

Charting the Landscape of Biological Asset Accounting Research: A Bibliometric Analysis

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ABSTRACT

The accounting treatment of biological assets has gained increasing attention following the introduction of fair value measurement requirements under the International Accounting Standard 41 (IAS 41). This study aims to explore the evolution and intellectual structure of research related to biological assets through a bibliometric analysis approach. Using the Scopus database, publications from 2007 to 2026 were collected and refined to obtain 112 relevant studies associated with accounting standards, agricultural accounting and agricultural production. The analysis evaluates publication trends, leading authors, influential journals, institutional affiliations, contributing countries and document types. The results show a steady growth in research output over time, with notable concentration in specific regions, particularly Brazil and within specialized academic journal. Journal articles represent the dominant form of dissemination, indicating strong emphasis on empirical analytical research. The finding highlights the expanding relevance of biological assets reporting and reveals research gaps that encourages further international and interdisciplinary studies addressing valuation, disclosure, and reporting challenges under IAS 41.

Keywords: Biological assets; IAS 41; Accounting standards; Agricultural accounting; Agricultural production.

INTRODUCTION

Biological assets constitute a unique category in accounting due to their living nature and continuous biological transformation, which separates them from conventional tangible and intangible assets. International Accounting Standard 41 (IAS 41) defines biological assets and requires them to be measured at fair value less costs to sell, reflecting changes arising from growth, degeneration, or reproduction. This requirement distinguishes biological assets from most other non-financial assets and introduces unique measurement challenges. As discussed by Campos-Llerena et al. (2024), biological assets such as crops, livestock, and forest resources are continuously transformed through biological processes, creating significant challenges for their measurement and presentation in financial reporting.

Expanding on the definition and measurement challenges of biological assets, Kadri et al. (2023) note that the adoption of MFRS 141 (the Malaysian equivalent of IAS 41) made fair value less costs to sell measurement “a mandatory requirement, despite the difficulties that were presented,” underscoring both the regulatory intent and practical difficulties of implementing fair value measurement in agriculture reporting. This dynamic characteristic has led to increasing scholarly attention, particularly in relation to the relevance, reliability, and comparability of fair value measurements across diverse agricultural settings and market environments.

In addition to definitional and regulatory discussions, empirical research has increasingly examined the implications of fair value measurement for the quality and usefulness of financial reporting. Alfariysi et al. (2022) provide practical evidence from Indonesian agricultural firms demonstrating that the fair value measurement of biological assets, together with related disclosure practices, has a statistically significant positive effect on firm value. Their findings suggest that fair value information conveys relevant economic signals to investors regarding expected future benefits. This supports the argument that measuring biological assets at fair value not only reflects their constant biological transformation but also improves the decision-usefulness of financial statements.

Consistent with this perspective, IAS 41 (IFRS Foundation, 2023) emphasizes that biological assets must be measured at fair value less costs to sell because such measurement reflects changes resulting from biological transformation. Nevertheless, the effectiveness of fair value reporting may depend on the level of disclosure transparency and the availability of reliable market data, thereby sustaining the broader debate concerning the trade-off between relevance and reliability in biological asset accounting.

Beyond their regulatory definition, biological assets are conceptually distinct because the value is driven by biological transformation rather than solely by exchange transactions. Scholarly literature emphasizes that the application of fair value to biological assets significantly affects financial reporting outcomes. Kadri et al. (2023) demonstrate that biological assets measured at fair value and the changes in fair value over time have significant value relevant for investors. Similarly, Herbohn and Herbohn (2006) find that the recognition of unrealized gains and losses arising from biological transformation can significantly influence reported profit figures, highlighting how both fair value measurement and biological changes directly affect financial performance.

Despite this conceptual and empirical support, the practical application of fair value accounting for biological assets under IAS 41 remains challenging. Practitioners highlight that the lack of active markets for many agricultural and forestry products forces reliance on subjective estimates and discounted cash flows, introducing instability and uncertainty in reported earnings. Frequent recognition of unrealized gains and losses can also create opportunities for earnings management, reducing stakeholders' confidence. Small-scale and emerging-market entities face additional constraints in valuation expertise and disclosure, compounding reliability and comparability issues. Thus, while fair value enhances transparency and relevance, in practice it often compromises the credibility, consistency and comparability of financial reporting for biological assets, presenting a determined challenge for both preparers and users in the agriculture and forestry sectors

In practice, the application of fair value under IAS 41 continues to pose significant challenges for the reliability and comparability of financial reporting for biological assets. According to Campos-Llerena et al. (2024), although fair value measurement enhances transparency by reflecting real economic changes, its application is constrained by volatility, subjective estimation, and limited availability of reliable market data, particularly in the absence of active markets. Consistent with this view, Argiles et al. (2012) observe that while fair value accounting may improve relevance, it can also introduce earnings volatility and measurement complexity, raising concerns about accounting quality. Consequently, reported financial performance may fluctuate considerably across firms, reducing comparability and potentially undermining users' confidence in reported figures. These persistent practical concerns reinforce the ongoing debate regarding the appropriate balance between relevance and reliability in biological asset accounting.

Considering this expanding body of literature and continuing argument, this study presents a bibliometric analysis of research on biological asset accounting under IAS 41. It systematically examines publication trends, influential authors, leading journals, countries and thematic developments in the literature on fair value measurement of biological assets. By mapping the intellectual structure and research evolution in this field, the study identifies dominant themes, research gaps and emerging directions, thereby providing a comprehensive overview of scholarly contributions and future research opportunities.

METHODOLOGY

This study employed a bibliometric approach to examine research trends and publication patterns related to biological assets. Data was retrieved from the Scopus database, which is widely recognized as a reliable and high-quality source of peer-reviewed academic literature. The data collection process was designed to capture scholarly outputs on biological asset accounting over the period of twenty years (2007 to 2026), allowing for a comprehensive assessment of the development and evolution of this research area. The search process commenced with the use of the primary keyword “biological assets”, which was applied across the title, abstract, and keyword fields within the Scopus core collection. This initial search yielded a total of 269 publications. As not all retrieved documents were directly relevant to the accounting and reporting aspects of biological assets, a refinement stage was conducted to enhance the accuracy of the dataset. Additional keywords, including “biological assets,” “IAS 41,” “accounting standards,” “agricultural accounting,” and “agricultural production,” were incorporated into the search strategy. This refinement reduced the dataset to 112 publications that were closely aligned with the objectives of the study. The final set of publications was analyzed using key bibliometric indicators, such as publication year, document type, authorship patterns, source titles, institutional affiliations, and countries of origin. The data were systematically organized and summarized using Microsoft Word tables, with publication counts manually compiled for each variable. This descriptive bibliometric method provides a structured overview of research productivity, topical focus, and geographical distribution in biological asset research.

FINDINGS AND DISCUSSION

Document by Year

Table 1 shows a clear upward trend in publications on biological assets over time. The highest number of publications occurred between 2020 and 2022, peaking at 10 publications annually. This wave may be attributed to increased global attention on agricultural sustainability, fair value measurement under IAS 41, and the growing relevance of biological assets in financial reporting during periods of economic and environmental uncertainty.

In contrast, the lowest publication output was recorded in 2008, with no publications, followed by very low numbers between 2007 and 2010. This limited output may reflect lower academic interest, fewer regulatory developments, and limited realistic data availability during the early adoption stages of biological asset accounting standards. After 2013, publication numbers gradually increased, indicating growing academic and practical interest in the topic.

Table 1 List of publications on biological assets by years

Year	Number of Publications	Year	Number of Publications
2025	3	2015	4
2024	1	2014	3
2023	5	2013	6
2022	10	2012	4
2021	10	2011	3
2020	10	2010	2
2019	9	2009	1
2018	7	2008	0
2017	9	2007	1
2016	7		

Document by Author

Table 2 presents the top 50 authors who have contributed to publications on biological assets, highlighting patterns of research productivity within this niche field. Svoboda, P emerges as the most productive author with five publications, followed by Bohusova, H and Oliveira, D.d.L with four publications each. Several authors, including Munis, R.A., Rech, I.J., Ribeiro, A.M., and Simoes, D, have produced three papers, indicating a small core group of researchers who consistently engage with biological asset-related topics. This concentration suggests that the field is driven by a limited number of specialists with sustained research interest.

Beyond the leading contributors, most authors listed in the table have produced two or one publication. Authors ranked from 8 to 31 mainly contributed two papers, while those ranked from 32 to 50 have only one publication each. This distribution reflects a long-tail authorship pattern, where many researchers contribute occasionally rather than continuously. Such a pattern may indicate that biological asset research is often addressed as part of broader accounting, agricultural, or sustainability studies, rather than as a primary research focus for most authors.

Table 2 Top 50 authors that published papers related to biological assets

No.	Author Name	Number of Publications	No.	Author Name	Number of Publications
1	Svoboda, P	5	26	Silva, C.A.T.	2
2	Bohusova, H	4	27	Xie, B.	2
3	Oliveira, D.d.L	4	28	da Silva, R.B.G	2
4	Munis, R.A.	3	29	da Silva, R.L.M.	2
5	Rech, I.J.	3	30	de Oliveira, L.P.	2
6	Ribeiro, A.M.	3	31	Sulek, R.	2
7	Simoes, D	3	32	Abdul Latif, R.	1
8	Abdullah, Z.	2	33	Ableeva, A.M.	1
9	Binotto, E.	2	34	Acuna, E.	1
10	Camargo, D.A.	2	35	Aimagambetova, A.	1
11	Campos-Llerena, P.	2	36	Aldea, D.	1
12	Cavalheiro, R.T.	2	37	Altarawneh, M.S.	1
13	Chandren, S.	2	38	Ambrozini, M.A.	1
14	Do Carmo, C.H.S.	2	39	Andrasic, J.	1
15	Dobsinska, Z.	2	40	Andybayeva, G.	1
16	Flach, L.	2	41	Araujo, A.O.	1
17	Gracia-Blandon, J.	2	42	Arbidane, I.	1
18	Giertlioiva, B.	2	43	Argiles Bosch, J.M.	1
19	Gimenes, R.M.T.	2	44	Argiles, J.M.	1
20	Jaksic, D.	2	45	Arias-Perez, J. S.	1
21	Nogueira, D.R.	2	46	Arimany, N.	1

22	Paulo, E.	2	47	Artene, A.	1
23	Prata, B.C.	2	48	Azevedo, G.M.d.C.	1
24	Rover, S.	2	49	Barreno-Cordova, C.	1
25	Sedlacek, J.	2	50	Barroso, E.D.S.S.	1

Document per year by Source

Table 3 summarizes the top 15 sources of documents based on the number of articles published on biological assets, revealing a highly uneven distribution across journals. *Custos e Agronegócio* clearly dominates as the leading source, with 44 publications, far exceeding all other outlets. This strong concentration suggests that the journal plays a central role in publishing research related to biological assets, particularly within the context of agribusiness and agricultural accounting. Its prominence may be attributed to its specialized scope, regional relevance, and strong alignment with biological asset valuation, disclosure, and management issues.

On the other hand, the remaining sources show relatively low and closely clustered publication counts. Several journals, including *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *Agricultural Economics* (Czech Republic), and the *Journal of Risk and Financial Management*, each contributed three articles, indicating moderate but consistent interest in the topic. Other journals published only one or two articles, reflecting a more isolated research landscape. This pattern suggests that while biological asset research attracts attention from diverse disciplines such as accounting, finance, forestry, and agricultural economics, most journals address the topic occasionally rather than as a core focus area.

Table 3: Top 15 sources of documents based on number of article publication

No.	Source Title	Number of Publications
1	Custos E Agronegocio	44
2	Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis	3
3	Agricultural Economics Czech Republic	3
4	Journal of Risk and Financial Management	3
5	Austrian Journal of Forest Science	2
6	Forests	2
7	Revista De Contabilidad Spanish Accounting Review	2
8	Accounting and Finance	1
9	Advance Series and Management	1
10	Agricultural Economics	1
11	Agricultural Finance Review	1
12	Annals of Forest Research	1
13	Archives of Biological Sciences	1
14	Asia Pacific Journal of Accounting and Economics	1
15	Bois Et Forets Des Tropiques	1

Document by Affiliation

Table 4 presents the top 15 institutional affiliations contributing to publications on biological assets, highlighting a strong geographical concentration of research output. Brazilian universities clearly dominate the list, with the *Universidade de São Paulo* leading at 13 publications, followed by *Universidade Federal de Santa Catarina* with eight publications. Several other Brazilian institutions, including *Universidade de Brasília* and *Mendelova Univerzita v Brně* from the Czech Republic, each contributed six publications, indicating that while Brazil is the primary contributor, selected European institutions also play a notable role. The strong presence of Brazilian universities reflects the country's significant agricultural sector and the relevance of biological assets within its economic and accounting research agenda.

From a country perspective, Brazil accounts for most affiliations, with eleven out of the fifteen institutions listed, demonstrating its central position in biological asset research. This dominance may be attributed to Brazil's extensive agribusiness activities, forestry resources, and early engagement with accounting standards related to biological assets. Other contributing countries include the Czech Republic, Spain, Malaysia, and China, each represented by one institution with lower publication counts. Although their contributions are smaller, these institutions indicate growing international interest and a gradual diversification of research efforts beyond Latin America, particularly in Europe and Asia.

Table 4: Tops 15 institutions that contribute publications related to biological assets

No.	Affiliation	Country	Number of publications
1	Universidade de São Paulo	Brazil	13
2	Universidade Federal de Santa Catarina	Brazil	8
3	Mendelova Univerzita v Brně	Czech Republic	6
4	Universidade de Brasília	Brazil	6
5	Universidade Federal do Rio Grande do Norte	Brazil	5
6	Universidade Federal do Rio Grande do Sul	Brazil	4
7	Universidade Federal da Paraíba	Brazil	4
8	Universidade Federal de Goiás	Brazil	4
9	Universitat de Barcelona	Spain	3
10	Universidade Estadual Paulista Júlio de Mesquita Filho	Brazil	3
11	Fundacao Universidade Federal de Rondonia	Brazil	3
12	Universidade Federal de Mato Grosso	Brazil	2
13	Universiti Utara Malaysia	Malaysia	2
14	Fujian Agriculture and Forestry University	China	2
15	Universidade Federal de Mato Grosso do Sul	Brazil	2

Document by Countries

Table 5 presents the top 20 countries contributing to publications related to biological assets, showing a highly uneven distribution of research output across nations. Brazil clearly dominates the field with 43 publications, far better than all other countries. This leading position reflects Brazil's strong agricultural and forestry sectors, as well as sustained academic interest in accounting and valuation issues related to biological assets. The Czech Republic follows at a distant second with nine publications, while the United States contributes five studies, indicating moderate but consistent research engagement in these countries.

Other countries demonstrate lower yet meaningful levels of contribution. Malaysia, Romania, and Spain each recorded four publications, suggesting emerging research interest within both developing and developed economies. Countries such as Ecuador and Portugal contributed three publications each, meeting the threshold for notable research activity. The remaining countries, including China, Indonesia, Latvia, the Russian Federation, Slovakia, and the United Kingdom, recorded two publications, reflecting more limited involvement. Overall, the findings suggest that biological asset research is concentrated in a small number of countries, with gradual expansion across diverse regions.

Table 5: Top 20 countries which have publications related to biological assets

No.	Country	Number of Publications
1	Brazil	43
2	Czech Republic	9
3	United States	5
4	Malaysia	4
5	Romania	4
6	Spain	4
7	Ecuador	3
8	Portugal	3
9	China	2
10	Indonesia	2
11	Latvia	2
12	Russian Federation	2
13	Sebvia	2
14	Slovakia	2
15	United Kingdoms	2
16	Australia	1
17	Austria	1
18	Bosnia and Herzegovina	1
19	Chile	1
20	Croatia	1

Document by Type

Table 6 illustrates the distribution of publications on biological assets according to document type. The results indicate that journal articles tremendously constitute the main form of scholarly output, with 88 publications recorded. This pattern suggests that researchers in this field mainly rely on journal outlets to present detailed realistic findings and theoretical discussions related to biological asset accounting and reporting.

By comparison, alternative publication formats appear far less frequently. Both conference papers and book chapters account for only three publications each, while reviewing articles are limited to a single study. The small number of non-article documents implies limited emphasis on preliminary findings or literature synthesis. Overall, the evidence points to a research field that prioritizes in-depth journal publications over other dissemination channels.

Table 6: Documents by types of publication related to biological assets

No.	Document Types	Number of Publications
1	Article	88
2	Conference Paper	3
3	Book Chapter	3
4	Review	1

CONCLUSION

This bibliometric analysis provides a comprehensive overview of the development and evolution of research on biological asset accounting, particularly in relation to fair value measurement under IAS 41. The findings reveal a gradual but consistent growth in scholarly interest over time, with publication activity increasing significantly after 2013 and reaching its peak between 2020 and 2022. This upward trend reflects the growing importance of biological assets in financial reporting, driven by heightened global attention to agricultural sustainability, valuation transparency, and the economic significance of agribusiness sectors. The dominance of journal articles as the primary publication type further indicates that the field emphasizes rigorous empirical and conceptual investigation.

The analysis also highlights a concentration research structure characterized by a limited group of highly productive authors, journals, institutions and countries. Brazil emerges as the leading contributor across institutional affiliations and national output, demonstrating the strong linkages between agricultural economic environments and academic research priorities. Similarly, the prominence of specialized journals suggests that biological asset accounting remains a niche yet developing area within accounting research. Although contributions from Europe and Asia are increasing, the uneven geographical distribution indicates that research participation is still expanding and has not yet reached global balance.

Overall, the study confirms that while fair value measurement of biological assets has attracted growing academic attention, significant opportunities remain for future research. Emerging economies, interdisciplinary perspectives and comparative international studies offer promising directions for expanding the literature. Future research may also explore methodological advancements, disclosure practices and the practical implications of valuation challenges faced by preparers and users of financial statements. By mapping existing scholarship and identifying research gaps, this bibliometric analysis contributes to a clearer understanding of the intellectual landscape of biological asset accounting and supports continued development in this evolving field.

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