BIOLOGICAL ASSETS: IMPACT OF MEASUREMENT ON FINANCIAL POSITION AND PERFORMANCE OF SMES

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ABSTRACT
The paper focuses on the possible ways of biological assets measurement in financial reporting of SMEs. According to IFRS for SMEs, the entity uses the fair value model for biological assets with readily determinable fair values, and the cost model for all other biological assets. The nature of all kinds of biological assets differs significantly, especially that of bearer plants and living animals. The authors evaluated the application of the above-mentioned methods to the representatives of both kinds of biological assets (an apple orchard and dairy cows). According to the study the way of biological assets measurement affects the financial position and performance of SMEs involved in the agricultural sector. The cost model is a more suitable way of measurement for bearer plants reporting, while the fair value measurement is more suitable for living animals in respect to fundamental principles of financial reporting.

KEY WORDS
Biological assets, bearer plants, livestock, IFRS for SMEs, agricultural reporting.

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Introduction

A significant proportion of all business entities is represented by small and medium-sized companies (SMEs). SMEs are considered as a key factor of economic growth and employment in economies. They are socially and economically important and represent 99% of all enterprises in the EU. Their activities on the international markets are limited by a great deal of obstacles in comparison to listed companies.

SMEs represent a very heterogeneous group of business entities. This group includes both companies which are dynamic, innovative, and growth-oriented and those, which are satisfied with their position. SMEs are often categorized according to the number of employees, by the value of their assets and their turnover as mid-sized, small and micro entities. Size categorization varies within regions and across the countries in relation to the size of the economy. Despite all the differences, many SMEs have a similar activity regardless of the country in which they

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operate. For example, in the UK, the majority of SMEs operate in the field of agriculture, trade and industry, in South Africa in personal and social services, financial services, real estate, trade, and agriculture, and in Kenya in farming (ACCA 2000).

Different national financial reporting and tax systems can be considered as the most important obstacles (European Commission 2003). Due to this fact, the International Accounting Standards Board was authorized to develop internationally acceptable accounting standards for companies which are not obliged to prepare financial statements in accordance with the IAS/IFRS, and the final version of the International Financial Reporting Standard designed for use by small and medium-sized entities (IFRS for SMEs) was published on July the 9th, 2009.

The IFRS for SMEs is a self-contained standard of about 230 pages tailored to the needs and capabilities of smaller businesses. This standard could be a suitable instrument for SME financial reporting harmonization. The IFRS for SME is aimed at millions of companies. The aim of the standard is to provide a simplified, self-contained set of standards. According to Deloitte (2013), this standard was meant to provide simplifications to the requirements in full IFRSs that reflect the needs of users of SME financial statements and cost-benefit considerations. It is less complex, no relevant topics are omitted, accounting policy choices are reduced, requirements in full IFRSs are simplified and disclosures are reduced.

Agriculture is one of the most common scopes of business of SMEs. The nature of agricultural activities significantly differs from other business activities and it demands a different way of reporting. Agriculture is a kind of activity which combines labor, land, animals, plants, solar energy to provide food and raw material. It has been associated with production of essential food. It includes farming, forestry, dairy, fruit cultivation, poultry or bee keeping. The common financial reporting treatments do not reflect the biological character of agricultural business. Despite the fact that there is Section 34 of IFRS for SMEs concerning agricultural reporting, the treatment concerning the biological assets accounting is very brief and ambiguous.

1. Aim and methodology

The paper is focusing on the proposal of treatment concerning agricultural reporting in Section 34 of IFRS for SMEs. The aim of this paper is to decide which way of biological assets measurement and reporting is in accordance with the true and fair view principle, eliminates ambiguity, and is in accord with the basic principles of IFRS for SME (simplicity, cost of reporting reduction with respect to differences between biological assets in the form of plants and living animals for financial reporting of SMEs.

The paper is divided into three parts. Firstly, within the theoretical framework the possible ways of biological assets reporting are considered. The second part is a comparative analysis of strengths and weaknesses of possible ways of biological assets reporting. The above mentioned parts of the paper served as the basis for the third part – original research in which the authors concentrated on the special nature of biological assets and the possible ways of SMEs biological assets measurement and reporting and their impact on financial position and financial performance of the entity. The changes on the balance sheet are used for impact on financial position evaluation and the chang-

es on the income statement for financial performance evaluation.

2. Possible ways to biological assets reporting

Despite the significant role of agriculture in the global economy, accounting standard setters such as International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) have paid only a little attention to accounting for agricultural activities. The IASC predecessor of IASB added an issue of agriculture to its agenda in 1994. The final IAS 41 – Agriculture was issued in December 2000. The model of fair value for agricultural assets and produce measurement was introduced in this standard. It was a significant change to a prior way of measurement based on a historical cost basis. Fair value measurement in comparison to a historical cost model reflects the biological transformation process and the increase in value during the production cycle due to the special biological nature of transformation. There are significant differences in the nature of individual biological assets and produce. The only way to measure and present all kinds of biological assets seems not to be appropriate and difficult to use. This idea was confirmed by amendments to IAS 16 and IAS 41 published by IASB in 2013.

In 1999 E 65 – Agriculture was issued for comments. This Exposure Draft (ED) was based on a different approach to agricultural assets measurement and agricultural activity reporting in comparison to the previous ways of agricultural activity reporting.

According to Elad (2004), IAS 41 represents the most comprehensive and far-reaching departure from historical cost. He considered IAS 41 as highly controversial, not only because it prescribes a full-fledged fair value accounting model for agricultural entities, but the departure from historical cost accounting is very radical and poses a broad range of theoretical and practical problems which affect its adoption across the world. Fair value measurement is based on a presumption that fair value is determinable for all biological assets. In spite of the fact that an active market for biological assets does not exist, the most recent market transaction price can be used for a fair value determination. Historical cost less accumulated impairment losses is permitted in cases when fair values cannot be determined reliably.

Fair value measurement for all kinds of biological assets in all stages of growth has been criticized since E 65 – Agriculture was issued. According to Amen (2000), there is no difference between biological assets and other assets like machinery from a theoretical point of view. Therefore, biological assets have to be measured in the same manner as property, plant and equipment. Amen (2000) supposed that biological assets and agricultural produce may be measured at fair value if an active market exists and at costs otherwise. CIMA (2000) did not consider biological assets sufficiently different from other types of asset to justify this unique approach, particularly when there are also many practical difficulties in relating market values (which are quoted in a standard form) to immature crops or livestock. Biological assets as any other assets would be measured and valued according to the established principle, the lower of cost or realizable value. In Hoffman et al. (2000), comment on E65 the determination of fair values for biological assets is often very unreliable.

On the other hand, there were many proponents of fair value measurements in

agriculture – e.g. ICCA, IFAC or the Danish Accounting Standards Committee. In the agricultural sector, measurement at cost would normally be difficult and misleading. This is due to the fact that historical cost as a measurement basis does not take into consideration the value added by biological transformation.

Lot of information users has been skeptical about the use of fair value in agriculture since the IAS 41 publication. Fair value measurement was considered to be too academic, and to be an inappropriate method of measurement for biological assets according to Herbohn (2006). The requirements of IAS 41 were neither theoretically nor practically compatible with most accounting models.

During the application of IAS 41 to agricultural activities reporting some problems arose. The most significant problem was that IAS 41 generalized fair value assessment for all biological assets although not all of these assets were designated for capital appreciation or sale, which led to misleading information (Aryanto 2011). In addition, according to Elad and Herbohn (2011) there were several models to determine fair value. The use of different assessment models could lead to differences in earnings quantity in the agricultural sector internationally, and according to accounting practitioners IAS 41 demanded a lot of extra work and it was hard to establish fair value (Burnside, Schiller 2005; Elad, Herbohn 2011). The extra costs were incurred and practical difficulties arose in fair value measurements of biological assets in the case of absence of markets for these assets. Argilés and Slof (2001) also pointed out the difference between the importance of accounting and the low level of accounting practice in the agricultural sector. Argilés et al. (2012) conducted an empirical study comparing Spanish farms using historical cost and respective fair value in measuring biological assets, finding no significant differences in relation to assessing future cash flows.

According to IAS 41, biological assets include, for example sheep, pigs, beef cattle, poultry, fish, dairy cows, trees or plants for harvest. Diversity in accounting treatment of agricultural activity is based on the special nature of this activity which creates uncertainty or conflicts when traditional accounting methods are applied, because of biological transformation and difficulty connected with its recording using a traditional model based on historical cost. Biological assets differ from non-living assets because they change biological form over their lives through growth, degeneration, production or procreation, resulting in changes in future economic benefits. On the other hand, not all biological assets are of the same character; there are some kinds of biological assets that are similar to long-term assets like equipment during their period of growth and fertility.

The prevailing opinion on some kinds of mature bearer biological plants (fruit trees, oil palms or rubber trees) is that they are very similar to other long-term tangible assets such as property, plant and equipment. The main reason is that these assets are mature, and are a means of growing agricultural produce over several reporting periods until they are scrapped at the end of their useful lives. Also Damian et al. (2014) considered a single accounting treatment for both bearer and consumable biological assets as inappropriate, especially a fair value measurement for mature bearer biological assets, which are no longer undergoing through biological transformation. This triggered the view that this operation is rather similar to that of manufacturing and should, therefore,

be accounted for like property, plant and equipment, under IAS 16, thereby permitting use of a cost model.

The Amendments to IAS 16 and IAS 41: Bearer Plants extend the scope of IAS 16 to bearer plants, but not to the produce of these plants. They were issued on 30 June 2014, and they are effective from January 1st, 2016. The amendments bring the bearer plants, which are used solely to bring the produce, into the scope of IAS 16- Property, Plant and Equipment, so they are treated in the same way. The measurement of bearer plants at recognition is based on the same principle as the measurement of other self-constructed assets reported according to IAS 16. The measurement after recognition allows the use of a cost or revaluation model. The scope of IAS 16 is extended only to bearer plants, not to livestock.

Due to the fact that the IFRS for SMEs is primarily meant to make simplifications to the requirements in full IFRSs that reflect the needs of users of SME financial statements and cost-benefit considerations, there are simplifications in Section 34 – Specialized Activities for Agricultural Reporting. According to Section 34 – Specialized Activities, the entity uses the fair value model for those biological assets for which fair value is readily determinable without undue cost or effort and the cost model for all other biological assets. Agricultural produce that is harvested from an entity's biological assets is measured at its fair value less costs to sell at the point of harvest.

This treatment concerning the biological assets accounting is very brief and ambiguous. Historical cost less accumulated impairment losses is permitted in the cases when fair values cannot be determined reliably. The final choice of the accounting policy is significantly affected by the policies used under national GAAP and is left to the discretion of the business entity. The fact that more possible methods of measurement of biological assets are in conformity with the IFRS for SMEs constitutes an impediment to comparability of financial information on biological assets across countries.

3. Proposal of biological assets reporting for SMEs

The paper focuses on the possibility of accounting for bearer assets by SMEs in order to increase the comparability of financial statements, and at the same time to ensure as far as possible consistency with the practice of full IFRS upon the adoption of Amendments to IAS 16 and 41. The main objective is to assess the possibility of development of similar treatments for accounting for biological assets in general, i.e., both plants and animals as in full IFRS while preserving the main principle of the IFRS for SMEs (preparation of financial statements without undue cost or effort).

Assuming the nature of biological transformation of bearer assets in the form of bearer plants and animals bred in order to give milk, wool, eggs, there are similar cycles which are characterized in the early stages by costs without benefits in the form of biological production (fruits, milk, wine grapes, etc.). This phase could be considered similar to the self-construction of fixed assets. The usefulness of information about the fair value of a bearer asset could be discussed. The impact of an increase or decrease in the fair value of a bearer asset in the income statement could distort the performance of a business entity. The other issues connected with fair value measurement are the level of incidental expenses spent on obtaining this information and the way of determination of fair value in the case of assets for

which no market exists (fruit trees, vineyards, sugarcane, bamboo, etc.).

Assuming the nature of biological transformation in the case of bearer assets, there are similar cycles in which there are in the early stages costs without making associated benefits in the form of biological production (fruits, wine grapes, milk, wool etc.). This phase could be considered similar to the self-construction of fixed assets, where the life cycle and accounting methodology could be divided into the procurement phase, the use phase and the phase of decommissioning. In the case of bearer assets the life cycle could be divided into similar stages (a period of growth, a period of fertility and gradual reduction in production capabilities, and death).

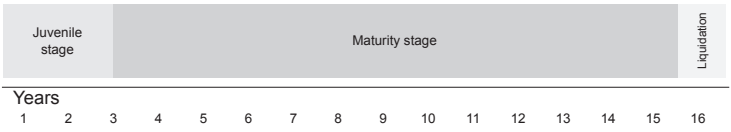
The period of growth is similar to the phase of acquisition; in the case of bearer plants, it is the time from planting the tree till the onset of economically important fertility. The period of full fertility and growth is characterized by the decreasing intensity of the growth of the vegetative parts. Fertility of bearer plants is almost regular. This stage is similar to the use phase of fixed assets. During this stage, the bearer asset should be depreciated. The determination of the fair value of bearer plants is greatly influenced by the fact that there is no active market for bearer plants due to their connection with the place where they are grown and it is not possible to move them and trade them separately from the relevant land.

Bearer biological assets in the form of living animals (dairy cows, sheep bred for wool, laying hens) differ from bearer plants. There is usually an active market for livestock – that means the determination of fair value is not as problematic as in the case of bearer plants. Livestock can be moved and thus easier to trade. A higher residual value at the end of the life cycle and lower disposal costs are typical. There is a significantly shorter lifespan for bearer animals (dairy cattle, sheep for wool and milk, laying hens). The fair value information is appropriate during the whole life cycle of livestock.

A comparison of cost and fair value measurements is made for bearer plants and living animals. An apple orchard and dairy cows are selected as representatives. Empirical data are used for processing. The data in the form of Situational and Forward-Looking Reports (Fruits, Milk, Meat (Situační a výhledová zpráva – ovoce, mléko, maso) and reports concerning cost efficiency presented by the Institute of Agricultural Economics and Information are used.

In the case of the apple orchard, the most common variety of apples (Golden Delicious) is considered (dwarf trees in intensive planting with an average yield during the useful life of 13 years, and three years to reach full fertility). The life cycle of an apple orchard is described in Figure 1. The DCF is used for FV measurement.

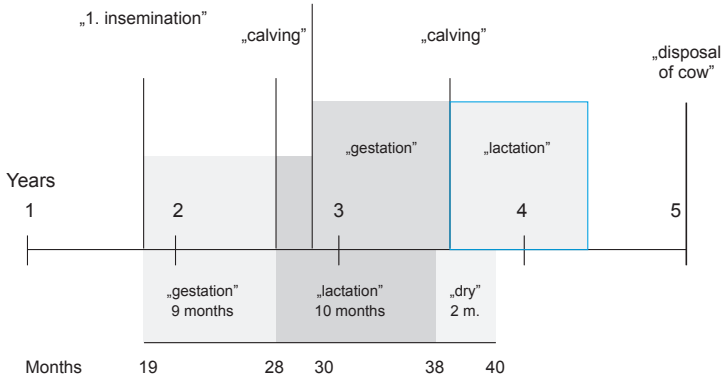
Figure 1.Life cycle of an apple orchard



Source: own elaboration.

In the case of dairy cows, the most common breed of dairy cattle in the Czech Republic (Holstein Friesian) is involved. All the information is related to one cow as part of a small group consisting of twenty cows. The average age of 14-15 months is considered as an age of conception. Five years is supposed an average length of useful life, weight at slaughter of 660 kg is considered for quantification. The information is based on a survey by Bouška (2006). Typical life cycle of a dairy cow is illustrated in Figure 2.

Figure 2. Life cycle of a dairy cow



Source: own elaboration.

Risk, uncertainty, and year on year changes in climate conditions are taken into consideration in the determination of the fair value of biological assets.

Changes in fair value and carrying amount of bearer plants during the useful life of bearer plants are presented in the Table 1. We calculated the fair value of an apple orchard using information of the Institute of Agricultural Economics and Information using sliding averages.

Table 1. Changes in fair value and carrying amount during the useful life (bearer plants)

Year	Fair value	Change in fair value	Carrying amount	Loss/Gain	Depreciation
1	878 988	- 72 694	415 385	72 694	34 615
2	806 294	- 80 523	380 769	80 523	34 615
3	725 771	- 84 617	346 154	84 617	34 615
4	641 154	- 84 505	311 538	84 505	34 615
5	556 649	- 83 933	276 923	83 933	34 615
6	472 716	- 86 625	242 308	86 625	34 615
7	386 091	- 79 754	207 692	79 754	34 615
8	306 337	- 62 625	173 077	62 625	34 615
9	243 712	- 58 263	138 462	58 263	34 615
10	185 449	- 53 852	103 846	53 852	34 615
11	131 597	- 50 203	69 231	50 203	34 615
12	81 394	- 40 286	34 615	40 286	34 615
13	41 107	- 41 107	- 0	41 107	34 615

Source: own elaboration.

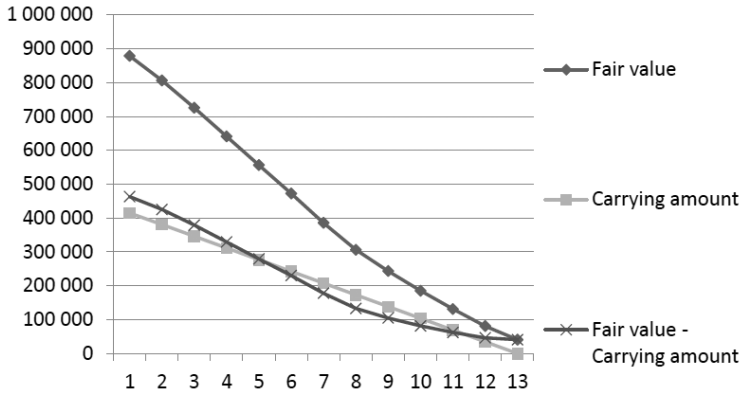
Table 2 compares the possible ways of measurement and reporting of bearer plants during their useful life according to Section 34 of IFRS for SMEs and amendments to IAS 16 and 41 – Bearer Plants.

Table 2. Comparison of bearer plants reporting during their life cycle

	Recording	Fair value model	Cost model
Bearer Plants reporting at the beginning of fertility	Bearer Plants/Cash (Costs incurred until fertility)		415,385
	Bearer Plants/Cash (FV based on DCF) Cash/Gain	878,988	
Change in Fair Value at the end of the reporting period after 1.year (based on DCF calculation)	Loss/Bearer Plants	72,694	
Depreciation during useful life (13 years straight-line, no residual value is supposed)	Depreciation costs/Acc. depreciation to Bearer Plants		34,615
Other regular cost connected with bearer plants (cultivation) – approximately 100,000 CZK	Expenses/Cash	100,000	100,000
Produce of Bearer Plants (fair value) approximately 137,000, cost to sell 2,000	Inventories/Gain	135,000	135,000
Sale of produce	Expenses/Inventories Cash/Revenues Cost of sale/Cash	135,000 137,000 2,000	135,000 137,000 2,000
Net impact on profit or loss	Gains and Revenues Expenses Impact on P/L	272,000 309,694 -37,694	272,000 271,615 385

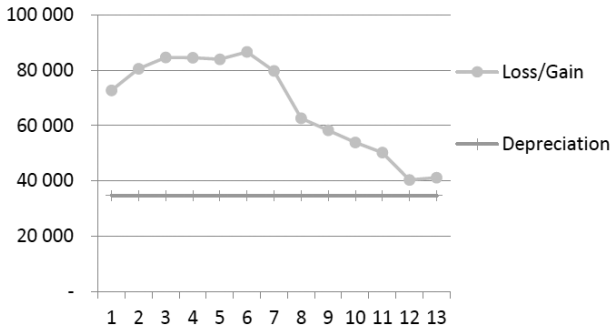
Source: own elaboration.

Figure 3. Comparison of fair value and carrying amount models



Source: own elaboration.

Figure 4. Income statement items structure



Source: own elaboration.

As it is evident from the Table 1 and the Figures 3 and 4, due to the fair value measurement, the bearer plants are reported at a higher value, compared to the cost measurement. It could mean that the bearer plants are overestimated, especially in the early years of useful life despite the fact that the bearer plants could not be traded separately from land. Measurement based on DCF is significantly influenced by estimation and the attitude to uncertainty. There is volatility of the fair value of bearer assets produce due to volatility in the market price, volatility in yield per hectare and influence of climatic conditions (rainfall, spring frosts) and the incidence of diseases and pests. These factors should be taken into account when estimating the fair value, but the reality may be quite different. In contrast, the cost model takes into account the level of costs incurred by the entity on acquiring the relevant bearer plant and allows recognition of these costs over the useful life of the bearer plants. As seen from the data and the Figures 3 and 4, the balance sheet total is significantly higher using the fair value measurement of bearer plants, especially in the initial phases of their useful life. It is in an accord with the initial analysis of potential impacts of implementation of new amendments to IAS 16 and IAS 41 on four listed plantation companies in Singapore (Fang 2015). The initial impact on financial position and company performance was evaluated and the conclusions were as follows:

– significant decrease in value due to changes in measurement (write downs) and appropriate decrease in shareholders' equity,
– change in cost structure – increase in depreciation cost (depreciation of mature plants).

The most significant impact is in the initial phases; during useful life the differences decrease and at the end of useful life they are insignificant.

Changes in fair value and carrying amount of living animals during their useful life are presented in the Table 3. We calculated the fair value of dairy cow using information of the Institute of Agricultural Economics and Information. Selling costs are not taken into account. Estimation of fair value of a new born calf is based on methodology of Kopeček (2012).

Table 3. Changes in fair value and carrying amount during the useful life of living animals

Month	Weight (kg)	Weight gain (kg)	Fair value per kg (CZK)	Fair value per pc (CZK)	Change in Fair value (CZK)	Carrying Amount	Change in CA
0	38	38	65	2,280	2,280	2,280	0
10 days	45	45	52	2,340	60		
10 days-6	200	155	55	11,000	8,660	11,290	9,010
6-15	480	280	46,80	22,434	11,434		
24 before calving		Not relevant	Not relevant	27,000	4,566	36,040	24,750
24 after calving	560		35	19,600	-7,400 + value of new born calf 2,280 + milking	36,040	
36	610		35	21,350	1,750	30,187	-5,853
48	635		28	17,780	-3,570	24,334	-5,853
60	660		28	18,480	700	18,480	-5,854

Source: own elaboration.

Table 4 compares the possible ways of measurement and reporting of bearer plants during their useful life according to Section 34 of IFRS for SMEs and amendments to IAS 16 and 41 applied to living animals. The estimated average milk production per pc and year is7,400 l, the sale price is 8.30 CZK/l – Situational and forward-looking report – milk – Institute of Agricultural Economics and Information (2012-2014).

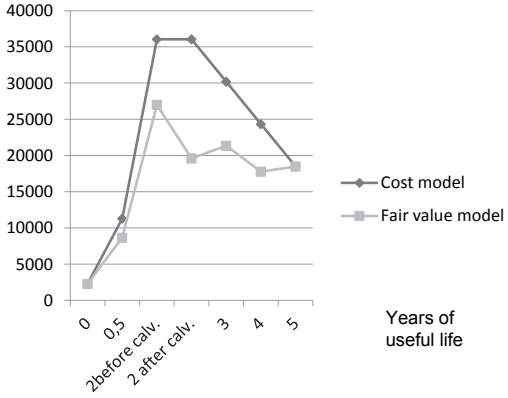
Table 4. Comparison of living animals reporting during the life cycle

Item	Recording	Fair value model	Cost model
Initial recognition of living animals (purchase), estimated cost to sell 340 CZK	Living Animals/Cash Loss/Cash	2,000 340	2,340
Initial recognition of new born animals (own production), estimated cost to sell 340 CZK	Living Animals/Gain	2,000	2,340
Direct cost incurred on animals till full fertility (approximately 36,000 CZK based on feeding days)	Living Animals/Cash Expenses/Cash	36,000	36,000
Increase in Fair Value (25,000), sale price 27,000 is expected based on Institute of Agricultural Economics and Information 2012-14)	Living Animals/Gain	25,000	
Depreciation per year during useful life (3 years straight-line, residual value of 18,000 is supposed – Estimated Revenues at the end the useful life: 660kg * 28 = 18,480 CZK, Depreciable amount: 36,040 -18,480 = 17,560 CZK	Depreciation costs/Acc. Depreciation to Living Animals		8,000
Increase or decrease in fair value	Living Animals/Gain, Loss/ Living Animals	1,750	
Recognition of a new born calf (fair value)	Inventories/Gain	2,000	2,000
Produce of milk per year	Inventories/Gain	61,420	61,420
Average cost per feeding day 160 CZK x 365 = 58,400 CZK	Expenses/Cash	58,400	58,400

Sale of produce	Expenses/Inventories Cash/Revenues	61,420 61,420	61,420 61,420
Net impact on profit or loss per year during the useful life	Gains and Revenues Expenses Impact on P/L	65,170 58,400 6,770	63,420 66,400 -2,980

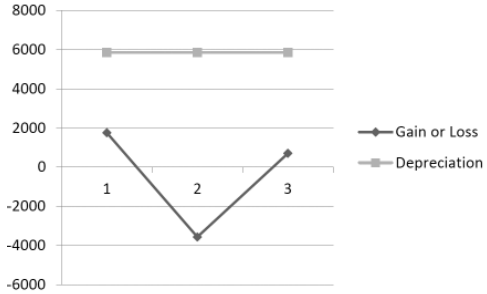
Source: own elaboration.

Figure 5. Comparison of fair value and carrying amount models



Source: own elaboration.

Figure 6. Income statement items structure



Source: own elaboration.

If living animals are bred for other products than meat – bearer animals, the situation differs from bearer plants. This is due to the fact that the information on fair value is available immediately, and without any additional effort and cost, and animals are ready for sale instantly. The application of the fair value measurement is suitable. The residual value at the end of useful life is relatively high for living animals. Financial information users could exploit this information for their decision making. On the other hand, the information on cost concerning living animals until reaching productivity is relatively difficult to obtain. The information is based on the calculation of internal cost per feeding day for each category, the calculation of internal cost of a new born an-

imal in the case of their own reproduction. This information is not necessary to present to external users. The comparison of the fair value model and the cost model for living animals reporting shows that the fair value model seems to be more accurate.

As evident from the Tables 3 and 4 as well as Figures 5 and 6, the situation of living animals differs. There is no significant difference in measurement in fair value and in cost in the early stages of the useful life of living animals. Moreover, in the case of fair value measurement, the value is lower than the value when the cost measurement is applied.

Conclusions

According to the above-mentioned possible characteristic features of individual groups of bearer biological assets, it is not reasonable to use only one accounting treatment for all kinds of biological assets. If the accounting treatments for biological assets reporting are effective in full IFRS, SMEs could report biological assets in a similar way as listed companies because no additional cost is incurred. In the case of bearer plants, the information of fair value is not important for external users. The effort and cost of obtaining this information would exceed the benefit, thus the cost model is appropriate. In the case of livestock the fair value information is important for external users, especially the special kind of biological transformation – growth and weight increase. The cost of fair value obtaining is relatively low. The fair value model (fair value less cost of selling) is an appropriate way for livestock measurement.

The issue of agriculture assets measurement was the main reason for research by the authors in the area. The main aim was to eliminate ambiguity in practical application of some requirements set by the standard when respecting specifics of agricultural produce and basic principles of preparation of financial statements.

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