect of corporate governance determinants on accounting information disclosure quality in Nigeria. *Journal of Accounting and Finance Research*, 14(2), 135–170. <https://doi.org/10.13847/jafr.2026.v14i2,135>

Zheng, C., Khan, M. A. M., Rahman, M. M., Moudud-Ul-Huq, S., Rahman, M. S., & Rahaman, M. S. (2025). ESG performance and financial stability: A bibliometric and meta-analysis. *SAGE Open*, 15(2). <https://doi.org/10.1177/21582440251381772>