Journal of
Risk and Financial Management

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Application of Accounting Standards in the Valuation of Biological Assets: An Analysis of the Poultry Sector in Tungurahua, Ecuador

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Abstract

This study analyzes the application of International Accounting Standard IAS 41—Agriculture in poultry companies (ISIC A0146.03) in the province of Tungurahua, Ecuador, with the aim of evaluating the degree of regulatory compliance, the level of technical knowledge of accounting managers, and the impact of the lack of homogenization in the presentation of financial statements. The research is based on a quantitative–descriptive approach, through the application of a structured questionnaire to 26 representatives of poultry companies, complemented with the financial analysis of the activity during the period 2010–2024. The results show that the application of IAS 41 is not exhaustive or uniform, and various valuation methods are used that are not always aligned with the fair value approach required by the standard. Likewise, significant heterogeneity in accounting criteria is detected, which limits comparability and reduces the usefulness of financial information for decision-making. Most respondents have general but limited knowledge of the standard, which affects its technical implementation. The study concludes that it is necessary to strengthen specialized accounting training, establish sectoral standardization criteria, and promote regulatory supervision to ensure transparent, coherent, and useful financial information.

Keywords: IAS 41; biological assets; poultry sector; fair value; agricultural accounting

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Academic Editors: Enkeleda Lulaj and Antonio Mínguez-Vera

Received: 3 July 2025
Revised: 2 September 2025
Accepted: 5 September 2025
Published: 13 September 2025

Citation: Campos-Llerena, P., Chávez-Hernández, Z., Jiménez-Estrella, P., & Salazar-Mejía, C. (2025). Application of Accounting Standards in the Valuation of Biological Assets: An Analysis of the Poultry Sector in Tungurahua, Ecuador. *Journal of Risk and Financial Management*, *18*(9), 509. https://doi.org/10.3390/jrfm18090509

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1. Introduction

The agricultural sector represents an essential component in the Ecuadorian economy, not only because of its contribution to the Gross Domestic Product (GDP), but also because of its capacity to generate employment and food supply (CFN, 2024). Within this sector, poultry farming oriented to egg production (ISIC A0146.03) stands out for its dynamism and expansion, especially in provinces such as Tungurahua, where activity has grown significantly in recent years (CONAVE, 2021). This productive evolution requires more accurate and normatively aligned accounting systems that allow the financial and economic situation of poultry companies to be faithfully reflected (INEC, 2020).

In this context, International Financial Reporting Standards (IFRSs) and in particular IAS 41—Agriculture, play a key role in establishing technical guidelines for the recognition, measurement, and presentation of biological assets. The standard promotes the use of fair value minus estimated costs at the point of sale as a valuation basis, with the aim of

providing useful, understandable, and comparable financial information (Carrión et al., 2021; Wen-hsin Hsu et al., 2019). However, its application presents particular challenges in biological activities such as laying bird production, where biological transformation is constant and often difficult to quantify in monetary terms.

In developing countries such as Ecuador, the practical adoption of IAS 41 has not been homogeneous, and empirical evidence on its implementation in specific sectors, such as poultry farming, is still limited (Fernandes et al., 2016). The lack of technical training, the lack of standardization of accounting criteria, and the particular conditions of the productive environment contribute to a partial or inadequate application of the standard, which compromises the quality of financial statements and their usefulness for strategic decision-making (Chávez et al., 2023; Sedláček, 2014).

The relevance of addressing this issue lies in the fact that the poultry sector of Tungurahua is one of the pillars of agricultural production in the region, contributing significantly to the local and national economy. However, the proper application of International Financial Reporting Standards (IFRSs), especially IAS 41 on biological assets, is decisive to ensure that accounting information accurately and timely reflects the economic reality of companies. This not only influences internal decision-making and investment attraction, but also strengthens transparency before control bodies and markets, which is essential for the competitiveness and sustainability of the sector.

The main objective of this study is to analyze the application of IFRSs in the poultry sector companies of Tungurahua, identifying the prevailing accounting practices, the valuation methods used, and the perception of the accounting owners or managers on the impact of this standard on the quality of financial information. Consequently, this article not only provides empirical evidence on the degree of compliance with IAS 41 in the poultry sector, but also raises the need to strengthen the technological processes of training, regulation, and accounting as a way to achieve greater transparency and efficiency in the financial management of this productive sector.

The originality of this study lies in the fact that, unlike previous research focused on broader agricultural sectors or national contexts, it focuses specifically on companies in the poultry sector of Tungurahua, comprehensively analyzing the application of IAS 41 and its impact on the quality of financial information. This approach allows not only the identification of the most commonly used accounting practices and valuation methods, but also exploration of the perception of the key stakeholders, owners and accounting managers, regarding their usefulness and relevance. The research gap to be filled arises from the scarce empirical evidence available on the degree of compliance with IFRSs in this productive sector, which limits the generation of regulatory, technological, and training strategies adapted to its particularities.

This research is beneficial for both the business sector and accountants and regulators and academics linked to agricultural accounting. It contributes to the design of technical training policies aimed at improving regulatory application in small- and medium-sized enterprises. For watchdogs and regulators, the findings allow us to identify implementation gaps that need to be addressed with more effective sectoral supervision and regulation strategies. Finally, this study also adds value to the academic community, as it expands the theoretical–empirical body on agricultural accounting in emerging economies, and can serve as a basis for comparative research or for the development of accounting models adjusted to local contexts.

The study is organized into the following sections: (i) Introduction, (ii) Theoretical Framework, (iii) Materials and Methods, (iv) Results, (v) Discussion, (vi) Conclusions, and (vii) References.

2. Theoretical Framework

2.1. Biological Active Ingredients and Their Typology

Biological assets are living resources, whether animals or plants, that entities manage for productive, transformation, or sale purposes (Osipchuk et al., 2024). Its definition, according to International Accounting Standard 41 (IAS 41), is framed in agricultural activities to be understood as the management of biological processes to generate agricultural products or new biological assets (Nurunnabi, 2021). Biological transformation includes growth, degeneration, production, and procreation, which implies that assets are constantly changing in value, radically differentiating themselves from traditional fixed assets (Ifeanyieze et al., 2021).

From an accounting perspective, according to Hadiyanto et al. (2018), two main types are recognized:

- Consumable biological actives: intended to be harvested or slaughtered, such as chickens for meat or short-cycle crops.
- Biologically produced assets: those that generate income over time without being directly consumed, such as laying hens or fruit trees.

In the context of the Ecuadorian poultry sector, biological assets range from live animals in different stages of development, to products generated by them, such as eggs, chicks, or even by-products such as guano or secondary proteins (ACCA Global, 2024; Valverde et al., 2022). This diversity introduces complexities in their classification, valuation, and accounting control, even more so when there are heterogeneous practices in companies, many of which do not apply the same regulatory criteria (Ning et al., 2022; Yapa et al., 2015). In addition, poultry farming has a high degree of specialization and short production cycles, which requires an agile, dynamic accounting record aligned with the biological reality of the asset, which makes the correct application of international standards even more relevant (Rodrigues et al., 2025; García et al., 2023; López-Solís et al., 2025).

2.2. Fair Value, Accounting Treatment, and Implementation Challenges

One of the most discussed conceptual axes within IAS 41 is the use of fair value as the main basis for the initial and subsequent measurement of biological assets (Jana & Marta, 2014). Fair value is defined as the price that would be received for selling an asset in an orderly transaction between market participants on the measurement date (Majercakova & Skoda, 2015). From this, the estimated costs at the point of sale are deducted, generating net value.

The subsequent valuation of assets, in accordance with the standard, must also be conducted on the basis of this value, recognizing changes in their magnitude in the results of the year. In certain cases, where fair value cannot be reliably measured, the use of the adjusted historical cost model is permitted, with the application of depreciation and impairment (Biondi & Oulasvirta, 2023; Guidolin, 2011).

In Ecuadorian practice, this approach has significant limitations; small- and medium-sized poultry enterprises lack standardized measurement systems and often do not have access to markets with representative prices (Bonilla-Jurado, 2024). Research such as that of Xie et al. (2020) and Hadiyanto et al. (2018) shows that, under these conditions, entrepreneurs prefer to use historical cost due to its greater traceability, even if it does not faithfully reflect the economic reality of the biological good.

However, studies have shown that the implementation of fair value can increase international comparability, tax accuracy, and efficiency in decision-making, generating added value in strategic management (Watkiss, 2019; Wang et al., 2021).

One of the main challenges in the application of IAS 41 in the poultry industry lies in the estimation of the fair value of biological assets, due to the lack of active markets, the high

biological variability of birds, and the absence of standardized methodologies that adjust to the particularities of the sector (Yapa et al., 2015). In contexts such as Ecuador, where small- and medium-sized enterprises with limited technical and technological resources predominate, cost-based valuation methods such as cost per tray or cumulative cost per production cycle are more accessible, although they do not adequately reflect the real economic value of assets (Bonilla-Jurado, 2022). In addition, the subjectivity inherent in estimating variables such as growth rates, future productivity expectations, projected prices, and marketing costs introduces a high degree of uncertainty that discourages accountants from adopting fair value (Xie et al., 2020). This situation generates a persistent preference for simpler but less representative methods, which limits the comparability and transparency of financial statements (Guidolin, 2011). It is therefore crucial to understand that the difficulty lies not only in the lack of knowledge of the standard, but also in the practical and structural obstacles faced by the industry in rigorously applying the requirements of IAS 41.

2.3. Regulatory Application in the Poultry Sector

The application of IAS 41 in the poultry sector is still incipient and uneven. International regulations establish general principles, but their practical operation requires specific adaptations that respond to the nature of poultry production (Menglikulov et al., 2024), where the stages of breeding, growth, laying, slaughter, and marketing can change over time and have different values depending on the species, the age of the bird, the feeding system, and other biological factors (Arimany et al., 2013; Bonilla-Jurado et al., 2023).

Recent studies indicate that only a small percentage of poultry companies formally apply standardized valuation methods (van Biljon & Wingard, 2020). This reflects not only low regulatory adoption, but also a lack of accounting training, absence of financial culture, and weakness in internal governance.

At the same time, other research, such as that by Wudhikarn et al. (2025), suggests that the internal policies of each company play a determining role in the way IAS 41 is applied. Some companies opt for fair value only at the sale stage, while others apply it from early stages, generating heterogeneous financial results even within the same subsector (Bolzani, 2020). This situation raises the need for a flexible valuation model, adapted to the Ecuadorian context, which respects the guidelines of IAS 41 but allows existing structural barriers to be overcome, such as informality, lack of technical knowledge, or lack of integrated accounting systems.

2.4. The Role of Accounting in Decision-Making Within the Agricultural Sector

Accounting, as a comprehensive financial reporting system, has a direct impact on the formulation of commercial, tax, and strategic decisions. Its correct implementation generates reliable data for planning, monitoring, and evaluating economic and productive performance (Poljašević et al., 2019).

A critical aspect is the valuation of biological assets, whose accounting treatment affects the determination of financial results, tax obligations, budgets, cash flow projections, and investment attraction (Kurniawan et al., 2014). IAS 41—Agriculture requires that such assets be measured at fair value with less costs to sell, which improves the accuracy and transparency of financial statements (IAS, 2022).

The rigorous application of IAS 41 strengthens the reliability and comparability of accounting information, favoring access to financing and the formalization of strategic alliances, in addition to ensuring tax compliance (Hadiyanto et al., 2018; Nakasone & Castillo, 2023).

At the level of operational improvement, the recognition and accurate measurement of biological assets make it possible to know the real value of resources, manage production risks (health, climate, financial), and optimize internal processes. Studies show that companies that implement IAS 41 increase their transparency and relevance in the market, especially when they adequately disclose valuation levels (Menezes da Silva et al., 2015). The standard also provides guidelines for land-linked assets (such as planted trees), allowing the use of methods such as residual: total value minus value of land, adjusting for the highest and best use in accordance with IFRS 13. Authors such as Nuhu et al. (2021) and P. D. Silva et al. (2024) highlight that the incorporation of modern accounting criteria, such as fair value and activity-based costing (ABC), favors greater production efficiency, waste reduction, and alignment between real costs and market prices, which are critical factors in the economic sustainability of the agricultural sector.

2.5. Diagram of the Concurrence of Keywords Related to IAS 41 and Biological Assets

The analysis of the concurrence of keywords shows that the concept of biological assets constitutes the central axis of the literature, around which different lines of research are articulated (Figure 1). From this nucleus, discussions emerge on valuation, regulations, disclosure, and usefulness of accounting information. The visualization obtained confirms that the field is structured in interconnected subtopics, which allows configuration of a conceptual model in which biological assets are not analyzed in isolation, but as part of a network of accounting practices, international regulations, and economic consequences.

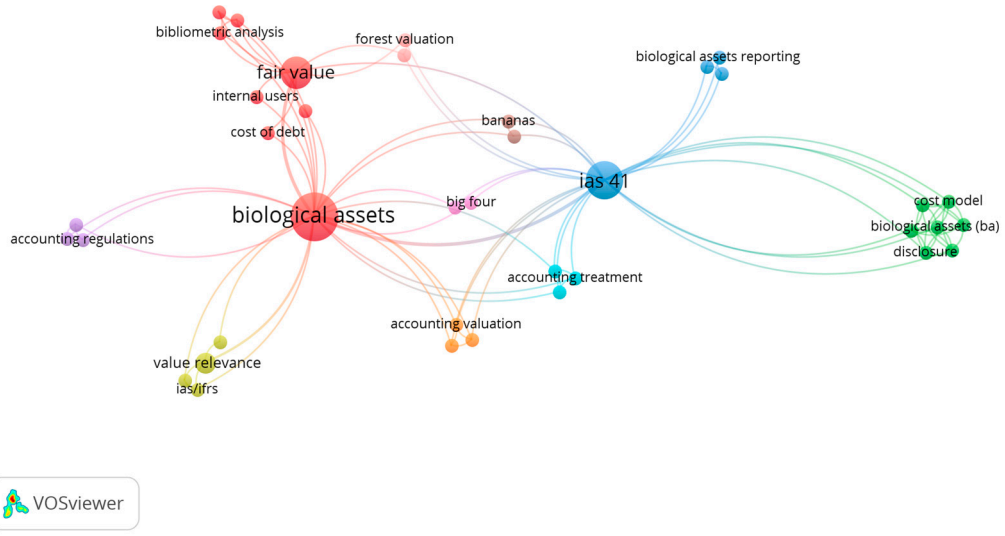


Figure 1. Keyword concurrency diagram.

One of the most relevant clusters is associated with International Accounting Standard 41 (IAS 41), which stands as the predominant regulatory benchmark in the accounting treatment of biological assets. From this node, debates arise on measurement methods, fair value valuation, and recognition for its alignment with principles of transparency and comparability, although it is also questioned for the volatility and costs it can generate. In contrast, the presence of the cost model is observed, which reflects the search for more stable and less complex alternatives for certain contexts. This normative–methodological contrast translates into a central axis of academic and practical controversy.

Another finding of the conceptual model is the link between biological assets and the relevance of the value of information for different users. The literature reflects a sustained interest in determining whether estimates under IAS 41 provide real utility to investors, auditors, and internal users. Likewise, connections are identified with institutional stake-

holders, such as international auditing firms (Big Four), and with financial variables, such as cost of debt, which indicates that accounting decisions on biological assets have direct effects on corporate management and market perception. In this way, the conceptual model not only captures the regulatory and technical foundations, but also the economic and governance implications underlying the practical application of the standard.

3. Materials and Methods

3.1. Research Approach and Design

This research adopts a quantitative approach, with a non-experimental design and descriptive–analytical scope aimed at examining the application of accounting standards in the valuation of biological assets within the poultry sector, specifically in companies registered under ISIC code A0146.03 (egg production) in the province of Tungurahua, Ecuador. The study set out to identify accounting practices, business perceptions, and the degree of alignment with the International Accounting Standard through financial reporting from secondary sources and the application of structured data collection tools.

3.2. Population and Sample

The population was composed of poultry companies active in Tungurahua, identified through records of the Internal Revenue Service (SRI) and the Superintendence of Companies, Securities, and Insurance. The sample was non-probabilistic of an intentional type, composed of 26 companies whose representatives voluntarily agreed to participate in the study. These key actors have direct knowledge about the accounting and financial management processes in their organizations. This strategy is justified by direct access to specialized information and by the willingness of participants to share accurate and relevant data. To reinforce external validity, the results are contrasted with the findings of previous studies in similar production contexts. In addition, a ranking of the main egg-producing provinces in Ecuador is presented, with Tungurahua being the first in the ranking (Figure 2), in addition to the fact that the main financial indicators of the sector and number of companies are focused on this province.

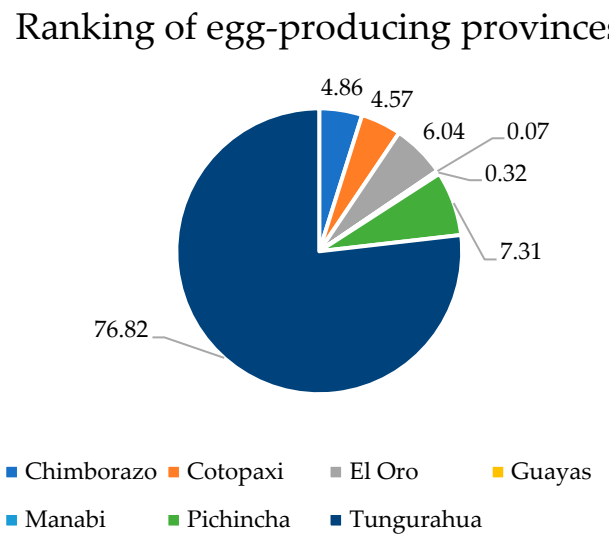


Figure 2. Ranking of egg-producing provinces in Ecuador.

The study universe was made up of 110 taxpayers registered with the Internal Revenue Service (SRI) under poultry activity (ISIC A0146.03), distributed in two main classes: Special (7 taxpayers) and Others (103 taxpayers) (SRI, 2025). Within this last category, it is observed that natural persons represent the predominant segment with 78 registrations,

while companies reach 25. In this context, the choice of a sample of 26 taxpayers belonging to the "Other–Natural Persons" group is justified by their greater representativeness within the population universe (71% of the total taxpayers) (SRI, 2025). This allowed the analysis to focus on the segment that concentrates the greatest economic activity in the poultry sector of Tungurahua, that is, small- and medium-sized businesses considered as MSMEs.

The external validity of the findings is reinforced as the selected sample reflects the structural characteristics of the population registered in the SRI and coincides with the trend observed in previous studies, where natural people predominate in agricultural activities over societies. In addition, since only active taxpayers have been considered until the date of collection of the information, it is guaranteed that the results correspond to the current economic dynamics.

3.3. Data Collection Tools and Techniques

A structured questionnaire composed of closed and multiple-choice questions was designed and applied, focusing on five key dimensions: (1) normative knowledge, (2) valuation methods applied, (3) accounting criteria of biological assets, (4) treatment of the poultry production cycle, and (5) usefulness of financial information for decision-making. The instrument was validated by the judgment of experts in financial accounting.

In addition, secondary accounting and financial data (assets, liabilities, equity, net local sales, income, costs, and expenses) were collected from official sources such as the Internal Revenue Service (SRI) from its SAIKU 2.0 data viewer in the period 2010–2024 in order to contextualize the financial situation of the sector in the province analyzed and its evolution and relationship with the valuation of biological assets.

3.4. Data Processing and Analysis

To contextualize the study from a macro perspective, an exploratory analysis of economic activity ISIC A0146.03 was conducted at the national level, using information published by official entities such as the SRI. The provinces with the highest participation in terms of total assets, local net sales (0% rate), and profit for the year were identified, which allowed a comparative ranking to be established. From this analysis, it was concluded that the province of Tungurahua leads in the three key variables, positioning itself as one of the most representative authorities of the poultry sector in Ecuador.

Consequently, this province was selected to carry out a detailed analysis of its accounting and financial information, covering the period 2010–2024, which was represented by descriptive graphs that reflect the evolution of indicators such as assets, liabilities, equity, income, costs, and expenses, in order to obtain a comprehensive view of the financial and economic behavior of the sector and its relationship with the accounting application of biological assets.

The data of the questionnaire were processed using descriptive statistics (frequencies and percentages), which allowed the identification of patterns and trends in the application of accounting regulations. At the same time, a Chi-Square goodness-of-fit test was performed for the survey responses using R-Studio and a table of relevant results per question was constructed with their respective analysis and interpretation.

As a qualitative and semantic complement, a keyword concurrence diagram was developed from the textual analysis of the answers and their interpretation, using text mining techniques and visualization of semantic networks using Python version 3.13.7 software and specialized libraries such as *scikit-learn* and *networkx*. This tool allowed the identification of the strongest conceptual relationships between the key terms used, reinforcing the coherence of the technical discourse around the valuation of biological assets.

3.5. Research Question

Within the framework of this research, the main question arises: How are the accounting standards for the valuation of biological assets applied in companies in the poultry sector (ISIC A0146.03) of Tungurahua, and what is the perception of their owners regarding their impact on financial information and decision-making? This question allows us to investigate not only the degree of technical application of accounting standards, but also the evaluation made by business actors on their practical usefulness. To delve deeper into this problem, three specific sub-questions were asked:

- Q1: Are the International Financial Reporting Standards (IFRSs) fully applied in the accounting record of the biological assets of poultry companies in Tungurahua?
- Q2: What level of technical knowledge do owners or accountants have about IAS 41 and how does it influence its practical application?
- Q3: How does the lack of homogenization affect the application of the accounting standards on the presentation and comparability of financial statements in companies in the poultry sector (ISIC A0146.03) of Tungurahua?

These questions guided the methodological design and the analysis of the results, allowing a comprehensive understanding of the challenges and opportunities represented by the adoption of accounting standards in production environments with high biological intensity.

3.6. Ethical Considerations

The confidentiality and anonymity of the participants was guaranteed, informing them in advance of the academic purposes of the research. All participants gave their informed and voluntary consent for data collection and analysis.

4. Results

The presentation of the results begins with a sectoral diagnosis that allows contextualizing the current state of the poultry sector in Ecuador and Tungurahua, specifically in the economic activity classified under ISIC code A0146.03, corresponding to the production of poultry eggs. This analysis is essential to understand the productive dynamics, the main challenges, and the trends of the national poultry market, which represents one of the most relevant agricultural activities due to its contribution to food security, rural employment, and the supply of animal protein. Based on statistical data, institutional records and the collection of primary information through a questionnaire aimed at key actors in the sector, critical aspects related to the application of accounting standards in the management of biological assets are evidenced, as well as structural gaps that affect the efficiency and sustainability of the sector.

Relevant accounting and financial information has been identified in several provinces of Ecuador, which allows contextualizing the behavior of the poultry sector in the territories where this activity represents a significant part of the productive apparatus. Among these provinces, Tungurahua, Cotopaxi, and Guayas stand out, which concentrate the largest number of registrations of active companies, as well as the highest values in terms of total assets, local net sales (0% VAT), and profit for the year, which are key variables to evaluate the financial and accounting dimension of the sector (Table 1).

These data constitute a fundamental basis for financial analysis, as they allow the performance of poultry production units to be compared from an accounting perspective, especially with regard to the application of international regulations, such as IAS 41—Agriculture, which regulates the treatment of biological assets. Within this group of provinces, Tungurahua stands out for registering the highest percentages in the variables analyzed, which demonstrates its leadership and relevance within the national poultry

activity (Table 1). Therefore, deepening the study of this province is strategic, since knowing the reality of a highly representative region allows generating more solid and generalizable conclusions about the current state and challenges in the application of accounting standards in the Ecuadorian poultry sector.

Table 1. Economic activity in the different provinces of Ecuador.

Province	Total Assets	%	Benefits of Exercise	%	Local Net Sales 0%	%
Chimborazo	614,679	0.94	74,076	3.30	3,147,819	4.86
Cotopaxi	17,442,399	26.81	133,983	5.96	2,960,329	4.57
El Oro	1,440,412	2.21	74,615	3.32	3,909,594	6.04
Guayas	8,542,466	13.13	76,965	3.42	46,571	0.07
Manabí	1,482,137	2.28	-	-	204,962	0.32
Pichincha	1,916,002	2.95	114,027	5.07	4,728,077	7.31
Tungurahua	33,617,708	51.68	1,774,363	78.93	49,710,426	76.82
Total	65,055,803	100	2,248,028	100	64,707,777	100

Figure 3 shows the evolution of the assets, liabilities, and equity of the poultry sector in the province of Tungurahua between 2010 and 2024, with sustained and significant growth in the three financial components. Total assets show a steady increase, exceeding 30 million in 2024, reflecting an expansion in investment and acquisition of productive resources within the sector, including biological assets, such as growing birds, laying hens, and other elements linked to the poultry cycle. This increase can be interpreted as an indicator that companies are strengthening their productive structure and improving their accounting systems to properly record such assets in accordance with IAS 41.

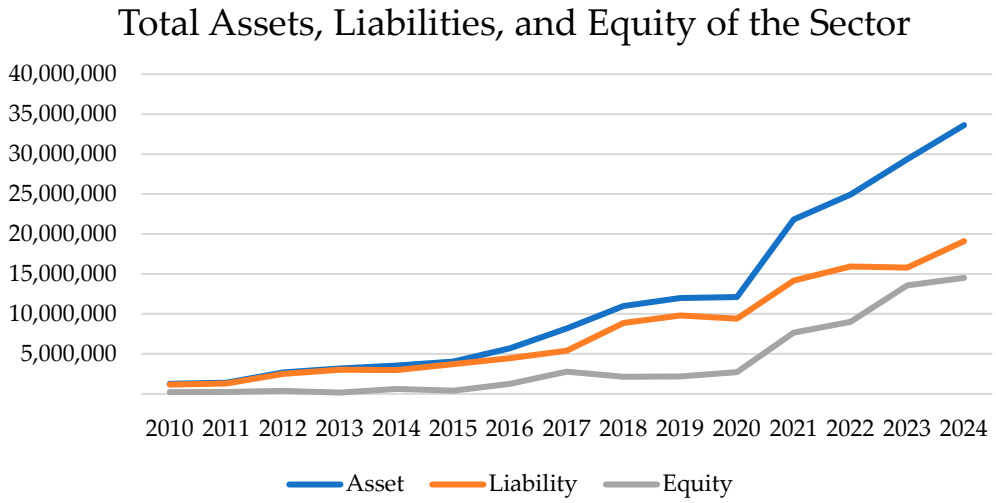


Figure 3. Evolution of the assets, liabilities, and total equity of the sector.

Liabilities also show parallel growth, suggesting higher financial leverage that could be used for technological upgrading or the acquisition of high-value biological assets. However, capital continues to rise, indicating that companies are not only increasing their debts, but are also generating equity value, increasing their shareholders' capital, and improving their financial sustainability. This behavior is consistent with a more rigorous application of international accounting standards, since a correct valuation of biological assets at fair value in this type of company allows the real economic value of the business to be reflected more accurately. In this context, Tungurahua's accounting information not only shows dynamism, but also allows inferring a greater degree of maturity in the adoption of modern accounting practices in the poultry sector.

The analysis of the evolution of income, costs, and expenditures of the poultry sector in the province of Tungurahua between 2010 and 2024 reflects a notable growth in the economic dynamics of the sector (Figure 4). Total sales show a sustained upward trend, exceeding $55 million in 2024, indicating a significant increase in the production and marketing of products such as eggs. This pattern suggests an efficient management of productive resources, where biological assets, when properly valued, have a direct impact on the calculation of the cost of sales and the correct determination of the result for the year.

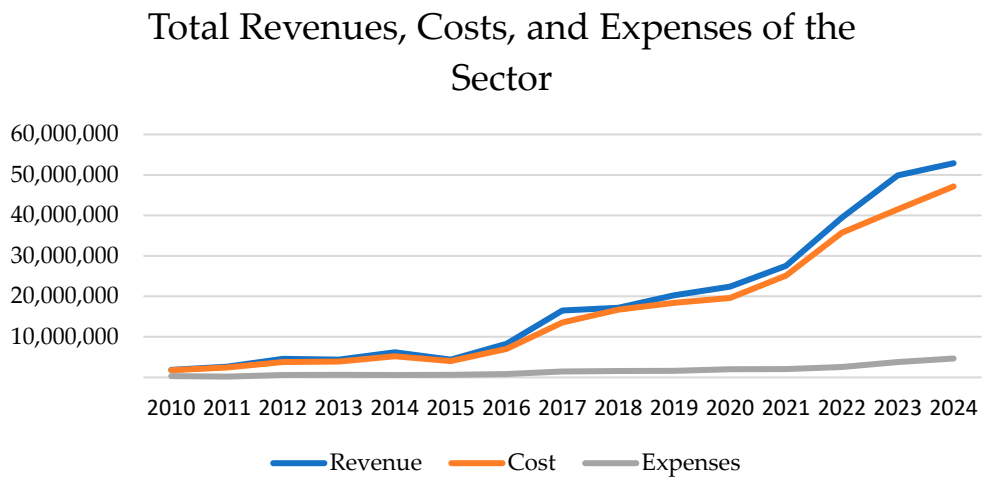


Figure 4. Evolution of total revenues, costs, and expenses of the sector.

Operating expenses, on the other hand, show more moderate growth, remaining significantly below revenues and costs, reinforcing the idea of an efficient business structure. In this context, the application of IAS 41 plays a key role, as it allows biological assets to be objectively measured at fair value minus estimated costs at the point of sale. This accounting practice has a direct effect on the determination of income and costs, especially in a sector intensive in biological cycles such as poultry. Consequently, the behavior of these variables in Tungurahua shows not only a high level of productive activity, but also that a growing accounting awareness must be taken about the importance of adequately reflecting the economic value of biological assets in the financial statements.

The following Figure 5 presents the evolution of net local sales taxed with 0% VAT from 2010 to 2024, reflecting sustained growth, especially from 2016 onwards. In 2022, 2023, and 2024, a stagnation in the maximum value is observed, exceeding 50 million, which denotes a stabilization of the market or production volume. The notable increase in net local sales indicates a steady expansion of the poultry sector in Tungurahua. This growth may be associated with increased demand for poultry products (eggs, chickens, by-products), reflecting their importance in the local economy.

The fact that they are 0% of sales suggests that they are exempt from VAT due to their essential or nutritional nature, as is often the case with unprocessed agricultural products. Such a significant increase in sales requires companies to conduct rigorous control and in accordance with accounting standards, such as IAS 41—Agriculture, for the fair measurement of biological assets (growing birds, layers, etc.). This is crucial to accurately reflect the financial situation. The correct application of accounting standards allows poultry producers to correctly value their outstanding assets and project future revenues. This favors both internal decision-making and the trust of third parties (investors, financial institutions, regulators).

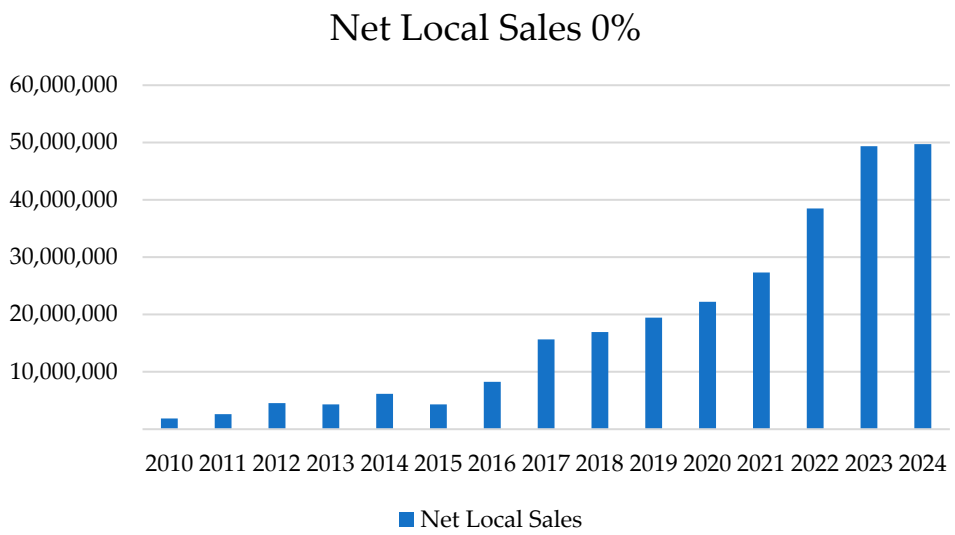


Figure 5. Evolution of local net sales with 0% VAT in the sector.

Figure 6 shows the evolution of the ROA (Return on Assets) and ROE (Return on Equity) of the poultry sector in Tungurahua between 2010 and 2024. ROA performance remains stable with slight variations, indicating that the sector has managed to use its assets efficiently in generating profits, albeit with modest margins. On the other hand, ROE is more volatile, with high peaks in certain years (2012, 2014, 2016) and subsequent sharp falls, reflecting a high sensitivity of return on equity to operational, financial, or cyclical factors of the economic environment.

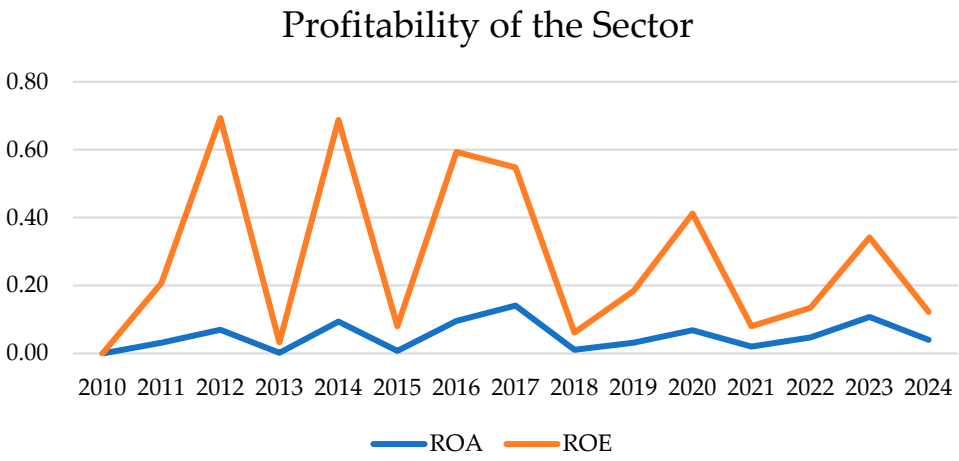


Figure 6. Evolution of ROA and profitability of ROE in the sector.

This behavior suggests that, although poultry companies have maintained some control over the use of their assets, the capital structure and profitability for owners has been unstable. This could be associated with poor accounting practices or the lack of systematic application of standards such as IAS 41, which would allow a correct valuation of biological assets and, consequently, a more faithful presentation of financial results. In this context, the implementation of sound accounting standards would promote greater transparency and efficiency in management, improving confidence in the sector and facilitating strategic financial decisions based on verified and comparable information.

The volatility observed in the ROE cannot be attributed solely to accounting deficiencies or to the partial application of IAS 41. This instability could also be related to structural and conjunctural factors, such as abrupt variations in the costs of input (balanced feed, medicines, energy), which are problems that have been present in the country in

recent years, despite being an agricultural country, it has not had a consensus to mitigate or propose efficient solutions. Fluctuations in egg sales prices and changes in tax or labor policies, as well as alterations in access to financing and in the rotation of working capital, are also present activities that explain the volatility of profitability. In addition, excessive financial leverage in certain periods may have magnified the impact of these factors on stock returns.

As part of this study, a questionnaire was applied to 26 representatives of poultry companies active in the province of Tungurahua, with the aim of knowing their perception regarding the application of accounting standards in the valuation of biological assets and their influence on business decision-making. The results show that a significant majority of respondents recognize the importance of reflecting the true value of biological assets (such as growing birds and layers) in financial statements, especially for useful, timely, and transparent information (Table 2).

Table 2. Results of the questionnaire applied to representatives of companies in the sector.

Question	Possible Answers	Total	%
1. What legal regulations apply to the accounting treatment of biological assets?	(a) IFRS SMEs	11	42.31
	(b) IAS 41 Biological Assets	12	46.15
	(c) LRTI *	1	3.85
	(d) Other IAS	2	7.69
2. What valuation method do you apply for the accounting treatment of biological assets?	(a) Capitalization of Costs	2	7.69
	(b) Accrual of Expenses	7	26.92
	(c) Initial and final recognition	6	23.08
	(d) Weighted Average	7	26.92
	(e) Regular Method	2	7.69
	(f) Historical Cost	2	7.69
3. How are biological assets initially recorded in the accounting books?	(a) Biological assets	9	34.62
	(b) Biological assets in development	2	7.69
	(c) Baby Bird Inventory (Birds of the Levant)	9	34.62
	(d) Laying Birds	3	11.54
	(e) Growing Birds	3	11.54
4. Explain, what are the stages of the poultry breeding process? and how are they recorded in the accounts?	(a) Levante (1–12 weeks)	24	92.31
	(b) Development (12–19 weeks)	2	7.69
5. With which account type are poultry identified in the statement of financial position?	(a) It does not have one	3	11.54
	(b) Biological assets (Birds)	3	11.54
	(c) Posture Birds	14	53.85
	(d) Inventory of Laying Birds	3	11.54
	(e) Fixed Assets	1	3.85
	(f) Moving assets	1	3.85
	(g) Non-Current Assets (Biological Assets)	1	3.85
6. How do you determine the fair value of the biological asset?	(a) Costs and Expenses	12	46.15
	(b) Market prices	4	15.38
	(c) Residual Value	9	34.62
	(d) Production Costs and Profit Margin	1	3.85
7. How is the value of the agricultural product (eggs) determined?	(a) Costs/# of egg trays	19	73.08
	(b) Market prices	4	15.38
	(c) Based on the depreciation of the bird	1	3.85
	(d) Costs and Expenses	1	3.85
	(e) Fair value—Costs	1	3.85

Table 2. *Cont.*

Question	Possible Answers	Total	%
8. Does the poultry company currently carry out the process of forced molting of the birds that are finishing their laying, and what life span is extended with this process?	(a) No	20	76.92
	(b) 4 Months	1	3.85
	(c) 5 Months	4	15.38
	(d) 6 Months	1	3.85
9. From what age do you acquire birds?	(a) 1 day	22	84.62
	(b) 12 Weeks	1	3.85
	(c) 13 Weeks	1	3.85
	(d) 15 Weeks	2	7.69

* Ecuadorian Tax Regime Law.

Limitations were identified in the practical implementation of IAS 41, related to the lack of technical knowledge, the lack of trained personnel and the absence of clear valuation methodologies. Despite this, the representatives pointed out that having financial information adjusted to the fair value of biological assets significantly improves planning, cost control, and profitability evaluation, which shows that there is a positive evaluation of their usefulness for business management, although challenges still persist in their proper accounting application.

Table 3 presents the application of the Chi-square goodness-of-fit test, which in this study is essential to identify whether the response distributions obtained in the survey differ significantly from a uniform distribution.

Table 3. Application of the Chi-square goodness of fit test.

Question	Chi-Square	*p* Value
1. Applicable regulations	15.54	0.0014
2. Valuation method	7.69	0.1740
3. Initial registration	9.38	0.0522
4. Stages of the poultry process	18.62	0.0000
5. Account types in financial statements	34.85	0.0000
6. Fair value of the biological asset	11.23	0.0105
7. Value of the agricultural product	47.08	0.0000
8. Forced molting process	50.59	0.0000
9. Age of bird Acquisition	63.93	0.0000

Statistical analysis using the Chi-square goodness-of-fit test showed that in most of the questions the answers are not evenly distributed, indicating a clear preference or tendency towards certain accounting practices within the poultry sector of Tungurahua. In particular, the questions related to the applicable accounting regulations (p1), the fair value of the biological asset (p6), and the method of valuation of the agricultural product (p7) showed significant differences in the answers, with *p*-values below 0.05. This suggests that while a formal regulatory framework such as IAS 41 exists, in practice its application is uneven, which aligns with the study's previous findings indicating partial and even confusing compliance with international standards.

Likewise, the results show a strong concentration of answers on questions such as the stages of the production process (p4), the accounting account in the financial statements (p5), forced molting (p8) and the age of acquisition of birds (p9), all with significantly low *p* values ($p < 0.001$). This reveals common and standardized practices within the sector, such as the acquisition of birds from the first day of life or the recording of the lifting process as a key stage. However, these standardized practices do not necessarily translate into

IAS 41-aligned accounting, as the lack of homogeneous criteria for valuing and classifying biological assets limits the transparency and comparability of financial information.

Finally, some questions such as the accounting valuation method (p2) and the initial accounting record (p3) showed higher *p*-values (greater than 0.05), indicating a greater dispersion in the answers and, therefore, an absence of consensus among the companies. This result highlights the urgent need to establish sectoral technical guidelines and training programs that allow for the unification of accounting criteria. Taken together, these results support the study's recommendations, which aim to improve institutional support, promote accounting homogenization, and strengthen technical training to raise the quality of financial information in the Ecuadorian poultry sector.

Table 4 presents a summary of the most important results of the information acquired by the representatives of the companies engaged in the poultry sector, especially in egg production. This reflects their analysis and interpretation to know the broad and real picture of the valuation of biological assets.

Table 4. Analysis of the relevant results of the questionnaire.

Question	Relevant Result	Analysis and Interpretation
1. What accounting regulations apply to the treatment of biological assets?	CIN 41 (46.15%)	There is evidence of a majority knowledge of the international standard that regulates biological assets, which is positive for technical and accounting adoption in the sector.
2. What valuation method is applied to biological assets?	Cumulative expenditure and weighted method (26.92% each)	There is no single dominant method, which reflects the heterogeneity in the accounting criteria used, which may affect the comparability of the financial statements.
3. How are biological assets initially registered?	Inventory of organic hatchlings/birds (34.62% each)	There is a tendency to register assets as inventory or as biological assets, indicating some ambiguity in the initial categorization, due to the lack of clear guidelines.
4. Stages of the poultry production process	Lift (1–12 weeks): 92.31%	There is clarity about the initial phases of the life cycle, which contributes to an orderly record from the early stages of production.
5. Which account type are birds identified with in the financial statements?	Birds at rest (53.85%)	Most recognize laying birds as relevant assets, but the accounting classification needs to be improved to correctly reflect their biological nature.
6. How is the fair value of the biological asset determined?	Costs and expenses (46.15%)	The cost approach takes precedence for the valuation of assets, although IAS 41 promotes the use of fair value, revealing a gap between standard and practice.
7. How is the agricultural product (eggs) valued?	Cost per tray (73.08%)	Most use practical methods such as unit cost per tray, which is useful for operational control but limited in terms of accounting accuracy for valuation.
8. Is forced detachment performed, and how long does the production cycle take?	Not performed (76.92%)	Most companies do not apply laying cycle extension processes, which can limit the economic use of the biological asset.
9. From what age are birds acquired?	1 day (84.62%)	Companies take on the full lifecycle from its initial stage, reinforcing the need to maintain accounting control from birth, as established by IAS 41.

The general analysis of the results of the questionnaire applied to the representatives of 26 poultry companies in the province of Tungurahua reveals a broad panorama in terms of the level of knowledge and accounting application of biological assets. Although a significant portion of respondents acknowledge that IAS 41 regulates the accounting treatment of these assets and states that it applies practices related to their valuation, there are still inconsistencies and diversity of criteria in key aspects such as valuation methods, accounting classification, and initial recording. Most companies identify laying birds as relevant assets and use practical methods such as cost per tray to value production, reflecting an operational rather than a technical approach. Likewise, there is evidence of a limited application of fair value, in contrast to what is required by international regulations, and a tendency not to apply biological optimization processes such as forced molting. These results indicate that, although there is an accounting knowledge base, greater technical training and standardization of practices are required to achieve a more accurate and uniform implementation of IAS 41, which would result in more reliable financial information for individual and sectoral decision-making, knowing that geographical location and the homogenization of activities are considered.

In order to complement the quantitative analysis of the results of the questionnaire applied to the representatives of the poultry sector of the province of Tungurahua, a diagram of the concurrence of keywords was used. This methodological resource allows us to visualize the most frequent semantic relationships between relevant concepts extracted from the analysis and interpretation of the answers (Figure 7). By identifying the terms that appear together most regularly, the diagram contributes to uncovering thematic needs, discursive trends, and conceptual patterns, facilitating a deeper understanding of how the accounting and regulatory aspects associated with the valuation of biological assets are perceived and implemented. This tool also makes it possible to verify the coherence between the declared results and the predominant concepts in the respondents' discourse.

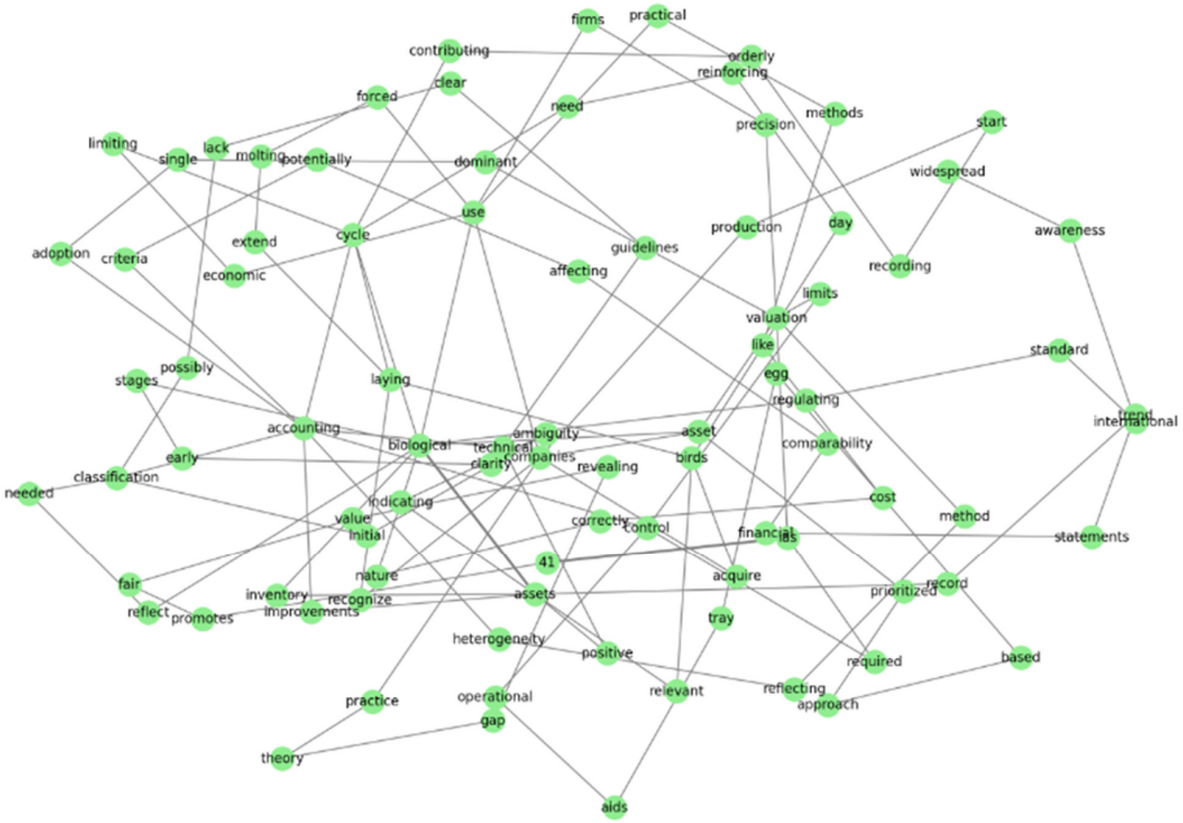


Figure 7. Concurrence diagram.

The concurrence diagram shows that the terms "biological assets", "accounting", "valuation", "control", "IAS 41", and "cycle" occupy central positions, confirming their high frequency and relevance in the conceptual analysis of the questionnaire. The strong association between peers such as "fair value–biological assets", "accounting control–life cycle", and "cost–valuation" indicates that respondents link accounting management with the operational and productive management of birds. Likewise, the presence of terms such as "classification", "initial registration", and "inventory" reveals that there is concern for the adequate accounting treatment from the first phases of the production cycle. However, the predominance of concepts associated with the cost-over-fair value approach also reflects a gap between international regulations and their practical application. The dispersion of terms related to valuation methods and classification criteria reveals the heterogeneity of accounting approaches in the sector, which must be taken into account when interpreting the strength of semantic connections in the graph. Another relevant aspect is that the diagram reflects the perceptions and language of the business representatives; therefore, its value lies more in showing how the issue is conceptualized in practice than in representing a formal regulatory structure. Overall, the diagram reinforces the idea that, although there is awareness of the importance of biological assets, there is still a need to move towards greater accounting standardization and greater technical alignment with the principles established by IAS 41.

5. Discussion

5.1. Discussion of Findings

This discussion is structured around the central question of the research: How are the accounting standards for the valuation of biological assets applied in companies in the poultry sector (ISIC A0146.03) of Tungurahua, and what is the perception of their owners regarding their impact on financial information and decision-making? This question seeks to integrate two fundamental dimensions: on the one hand, the technical application of IAS 41—Agriculture in the recognition, measurement, and presentation of biological assets; and on the other, the subjective assessment of business representatives on the usefulness of such information in the accounting and strategic management of their organizations. Through the analysis of the results obtained through the questionnaire, as well as the financial and documentary study of the sector, the empirical findings are contrasted with current regulations and with previous studies in order to understand the degree of alignment between accounting theory and business practice in a highly productive and biologically intensive sector such as poultry.

The results obtained allow us to affirm that the IFRS applied in a large percentage is IAS 41 in the poultry sector of Tungurahua, but this is not conducted in a comprehensive or standardized way. Although a significant percentage of respondents (46.15%) recognize the existence and relevance of this international standard, in practice there is a diversity of valuation methods such as IFRS MSMEs (42.31%), the Internal Tax Regime Law (3.85%), and other types of IASs (7.69%), which do not necessarily respond to the central principle of IAS 41: the measurement at fair value less than the estimated costs at the point of sale. In addition, there is ambiguity in the initial registration of biological assets, since they are classified in some cases as inventories (34.62%) and in others as biological assets (42.31%), which generates accounting inconsistencies and limitations in the comparability of financial information.

The application of IAS 41 in the accounting of biological assets in agricultural enterprises has not been implemented uniformly across regions or among organizations themselves, evidencing a divergence in the interpretation and application of international standards (Bohušová & Svoboda, 2017; Pires et al., 2021; A. Silva et al., 2020). Various

studies agree that although IAS 41 is the main standard used for the recognition, measurement, and disclosure of biological assets, its practical implementation has limitations (Bozzolan et al., 2016; Herrera et al., 2021; Menezes da Silva & Ciampaglia, 2023; Ríos et al., 2024). For example, in the Czech Republic, a significant gap has been identified between the accounting regulatory framework and the way biological assets are recorded in practice, especially in relation to biological transformation and information disclosure (Jana & Marta, 2014; Sedláček, 2014). Similarly, a study conducted in Vietnam explored the relationship between the correct application of accounting standards and the profitability of agricultural enterprises, concluding that the effective adoption of international standards requires not only a legal framework, but also the continuous training of human resources and the incorporation of technological tools (Hoa et al., 2022).

On the other hand, the study shows that although a significant part of the business representatives surveyed claim to be aware of IAS 41, this knowledge is superficial and, in many cases, limited to a general understanding of the concept of biological assets without a clear mastery of its technical and methodological implications. This situation is reflected in the variety of accounting criteria used for the registration and identification of birds as biological assets (11.54%), laying birds (53.85%), poultry inventory (11.54%), fixed assets (3.85%), non-current assets (3.85%), and non-owners (11.54%). On the other hand, the valuation is different, such as cost capitalization (7.69%), accumulation of expenses (26.92%), initial and final recognition (23.08%), weighted average (26.92%), regular method (7.69%), and historical cost (7.69%), as well as in the preference for practical methods such as unit cost per tray, which are useful for operational control, but do not comply with regulatory requirements on measurement at fair value. The lack of specialized training and the absence of accounting professionals with experience in international standards directly influence the partial application of IAS 41, which has an impact on the reliability and transparency of financial reporting (Mirović et al., 2019). In this sense, the current level of technical knowledge limits the correct implementation of regulations and, consequently, restricts the strategic use of financial statements as a tool for decision-making based on objective and normatively supported information (Middelberg et al., 2012; Peštović et al., 2022).

Although IAS 41 has the potential to improve the quality and transparency of accounting information in the agricultural sector, its application also introduces significant challenges related to the variability of the methods used and the subjectivity in the estimates that compromises the comparability and relevance of financial statements between different entities (Altarawneh, 2023; Giertliová et al., 2017). In the case of the poultry industry of Tungurahua, the results of this study confirm these limitations, since the heterogeneous use of valuation criteria and a partial adoption of the fair value approach were identified, a situation that reflects the practical difficulties pointed out by the international literature. The measurement of fair value, the core of the standard, requires a high level of technical knowledge and mastery of specialized methodologies, such as the use of discounted cash flows or specific valuation models, the application of which is not always feasible in companies with limited resources (Xie et al., 2020).

Various studies have shown that one of the main obstacles to the correct implementation of IAS 41 is insufficient training in agricultural and international accounting (Bozzolan et al., 2016; Fernandes et al., 2016; Wen-hsin Hsu et al., 2019). This finding coincides with the reality observed in Tungurahua, where accounting managers have a general but limited knowledge of the standard, which generates an inconsistent application that responds both to gaps in professional training and to the absence of clear sectoral guidelines. Consequently, the literature and empirical results suggest that overcoming these barriers requires continuous and specialized training programs, accompanied by standardization and su-

pervision strategies that reduce subjectivity in estimates and guarantee the usefulness of financial information in productive contexts such as poultry.

Finally, the quantitative results of the study show a lack of homogenization in the accounting criteria applied by the companies in the poultry sector of Tungurahua, which directly affects the presentation and comparability of the financial statements. For example, when asked about the method used to value agricultural products, the responses were divided between the cost per bucket of eggs method (73.08%), market prices (15.38%), based on the depreciation of the bird (3.85%), costs and expenses (3.85%), and fair value minus costs (3.85%), showing divergent criteria for the same accounting treatment. In addition, in terms of determining the fair value of the biological asset, there are costs and expenses (46.15%), market prices (15.38%), residual value (34.62%), and production costs and profit margin (3.85%), which reflects an inconsistency in the accounting valuation.

This diversity of practices reveals that the absence of common guidance or the limited technical implementation of IAS 41 generates financial statements that are not comparable across firms, compromising the reliability of sectoral analyses and making it difficult for investors, regulators, or managers to make informed decisions (Solovyov & Kuznetsov, 2011). Therefore, the data suggest that the homogenization of accounting criteria and the correct application of regulations are necessary conditions to improve the quality and usefulness of financial information (Pavić, 2020; Solovyov & Kuznetsov, 2011).

In addition, problems arising from continuous changes in IFRSs are identified, which may compromise the application of fundamental principles such as consistency and comparability. This situation makes it difficult to compare financial statements over time and between different companies in the sector (Felski, 2017; Smith et al., 2021). The flexibility inherent in IFRSs in terms of recognition, measurement, and disclosure of assets, while seeking adaptability, also leads to disparities in accounting practices (Altarawneh, 2023), especially in sectors with particular biological and productive characteristics, such as the poultry industry. These variations are influenced not only by the specific nature of the sector, but also by regional accounting practices and different levels of technical knowledge (Mirović et al., 2019). Faced with this scenario, it is necessary to move towards the standardization of accounting criteria and the reduction of excessive interpretative margins, as well as strengthening supervision by regulatory bodies and promoting technological integration (Mirović et al., 2019; Peštović et al., 2022; Sakovié et al., 2020). The lack of homogenization generates significant barriers, such as information asymmetries, inconsistencies in financial reporting, and difficulties in objectively assessing economic performance among comparable entities (S. R. Ika et al., 2022; Wen-hsin Hsu et al., 2019).

Studies have shown that the adoption of IASs and IFRSs contributes to higher accounting quality, less discretionary management of results, and more timely recognition of losses, thereby strengthening the transparency of financial statements (Bohušová & Svoboda, 2017; S. Ika et al., 2024). In particular, companies that implement IAS 41 consistently and sustainably over time tend to present more accurate and reliable information about their biological assets, which is often associated with larger organizations, greater profitability, and financial strength. This rigorous application reflects a commitment to accounting transparency and facilitates informed decision-making both internally and externally (Sedláček, 2014; Solovyov & Kuznetsov, 2011). Likewise, companies with a high intensity of biological assets tend to be more committed to their adequate disclosure, which not only improves the quality of financial information, but can also have a positive impact on market perception, access to financing, and long-term profitability (Felski, 2017; Middelberg et al., 2012; Wen-hsin Hsu et al., 2019).

5.2. Comparison of Results with Other Economies

The application of International Accounting Standard 41 (IAS 41) and, in general, of International Financial Reporting Standards (IFRSs) varies depending on the country, the productive sector, and the level of economic development. These differences are reflected in aspects such as the recognition and measurement of biological assets, consistency in regulatory interpretation, and the degree of technical preparation of organizations. In the agricultural sector, these variations affect both the quality of financial information and international comparability, generating the need to analyze experiences and practices adopted in different contexts.

In Huila, Colombia, the adoption of IFRSs in small- and medium-sized enterprises engaged in the cultivation of coffee, cocoa, fish, and rice has been relevant for the preparation of more reliable financial statements. However, challenges related to the recognition and valuation of assets persist, as well as the lack of training of personnel (Ultreras et al., 2024). In South Africa, agricultural companies operating in commodity derivatives must comply with IAS 39, although the application and interpretation are not uniform, which motivates the recommendation to adopt standardized methodologies for inventory valuation and transaction classification (Middelberg et al., 2012). In Kosovo, the implementation of IFRSs did not significantly change the profitability of companies, although it did affect solvency and short-term liquidity (Perjuci & Hoti, 2022). In India, voluntary adoption in the technology sector showed notable differences in financial indicators compared to Indian accounting principles (Chandrasekar & Kumar, 2017). In Vietnam, despite not being mandatory, some companies have implemented IFRSs on a voluntary basis, highlighting the need to move towards their formal adoption (Tran et al., 2019). In the United States, the main limitation identified is insufficient technical training in IFRSs, which could compromise its future application (Tan et al., 2014).

Likewise, Sweden has a high standard in the integration of sustainability criteria, while the Netherlands stands out for its circular economy practices and Germany for the efficient use of renewable energies. By contrast, the Kyrgyz Republic is just beginning to adopt environmental, social, and governance (ESG) standards with limited resources (Sakkaraeva & Abdurashitov, 2024). In Indonesia, the degree of disclosure of information on biological assets according to PSAK 69 (aligned with IAS 41) varies significantly, influenced by the intensity of those assets and the size of the company (Noviari et al., 2021).

The literature indicates that the application of IASs tends to improve the quality of accounting information, reducing profit management, recognizing losses in a timelier manner, and increasing the relevance of the value of the reported amounts, compared to national regulatory frameworks that are not aligned with international standards (S. R. Ika et al., 2022). However, fair value accounting is still under debate. In Australia, for example, its application has been shown not to provide incremental capacity to forecast future operating cash flows (He et al., 2018). Another relevant aspect is government agricultural subsidies, for which uncertainties persist in their recognition and accounting, particularly when they are conditional. A methodology for recording them has been proposed to increase the transparency and usefulness of the information (Osipchuk et al., 2024).

International experience shows that while some countries have reached advanced levels in the implementation of IASs in the agricultural sector, others face structural and methodological barriers. Lack of interpretive uniformity, market limitations for valuation, and a shortage of trained human resources are recurrent obstacles. Consequently, it is essential to continue regulatory harmonization efforts, develop methodological guides applicable to different contexts, and strengthen technical training, in order to raise the quality and comparability of financial information in the agricultural sector.

5.3. Regulatory Bodies and Institutional Barriers in the Application of IAS 41 in Ecuador

The role of regulatory bodies is crucial to ensure the correct application of IAS 41 in the Ecuadorian poultry sector. In this sense, entities such as the Superintendence of Companies, Securities and Insurance (SUPERCIAS), and the Internal Revenue Service (SRI) play key roles in supervising regulatory compliance and demanding reliable financial information. However, the lack of specific guidelines adapted to the nature of biological assets and the limited articulation between regulators and business associations have generated gaps that make it difficult to homogenize accounting criteria (Menglikulov et al., 2024). This situation is reflected in the disparity of valuation methods used by companies, which decreases the comparability of financial statements and reduces their usefulness in strategic decision-making (van Biljon & Wingard, 2020).

Despite regulatory advances, institutional barriers persist that restrict the full implementation of IAS 41 in the Ecuadorian context. Among the most relevant are the scarce technical training offered to accounting professionals, the weak culture of regulatory control and the limited availability of sanction and follow-up mechanisms in cases of non-compliance. In addition, the lack of fiscal or financial incentives that promote the adoption of international standards discourages many poultry companies, especially small- and medium-sized enterprises, from rigorously applying the fair value required by the standard. All this shows the need to strengthen accounting institutions and design public policies that facilitate effective convergence towards international standards in the presentation of financial information.

6. Conclusions

6.1. Conclusions of the Study

This study analyzed the application of International Financial Reporting Standards (IFRSs), with emphasis on IAS 41—Agriculture, in companies in the poultry sector in the province of Tungurahua, Ecuador, specifically those registered under ISIC code A0146.03 for the production of poultry eggs. From a mixed approach that included the analysis of financial data, descriptive statistics, and the perception of business representatives, it was possible to obtain a comprehensive vision of the degree of regulatory compliance, the technical knowledge of accounting managers, and the effects that the lack of accounting homogenization generates on the quality of financial statements.

With regard to the first research question, the results show that IAS 41 is not fully applied in the poultry companies analyzed. Although a significant part of the respondents claim to be aware of the standard and follow some of its guidelines, in practice a partial adoption is observed, influenced by the preference for alternative valuation methods such as unit cost per tray or accrued cost. These approaches are not always aligned with the principle of fair value, as required by IAS 41, resulting in a significant gap between what is established by the standard and what is actually implemented in the local business context.

In relation to the second research question, it was found that the level of technical knowledge about IAS 41 among owners and accounting managers is limited and heterogeneous. Although there is awareness of the existence of the norm, its technical understanding is superficial, which translates into an inadequate or confusing execution of normative procedures. The absence of specialized training in agricultural and international accounting, coupled with the lack of external professional advice, limits the ability of companies to properly implement the criteria for the recognition, measurement, and disclosure of biological assets.

Regarding the third research question, the lack of homogenization in the accounting application generates serious consequences for the presentation and comparability of financial statements. The different practices used in asset classification (such as inventory,

birds in laying, or others) and the measurement methods adopted lead to inconsistent accounting reports, which hinders both cross-company benchmarking and decision-making based on standardized information. This dispersion also reflects the absence of clear sectoral guidelines and the urgent need for regulatory oversight.

The findings also confirm that companies with higher bioactive intensity, and with more rigorous adoption of IAS 41, tend to exhibit more complete, transparent, and useful financial statements, suggesting a direct relationship between regulatory commitment and the quality of financial reporting. In addition, it is highlighted that the correct application of these standards not only improves internal accounting, but can also contribute to the profitability, sustainability, and competitiveness of the poultry sector, by facilitating access to financing and improving the perception of risk by third parties.

Finally, it is concluded that in order to achieve an effective implementation of IAS 41 in the poultry sector of Tungurahua, it is essential to strengthen accounting training processes, promote the homogenization of sectoral accounting criteria, and establish technical and regulatory supervision mechanisms that guide companies towards a coherent and systematic application. The improvement in these aspects will allow the generation of more reliable, comparable and useful financial information for strategic management, auditing, performance evaluation, and decision-making at the business and regulatory level.

6.2. Results-Based Recommendations

To bridge the gap between the technical knowledge and practical application of IAS 41 in the poultry sector of Tungurahua, it is critical to implement specialized training programs that address both the conceptual foundations and operating procedures of this standard. Since many managers and owners have superficial or fragmented knowledge, it is recommended to organize practical workshops on fair value valuation, initial recognition and subsequent measurement of biological assets, focusing on the particularities of egg production. These courses should include case studies and applied exercises that show how to translate the normative guidelines into real situations in the local productive environment.

In addition, the inclusion of training modules in agricultural and international accounting within the continuing and technical education programs for accountants in the sector is proposed. These modules should address topics such as the accounting treatment of biological changes and the classification of assets at different stages of the production cycle (replacement pullets, laying birds, etc.), as well as the preparation of disclosures in accordance with IAS 41. To ensure the effectiveness of these actions, it is suggested to be accompanied by IFRS experts who function as mentors or consultants and who can offer direct feedback to the accounting teams during implementation.

Finally, considering that the lack of accounting homogenization hinders the comparability and transparency of financial statements, it is recommended to develop a sectoral guide adapted to the conditions of poultry production in Ecuador. This guide, developed with the support of associations, universities, and regulatory authorities, should contain common technical guidelines for the classification, measurement, and presentation of biological assets in poultry enterprises. In addition, training processes should also focus on the correct interpretation and application of this guide, promoting unified criteria that facilitate external oversight, auditing, and regulatory compliance in a sustainable manner.

6.3. Role of Regulators and Institutional Gaps in the Implementation of IAS 41

Although IAS 41 is part of the international accounting framework adopted by Ecuador, its effective application in specific sectors such as poultry depends on the coordinated action of national and local regulatory bodies. In the case of Tungurahua, there is a notorious absence of supervision and technical support mechanisms by institutions such as

the Superintendence of Companies, Securities and Insurance (SUPERCIAS), the Internal Revenue Service (SRI), or the productive unions, which has contributed to the application of this regulation being partial, heterogeneous and, in many cases, inadequate. The lack of clear sectoral guidelines, technical guides adapted to the local agricultural context, and training spaces promoted by the public sphere shows an institutional vacuum that limits the consolidation of a professional and standardized accounting culture in the poultry sector.

In view of this situation, it is essential that regulatory authorities assume a more active and articulating role, not only in the application of regulatory compliance, but also in the provision of training resources, technical advice, and effective surveillance. It proposes, for example, the design of a national plan for the progressive implementation of IAS 41 in the agricultural and livestock sectors, which includes awareness campaigns, specialized training for accountants in the rural sector, and the development of homogeneous technical criteria for the measurement and presentation of biological assets. In addition, cooperation between the public sector, universities, and accounting associations would make it possible to generate sustainable technical capacities and bridge the gap between international regulations and their practical application in production units. In this way, not only would the quality of financial information be strengthened, but also the transparency, supervision, and competitiveness of the sector.

6.4. Future Lines of Research

Based on the findings obtained, a relevant future line of research is to explore the financial and operational impact of the full application of IAS 41 on companies in the agricultural sector, including not only poultry, but also activities such as livestock, fruit production, or transition crops. This research could incorporate econometric models or longitudinal case studies to analyze how the full adoption of the standard affects key variables such as profitability, operational efficiency, access to credit, or the market value of companies, thus allowing a more robust evaluation of the cost–benefit of its implementation.

Another valuable line of research would be the development of sectoral accounting guidelines specific to biological assets in emerging economies, considering the reality of agricultural micro-, small-, and medium-sized enterprises (MSMEs). This approach would allow for the proposal of simplified but normatively aligned criteria that facilitate the practical application of IAS 41, especially in regions with a low level of digitalization, limited technical training, and little supervision. In addition, analysis of the role of digital technologies and automated accounting systems could be incorporated as tools to close knowledge gaps and promote accounting standardization in the agricultural sector.

Author Contributions: Data curation, Investigation, Conceptualization, Writing - Review & Editing, Software, P.C.-L.; Conceptualization, Formal Analysis, Supervision, Z.C.-H.; Conceptualization, Methodology, and Software, P.J.-E.; Investigation, Methodology, and Writing, C.S.-M. All authors have read and agreed to the published version of the manuscript.

Funding: The authors would like to express their gratitude to the Dirección de Investigación y Desarrollo (DIDE) of the Universidad Técnica de Ambato (UTA) for their support in the publication of this article, which stems from the research project entitled "Valuation of Biological Assets and the Reasonableness of Financial Information in the Poultry Sector, Egg Production, Tungurahua Province", under Code: SFFCAUD04, approved by Resolution No. UTA-CONIN-2023-0086-R issued by the Dirección de Investigación y Desarrollo (DIDE) of the Universidad Técnica de Ambato, Ecuador. All related investigations have provided additional data that complement the findings presented herein.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki. The research is part of an institutional project entitled "Valuation of Biological Assets and the Reasonableness of Financial Information in the Poultry Sector, Egg Production, Tungurahua

Province", approved by the Dirección de Investigación y Desarrollo (DIDE) of the Universidad Técnica de Ambato (UTA), Ecuador (Code: SFFCAUD04, Resolution No. UTA-CONIN-2023-0086-R).

Informed Consent Statement: Informed consent was obtained from all participants involved in the study. Explicit authorization was granted by the poultry sector companies under analysis, which confirmed their willingness to provide information through the administration of the surveys, thereby ensuring validity and adherence to ethical principles in the collection of primary data.

Data Availability Statement: The data used in this study come from official institutional sources in Ecuador, which are publicly available, as well as from a survey conducted specifically with representatives of the poultry sector in the province of Tungurahua. Survey data were collected for academic purposes and are available upon reasonable request to the relevant author, in accordance with participant confidentiality and applicable ethical standards. Institutional information can be accessed through the relevant government portals.

Conflicts of Interest: The authors declare that they have no conflicts of interest.

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