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UOK (UOK): 657.42:631.16 IMPROVING THE ACCOUNTING AND AUDITING OF BIOLOGICAL ASSETS BASED ON INTERNATIONAL STANDARDS

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Abstract. This article examines the issues of improving the accounting and auditing of biological assets in agricultural enterprises based on the requirements of International Financial Reporting Standards, particularly IAS 41 "Agriculture." The research employs the methods of scientific abstraction, comparative analysis, grouping, and systematic analysis. A multifactor model for determining the fair value of biological assets is proposed, combining market prices, biological transformation, productivity, and expected economic benefits. The model is based on a system of working accounts, including 0180, 0181, 0182, 2600, 2610, 2620, 9071, 9072, 9171, and 9172. In addition, a system of internal control indicators for auditing biological assets is developed. The results contribute to increasing the reliability of accounting information and financial reporting.

Keywords: biological assets, fair value, IAS 41, accounting, audit, internal control, working chart of accounts, biological transformation, agricultural economy, financial accounting.

Аннотация. В статье исследуются вопросы совершенствования бухгалтерского учета и аудита биологических активов в сельскохозяйственных предприятиях на основе требований Международных стандартов финансовой отчетности, в частности МСФО (IAS) 41 «Сельское хозяйство». В ходе исследования использованы методы научной абстракции, сравнительного анализа, группировки и системного анализа. Предложена многофакторная модель определения справедливой стоимости биологических активов, объединяющая рыночные цены, биологическую трансформацию, продуктивность и ожидаемые экономические выгоды. Модель основана на системе рабочих счетов (0180, 0181, 0182, 2600, 2610, 2620, 9071, 9072, 9171 и 9172). Кроме того, разработана система показателей внутреннего контроля для проведения аудита биологических активов. Полученные результаты способствуют повышению достоверности учетной информации и финансовой отчетности.

Ключевые слова: биологические активы, справедливая стоимость, МСФО (IAS) 41, бухгалтерский учет, аудит, внутренний контроль, рабочий план счетов, биологическая трансформация, экономика сельского хозяйства, финансовый учет.

INTRODUCTION

In global practice, the organization of accounting and auditing of biological assets in accordance with international requirements is considered one of the most relevant scientific and practical issues. One of the main reasons for this is the introduction of the principle of fair value measurement of biological assets under International Accounting Standard 41 "Agriculture" (IAS 41), the requirement to reflect value changes arising from biological transformation in financial results, and the growing need to ensure transparency and comparability of financial statements.

In the Republic of Uzbekistan, agriculture is one of the strategic sectors that forms a significant share of the country's gross domestic product, and the development of the agricultural sector is defined as one of the priority areas of state policy. The Resolution of the President of the Republic of Uzbekistan No. PQ-4611¹ dated February 24, 2020, "On Additional Measures for the Transition to International Financial Reporting Standards," sets the task of organizing accounting in large enterprises, including agricultural sector entities, on the basis of IFRS. However, in practice, a number of methodological issues remain regarding the fair value measurement of biological assets, their systematic reflection in accounting records, and the consideration of biological transformation and productivity factors in the audit process.

¹ <https://lex.uz/docs/-4746047>

The analysis of practice shows that the current accounting of biological assets is complicated by several factors, including the volatility of market prices in determining fair value, natural losses of animals or plants due to disease, adverse weather conditions or crop failure, and the insufficient automation of accounting processes in many agricultural enterprises. In addition, the incomplete formation of a system of working accounts for the separate accounting of biological assets in national practice, as well as the absence of indicators for assessing biological transformation and productivity during the audit, affect the reliability of accounting information and financial reporting. These issues require the improvement of the methodological foundations of accounting and auditing of biological assets in accordance with international standards.

The purpose of this study is to develop theoretical and methodological proposals, as well as practical recommendations aimed at improving the accounting and auditing of biological assets in agricultural enterprises based on international standards. The object of the study includes the activities of agricultural enterprises related to the accounting and auditing of biological assets, including “Mehnat Bakhtli Sut” LLC, “Indorama Agro” LLC in Tashkent district of Tashkent region, and “Yangi Tashkent Konserva” LLC in Qibray district. The following sections of the article sequentially cover the literature review, research methodology, analysis results, conclusions, and recommendations.

LITERATURE REVIEW

The problem of valuing biological assets has been widely covered in the studies of foreign economists. Argilés et al. (2011) compare valuation methods based on fair value and historical cost and argue that information based on fair value has higher predictive power. Gonçalves et al. (2017) emphasize that the fair value measurement of biological assets under IFRS increases the value relevance of financial information. Sedláček (2010) systematizes valuation methods in agricultural accounting and demonstrates the need for a differentiated approach depending on the type of asset.

In the livestock sector, Wencun Shu (2019) proposes a special model for measuring biological assets. Widiyanti et al. (2018), as well as Marrufo Garcia and Cano Morales (2021), analyze the specific aspects of recognizing and valuing biological assets in the practices of different countries. Arbidane and Mietule (2018), along with Wegrzynska and Nowotarska (2021), study practical issues related to the valuation and accounting of biological assets and propose possible solutions. Among scientists from CIS countries, Kruglyak (2018) and Klichova et al. (2015) developed methodologies for accounting for agricultural products and plant biological assets at fair value. Demina and Stepanyan (2024) examine the impact of choosing valuation methods in an inflationary environment, while Stepanyan (2023) analyzes the issues of testing the internal control system for transactions involving biological assets.

Among Uzbek scholars, Boltayev (2023; 2025) studied the classification of biological assets as accounting objects in business processes and the improvement of accounting methodology for agricultural activities. Menglikulov (2023) examined the methodology of accounting and auditing biological assets in livestock farming, while Dusmuratov et al. (2021) studied the methodological aspects of calculating the cost of dairy products. Karimov et al. (2021) developed the theoretical and practical foundations for the application of IFRS. In addition, research on the methodology for analyzing the activities of agricultural enterprises has also been published in this journal (Akramov, 2024).

The literature review shows that the development of a comprehensive multifactor model for measuring biological assets at fair value, a system of working accounts aligned with the national chart of accounts, and a set of internal control indicators for auditing biological assets have not been sufficiently studied. This indicates the existence of a scientific gap in this area of research.

RESEARCH METHODOLOGY

In conducting the research, the methods of scientific abstraction, observation, analysis and synthesis, inductive and deductive reasoning, systematic analysis, grouping, and comparative analysis were used comprehensively. The theoretical basis of the study consists of the provisions of IAS 41 “Agriculture,” National Accounting Standard No. 21 of the Republic of Uzbekistan, namely the Chart of Accounts, and the International Standards on Auditing, including ISA 300, ISA 315, ISA 500, and ISA 520.

The audit approach was developed on a risk-based basis in accordance with the International Standards on Auditing. The stages of understanding the enterprise and its environment, identifying risks of material misstatement under ISA 315, determining materiality under ISA 320, planning responses to identified risks under ISA 330, collecting audit evidence under ISA 500, and applying analytical procedures under ISA 520 were adopted as components of the research methodology. In the audit of biological assets, audit risk was interpreted as the probability of failing to detect, in a timely manner, misstatements related to the existence, condition, and fair value of the asset.

The empirical analysis was conducted based on official statistical data from the National Statistics Committee of the Republic of Uzbekistan, as well as accounting and financial reporting data of selected agricultural enterprises for 2022–2025. The selected enterprises included a dairy farming enterprise, “Mehnat Bakhtli Sut” LLC; a large agricultural enterprise with foreign investment, “Indorama Agro” LLC; and a plant raw material processing enterprise, “Yangi Tashkent Konserva” LLC. This selection made it possible to cover various classes of biological assets. The reliability of the research results is ensured by the appropriateness of the chosen methodological approach, the use of official reporting data, and the practical applicability of the developed proposals.

ANALYSIS AND RESULTS

1. A Multifactor Model for Determining the Fair Value of Biological Assets. In traditional practice, the valuation of biological assets is based mainly on active market prices, which cannot fully reflect the biological transformation process and future economic benefits. This study is based on a multifactor model that determines the fair value of biological assets through the interrelationship of four main factors: market prices, the degree of biological transformation, productivity indicators, and expected economic benefits. The content of these factors and their impact on valuation are presented in Table 1.

Table 1

Description and relative importance of factors affecting the valuation of biological assets²

No.	Factors	Impact on content and assessment	Share, %
1	Market prices	Current prices in an active market; determines current value	35
2	Biological transformation rate	The processes of growth, maturation, and multiplication; describe the increase in the value of an asset	25
3	Productivity indicators	Productivity, milk yield, live weight; assesses future production potential	20
4	Expected economic benefits	Future cash flows and profits; determine the economic benefit of the asset	20
	Total		100

Although market prices remain the main factor in the model (35%), biological transformation (25%), productivity (20%), and expected economic benefits (20%) are integrated into the valuation system. This allows for a more accurate representation of the true economic value of the asset. A comparative description of the traditional and proposed methods is given in Table 2.

Table 2

Comparative description of traditional and proposed assessment methods³

Indicator	Traditional assessment	Multifactor model
Taking into account market prices	+	+
Taking into account biological transformation	–	+
Productivity indicators	–	+
Expected economic benefits	–	+
Accuracy level of assessment	Average	High
Reliability of financial reporting	Average	High
Investment attractiveness	Average	High

The results of the study show that the traditional valuation method, which relies mainly on market prices, cannot fully reflect the biological changes and future economic benefits of biological assets. The proposed multifactor model enables a reliable assessment of fair value by taking into account the degree of biological transformation. As a result, the reliability and investment attractiveness of financial reporting increase, and a high-quality information base is formed for managerial decision-making. The practical implementation of the model improves the accuracy of biological asset valuation and ensures the objectivity of the information presented in financial statements.

² author's development

³ author's development

2. System of Working Accounts for Analytical Accounting. In order to form operational and analytical information on biological assets, it is proposed to introduce separate working accounts into the accounting policy of the enterprise. These accounts allow biological assets to be recorded in a differentiated manner according to their type and movement within business processes (Table 3).

Table 3

Proposed working accounts for accounting for biological assets⁴

Account number	Account name
0180	Long-lived biological assets
0181	Plants (perennial trees and crops)
0182	Animals (main herd)
2600	Current biological assets
2610	Animals in breeding
2620	Animals in the forest

3. Working accounts for recording income and expenses. In accordance with the requirements of IAS 41, it was proposed to introduce income and expense accounts to separately record the financial results arising from the initial recognition of biological assets and changes in fair value (Table 4).

Table 4

Income and expense accounts for biological assets⁵

Account number	Account name
9071	Gains from initial recognition of biological assets
9072	Gains from changes in fair value less costs to sell of biological assets
9171	Expenses related to biological assets
9172	Loss arising from changes in fair value less costs to sell of biological assets

This will allow for a transparent reflection of income, expenses and changes in value related to biological assets. The analysis of selected enterprises shows that the share of biological assets in total assets is steadily growing. In Mehnat Bakhti Sut LLC, this indicator increased from 18 percent in 2022 to 27 percent in 2025, and in Indorama Agro LLC, which has foreign investments, from 32 percent to 40 percent (Figure 1).

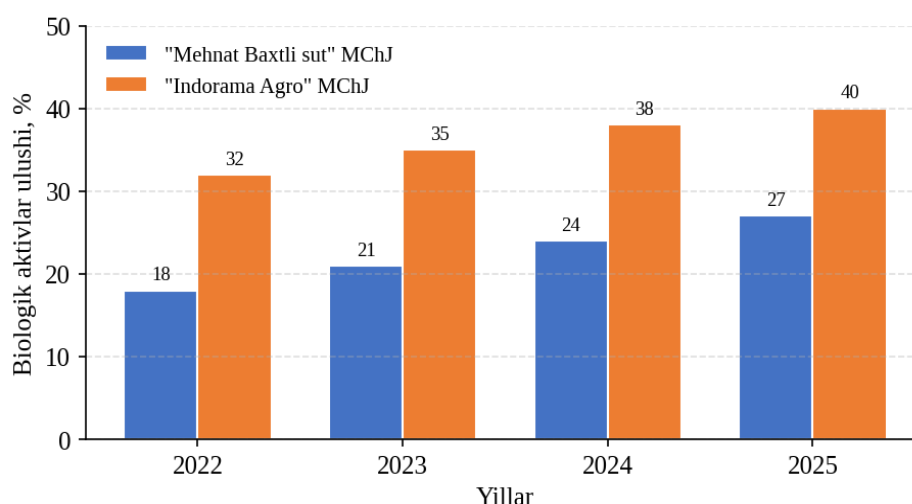


Figure 1. Dynamics of the share of biological assets in selected agricultural enterprises (2022–2025), %⁶

⁴ author's development

⁵ author's development

⁶ Source: compiled by the author based on financial reporting data of enterprises.

This confirms the increasing importance of systematic accounting and fair value measurement of biological assets.

The relatively high share of biological assets and their stable growth in “Indorama Agro” LLC, an enterprise with foreign investment, indicate that the company relies on advanced foreign experience, including the systematic application of fair value measurement for biological assets. At the same time, differences were identified in the practices of local enterprises, such as the absence of depreciation accounting for biological assets and the lack of separate accounting for changes in their value. This further substantiates the need to introduce the proposed system of working accounts and valuation model into national accounting practice.

4. System of Internal Control Indicators for the Audit of Biological Assets. A system of internal control and audit indicators has been developed to assess the existence and movement of biological assets, changes in their value, and the reliability of accounting for agricultural products derived from them. This system also helps determine the effectiveness of internal control, ensure the sufficiency and reliability of audit evidence, and reduce audit risk. A comparative description of the traditional and improved internal control systems is presented in Table 5, while the recommended key indicators are provided in Table 6.

Table 5
Comparative description of the traditional and improved internal control system⁷

Indicators	Current system	Improved system
Inventory control	There is	There is
Biological transformation monitoring	Not available	There is
Monitoring changes in fair value	Partially	Complete
Productivity indicators	Not available	There is
Assessment of expected economic benefits	Not available	There is
Transparency of financial reporting	Average	High
Quality of audit evidence	Average	High
Ability to identify risks	Limited	High

Table 6
Recommended key internal control indicators for biological assets⁸

No.	Indicators	Unit of measurement	Inspection frequency
1	Number of biological assets	piece	Once a month
2	Productivity level	centner/ha	At the end of the season
3	Milk yield	liter	Once a month
4	Live weight gain	kg	Once a month
5	Percentage of animals that died	%	Quarterly
6	Change in fair value	thousand soums	Quarterly
7	Product output	ton	At the end of the season
8	Inventory variances	piece	Once a year
9	Profitability ratio	%	Quarterly

An improved internal control system significantly increases the transparency of financial reporting and the quality of audit evidence compared to the traditional system by monitoring changes in biological transformation, productivity, and value. The established indicators allow the auditor to objectively assess the existence, condition, and valuation of assets, as well as to reduce audit risk.

The above system of indicators serves as a basis for forming an audit strategy at the planning stage of the audit of biological assets. Taking into account the specific characteristics of the audit object, including growing and barn-kept animals, perennial crops, and related inventory differences, the auditor determines the level of materiality and directs audit resources to high-risk areas. As a result, the methodological foundations of auditing biological assets are improved, and the reliability of information on these assets in financial statements is ensured.

In general, the proposed solutions in four areas—a multifactor valuation model, two groups of working accounts, and a system of audit indicators—form a coherent methodological framework.

⁷ author's development

⁸ author's development

CONCLUSION AND RECOMMENDATIONS

The results of the study made it possible to identify the following main areas for improving the accounting and auditing of biological assets based on international standards. First, the assessment of the fair value of biological assets based on a multifactor model that combines market prices, biological transformation, productivity, and expected economic benefits more fully reflects their economic substance. Second, the inclusion of working accounts 0180, 0181, 0182, 2600, 2610, and 2620 in the accounting policy will improve the operational and analytical accounting of biological assets. Third, the introduction of accounts 9071, 9072, 9171, and 9172 will allow separate and transparent accounting of income, expenses, and changes in value related to biological assets. Fourth, the system of internal control and audit indicators will increase audit efficiency, reduce audit risk, and ensure the reliability of information presented in financial statements.

The developed proposals and recommendations are of practical importance, and the proposals concerning the use of the biological asset valuation model and the working accounts system can be introduced into agricultural practice by the relevant authorized bodies. In future studies, it is advisable to examine in greater depth the issues of digitalizing biological asset accounting, eliminating methodological differences between IAS 41 and national standards, and integrating audit procedures with automated information systems.

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