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BIOLOGICAL ASSETS ACCOUNTING IN THE AGRICULTURAL SECTOR

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Abstract
Biological assets are a basic renewable resource for the agricultural sector. Due to their complex nature and transformation of their structure or destination over time, the recognition and accounting treatment of biological assets is a challenge for small agricultural entities due to the limited nature of the business and due to the disclosure of assets required by current accounting. The paper aims are to approach by empirical methods the casuistry of biological assets from an accounting perspective and to present a dashboard for adequate accounting procedures in the case of biological assets. The article is useful to economic entities in the agricultural sector, bringing to light the latest practices regarding accounting approach for biological assets by reference to the international IAS / IFRS standards.

Keywords: *agriculture; biological assets; international standards; accounting procedures*

JEL Classification: M41

I. INTRODUCTION

Biological assets, by their nature and destination, represent a renewable resource subject to active economic principles, promoted by the EU, in terms of sustainability, rational use of resources, efficiency and effectiveness in operation, protection of the environment.

These European principles affect the biological transformation of assets so that managers reposition themselves through integrative management techniques applied to higher or lower economic positions to take advantage of competitive advantage in accordance with the accounting rules and procedures introduced by IAS 41, IAS 2, IAS 16 or IAS 38.

The European approach to modern agriculture includes, among others, the repetitive economic process regarding the management of biological transformations of agricultural agricultural assets in order to reach the maturity stage necessary for the consumption of the population or for the generation of additional biological assets. This activity complies with the efficiency and effectiveness rules necessary to ensure the competitiveness of agricultural products and the maintenance of the agricultural entity on the market. The funds granted under the Strategic Plan CAP 2021-2027 also aim to attract young farmers and business development in rural areas, economic growth and inclusion in rural areas to improve food security, research, technology and digitalization, in order to increase competitiveness (Cosmulese & Ciubotariu, 2017).

Recently, there is an increasing emphasis on an ecological agri-food production that aims to promote techniques and technologies for soil cultivation and animal husbandry to ensure the conservation and restoration of soil fertility by eliminating populating technologies.

The repetitive processes required for agricultural activity are cyclical and produce qualitative and / or quantitative changes in biological assets for agricultural use and cease at the time of sale for consumption similar to the disposal of biological assets.

Due to the versatility of biological transformations as a result of agricultural activity, patrimonial impacts of assets can be produced in the sense of value growth through the quantitative and qualitative side induced by the exploitation of biological assets through their reproductive, regenerative and multiplicative function, but the changes can also be the opposite meaning containing qualitative and quantitative degenerations..

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These particularly complex aspects of the use of biological assets for access to an active global market require an adequate knowledge of the financial mechanisms that ensure compliance with international standards for assessing and disclosing the value of biological assets through financial statements and reporting required by government bodies.

In terms of the tax liabilities generated by biological assets, they involve gains or losses related to the initial recognition at fair value, added over time to any cumulative depreciation cost of the asset and any loss on accumulated depreciation under IFRS. 5, IAS 36, IAS 16 and IAS 2.

In these circumstances, the presentation in a structured manner of the main conditions related to the interpretation and implementation of international standards stipulated in IAS 41 is a point of interest for managers of agricultural entities in order to acquire the emerging rules and obligations to ensure economic competitiveness and access to global market in which the principle of transparency is very important for stakeholders, who have the leverage to slow down or accelerate the economic processes of the entity, including in this case through the subsidy mechanism in accordance with the provisions of IAS 20.

II. LITERATURE REVIEW

In the literature IAS 41 - Agriculture is analyzed both by its regulatory valences for the recognition and measurement of biological assets (Feleaga, Feleagă & Răileanu, 2012; Mates et al., 2015) and by aspects related to the introduction of the fair value of biological assets or assets used in agriculture (Svensson et al., 2008; Argilés, Garcia-Blandon & Monllau, 2011). In Romania, the introduction of the concept of fair value in agriculture (in relation to biological assets, especially after 2007, the year of Romania's accession to the EU) (Mateș & Grosu., 2008).

The concept of measuring and recognizing fair value in agriculture has been of interest to many researchers who have developed scientific methods of cumulative measurement (see Figure 2), these models being approached by descriptive statistical methods in an attempt to standardize the application of the concept of fair value to users of accounting information. from agriculture.

1 $$P_{i,t} = \mu_0 + \mu_1 MATCH + \mu_2 BVPS_{i,t} + \mu_3 EPS_{i,t} + \mu_4 MATCH * BVPS_{i,t} + L2\_L3_{i,t} + \varepsilon_t$$

2 $$Ret_{i,t} = \mu_0 + \mu_1 MATCH + \mu_2 NI_{i,t} + \mu_3 \Delta NI_{i,t} + \mu_4 MATCH * NI_{i,t} + L2\_L3_{i,t} + \varepsilon_t$$

Figure 1 – Models for assessing the fair value of biological assets
Source: After Lefter & Roman, 2007

Other authors have developed the fair value measurement based on the goodwill surplus of agricultural firms (Cosmulese, Grosu & Hlaciuc, 2017), after previously the value of the firm was assessed in relation to the risk of monetary rates, cash flow available to managers, and the forecast rate of evolution of the figure of business (Hsu, Liu, Sami & Wan, 2019).

III. METHODOLOGY

Statistically, according to Eurostat data for the EU-27 group, cereal production by main categories reflects, through weighted growth averages, a decrease in cereal production with high gluten content and an increase in cereals with high fiber content, of which in the first place is the rye with an average growth forecast in 2020 compared to the European average for the last 5 years of 18.5%, with the mention that Romania produces annually at most 0.5% of European rye production (see https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/overviews/market-observatories/crops/cereals-statistics_en).

At the opposite pole with a decrease of 11.3% in comparable terms is the production of durum wheat to which Romania also contributes with a share of 0.3% of European production. The most significant crops for Romania in terms of the representation of the European agricultural productive basket are represented by:

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- Soft wheat (about 10% of European production);
- Grain maize (about 30% of European production);
- Sorghum (about 10% of European production);

In total, the cereal production in Romania amounts to 5,406 thousand tons, respectively 10.29% of the total European production, in the amount of 52,553 thousand tons according to Eurostat.

The procedures for recognizing and presenting in the financial statements the values of biological assets involve measuring them at their fair value so as to reflect the aggregate gain or loss for the current period in relation to the initial value and adjusted for changes in fair value. This procedure includes the estimated costs at the points of sale of the biological assets.

Schematically the procedure can be highlighted graphically according to Figure 2.

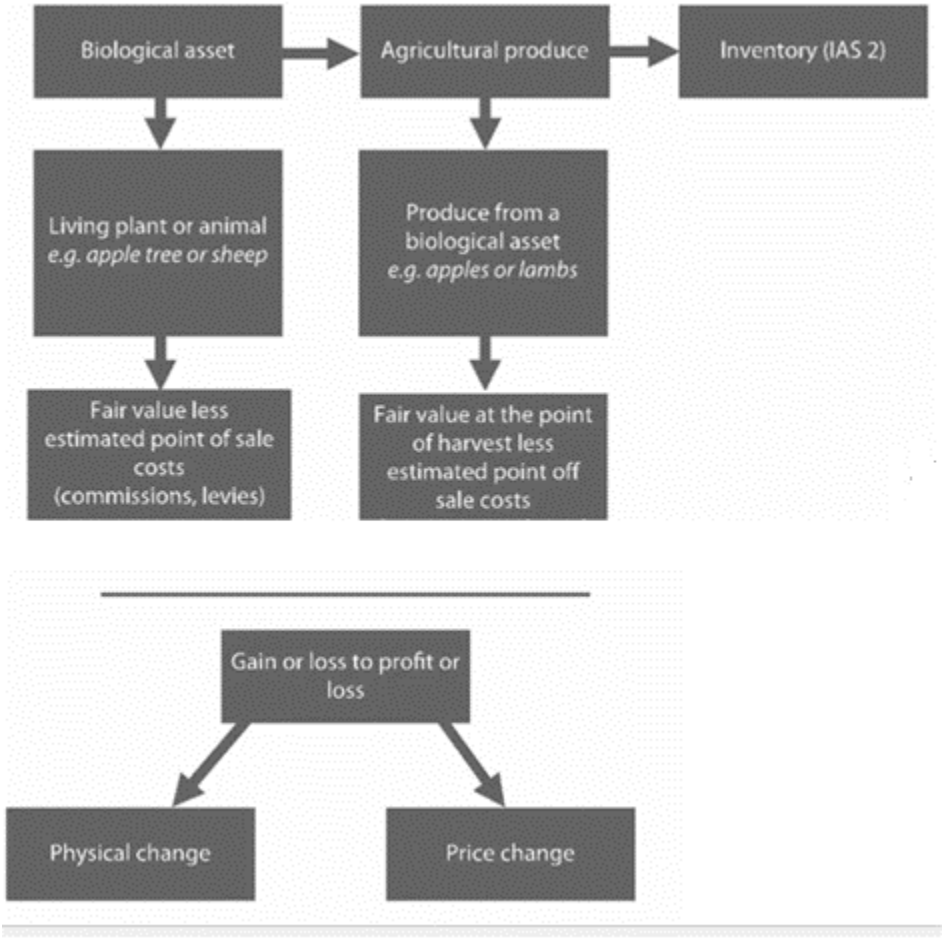

Figure 2 – The procedure for recognizing and presenting in the financial statements the values of biological assets

Source: After IAS 41

Biological asset
Agricultural produce
Inventory (IAS 2)
Living plant or animal *e.g. apple tree or sheep*
Produce from biological asset *e.g. apples or lambs*
Fair value less estimated point of sale costs (commissions, levies)
Fair value at the point of harvest less estimted point pff sale costs
Gain or loss to profit or loss
Physical change
Price change

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The proposed model for recognizing and assessing the fair value of biological assets is based on the reports for the last 5 years made by Romanian economic agents, reports taken over by Eurostat in the section on agricultural statistics. The data were extracted and centralized by the author depending on the type of cereal production made by economic agents (wheat, barley and corn crops).

The statistics of the European Commission (EU cereal farm report based on 2017 FADN data, see https://www.madr.ro/docs/rica/raport-ferme-cereale-RICA2017.pdf.) reflect the dynamics of the agricultural economic agents in Romania by categories of cultivated agricultural products as can be seen in Figure 3.

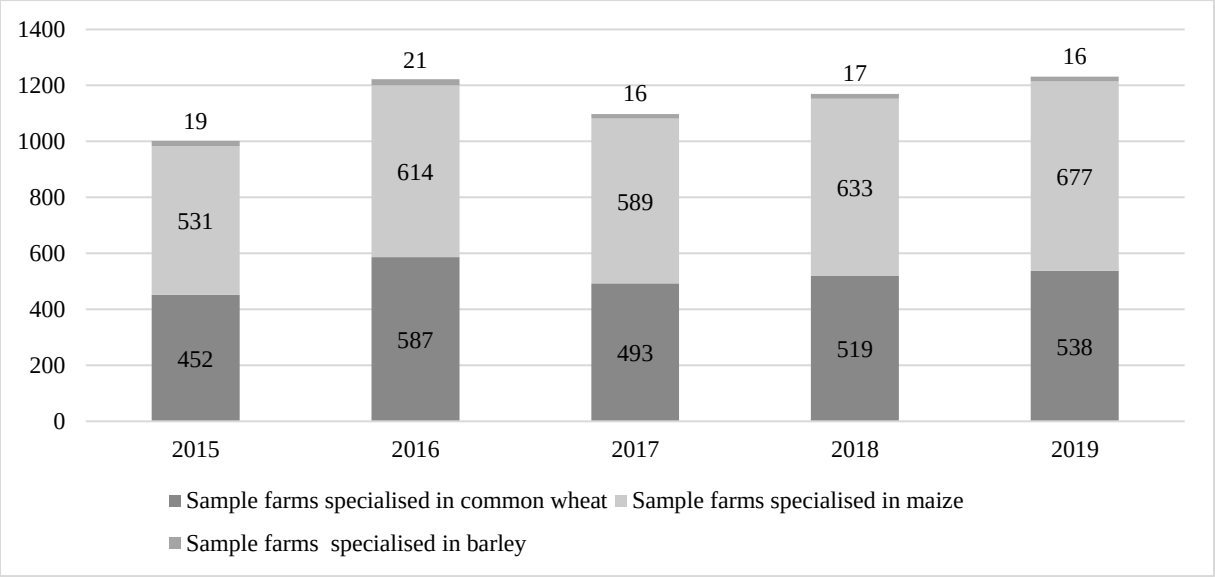

Figure 3 – Dynamics of the agricultural economic agents in Romania by categories of cultivated agricultural products in the period 2015-2019
Source: EU cereal farm report based on 2017 FADN data

At the same time, the global dynamics of economic agents in Romania reflected a decrease in their number in the period 2008-2019 in the field of wheat production and an increase in the number of agricultural holdings producing corn according to the data presented graphically in the figure below:

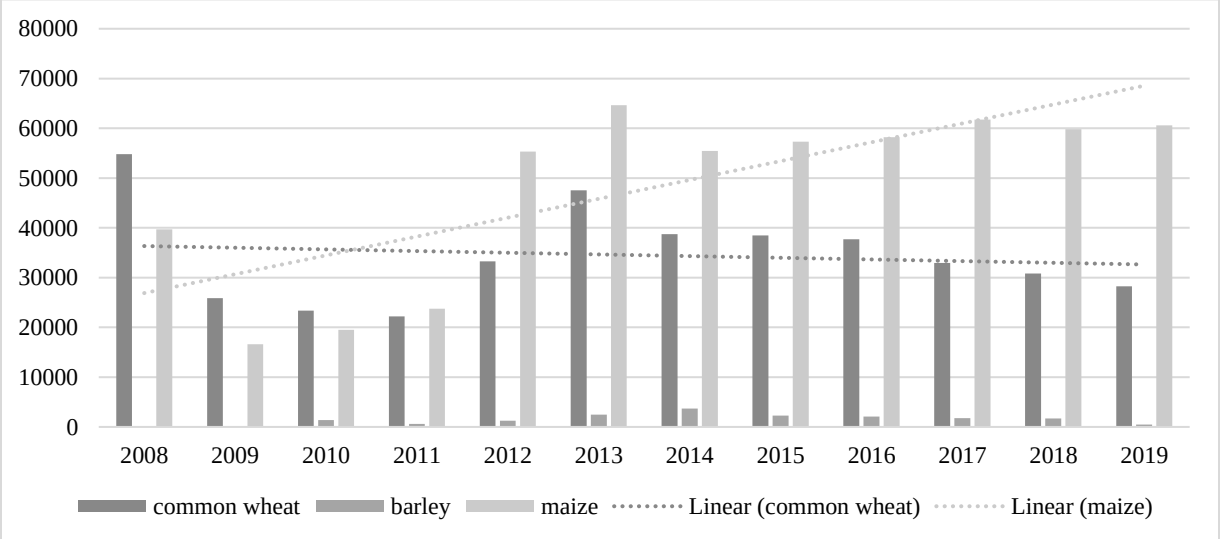

Figure 4 – The global dynamics of economic agents in Romania in the period 2008-2019
Source: EU cereal farm report based on 2017 FADN data

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From the point of view of the utilization rate of agricultural areas for cereals, they had a decreasing trend after the peak period 2009-2011, on the three categories of agricultural products analyzed according to Table 1.

Table 1. The utilization rate of agricultural areas for cereal crops in Romania in the period 2008-2019

Total Utilised Agricult. Area (ha)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
common wheat	48	103	93	87	59	39	40	44	45	41	43	44
barley	0	0	31	67	26	22	14	18	17	20	19	23
maize	18	39	39	44	30	22	21	20	20	18	17	16

Source: European Commission. (2020). Cereals statistics

For the analyzed period 2015-2019 the evolution of the productive yield as the difference between the incomes and the expenses per hectare of the cereal production were situated according to the centralized data by the author between 200 and 400 euros gross value from which are deducted other farm costs, attributed to common wheat production.

Table 2. Productive yield, income and expenditure per hectare of cereal production

Year	**Receipts per hectare common wheat**	**Receipts per hectare barley**	**Receipts per hectare maize**	**Operating costs per hectare common wheat**	**Operating costs per hectare barley**	**Operating costs per hectare maize**	**Productive yield per hectare common wheat**	**Productive yield per hectare barley**	**Productive yield per hectare maize**
2015	625	528	657	380	340	448	245	188	209
2016	661	601	758	396	400	472	265	201	286
2017	707	600	788	366	377	453	341	223	335
2018	825	825	825	502	502	502	323	323	323
2019	864	814	842	446	471	473	418	343	368

Source: European Commission. (2020). Cereals statistics

The level of additional costs from external sources includes the groups of expenditure related to the depreciation of assets, ranging from 50 to 150 euro / ha, human resource costs estimated at about 100 euro / ha and costs related to production credits estimated at 5-7 euro / ha.

IV. RESULTS AND DISCUSSION

The data presented above were centralized by econometric modeling on data pairs, obtaining a statistically significant model, with a significance level of over 67% in the case of corn and up to 98% in the case of peas. The statistical tests are presented as follows:

Table 3. Paired Samples Statistics

		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	Receipts per hectare common wheat	736,45	5	103,864	46,450
	Operating costs per hectare common wheat	417,95	5	55,811	24,959
Pair 2	Receipts per hectare barley	673,51	5	136,381	60,992
	Operating costs per hectare barley	417,93	5	66,932	29,933

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		Mean	N	Std. Deviation	Std. Error Mean
Pair 3	Receipts per hectare maize	773,93	5	73,003	32,648
	Operating costs per hectare maize	469,67	5	21,282	9,518

Source: own processing

It can be seen from Table 3 that the analysis by data pairs highlights the more attractive nature of the higher productivity of maize and wheat crops, for which there are higher amplitudes of the trend series on income and expenditure obtained from agricultural activity in the last 5 years.

Table 4. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Receipts per hectare common wheat & Operating costs per hectare common wheat	5	,794	,109
Pair 2	Receipts per hectare barley & Operating costs per hectare barley	5	,980	,003
Pair 3	Receipts per hectare maize & Operating costs per hectare maize	5	,670	,216

Source: own processing using the software GRETL

The dispersion of results and correlation tests reflect the directly dependent evolution of income from agricultural activity related to pea production, while the independence test reflects a higher resistance of expenditure related to maize production compared to income obtained in the branch, while wheat production proves to be the most balanced of the 3 analyzed.

Table 5. Paired Samples Test

		Paired Differences			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference
					Lower
Pair 1	Receipts per hectare common wheat - Operating costs per hectare common wheat	318,492	68,526	30,646	233,406
Pair 2	Receipts per hectare barley - Operating costs per hectare barley	255,579	72,070	32,231	166,091
Pair 3	Receipts per hectare maize - Operating costs per hectare maize	304,258	60,836	27,207	228,720

Source: own processing using the software GRETL

The gross productive yields that can be, in the author's opinion, the basis for establishing the fair value of the stocks of biological assets are between 166 euro / ha in the case of pea production and 233 euro / ha in the case of wheat production. At the same time, the approximation through statistical modeling on a series of trends between the values of wheat and maize productive yields is indicated, which indicates that the average correlation between income and expenditure allows the agricultural producer to reach the level of performance that ultimately guarantees business viability.

V. CONCLUSION

The normative provisions regarding the recognition, evaluation and accounting treatment applied to biological assets lead to the adoption of a prudential conduct by managers who, in addition to direct expenses, face the increase of indirect expenses, as they were identified in the methodology chapter, namely asset depreciation. human resources and costs related to production appropriations. The estimated unit values (euro/ha) of indirect costs were estimated by the author based on specialized studies published by the European Commission.

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IAS 41 is a significant reference for agricultural agents containing the financial customs necessary to ensure good transparency and economic competitiveness of the entity in its relations with business partners and tax bodies, ensuring by applying recommendations, the establishment of good practices in the accounting of economic agents. and certification of the quality of financial statements.

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