The methods of valuation in agricultural accounting

Metody oceňování v zemědělském účetnictví

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Abstract: This paper deals with the valuation of the biological assets and agricultural production. There are analyzed two approaches: Czech and international. The International Accounting Standards are emulative of more authentic presentment of economic processes in agricultural activities than Czech accounting legislation. From the comparison the both approaches accrued some differences, which can influent the financial statements of enterprises. The causation of main difference appears an application of fair value, which is prescribed for biological assets and agricultural production in international accounting standards. In international accounting standards is preferred principle of fair and true view, while in Czech accounting is preferred prudence principle.

Key words: biological assets, agricultural production, recognition of assets, methods of valuation, accounting procedure, fair value, historical cost, impairment, cost model, fair value model

Abstrakt: Příspěvek se zabývá metodami oceňování biologických aktiv a zemědělské produkce. Jsou analyzovány dva přístupy k vykazování a oceňování: český a mezinárodní. Mezinárodní účetní standardy se snaží o věrnější zobrazení ekonomických dějů v zemědělských činnostech než česká účetní legislativa. Z porovnání obou přístupů vyplynuly rozdíly, které mohou ovlivnit účetní výkazy sestavované podniky. Největší rozdíly ve vykazování finanční situace a výkonnosti podniků jsou způsobeny použitím modelu reálné hodnoty, který je pro oceňování biologických aktiv a zemědělské produkce vyžadován mezinárodními účetními standardy. Mezinárodní přístup tak dává přednost principu věrného a poctivého zobrazení skutečnosti v účetnictví, zatímco české účetnictví upřednostňuje zásadu opatrnosti.

Klíčová slova: biologická aktiva, zemědělská produkce, uznávání aktiv, oceňovací metody, postupy účtování, reálná hodnota, historická cena, znehodnocení, nákladový model, model reálné hodnoty

In general, the main objective of accounting is giving information useful for economic decisions. The accounting model, which is capable of generating this information, is in most cases based on the enterprise's ability to reproduce historical costs as well as on the concept of maintaining the nominally expressed financial capital. Information from accounting is usually presented in an aggregated form – in the financial statements, which apprise the user of the financial situation of the company, its effectiveness and capital links (Belkaoui 1992). It is designated mainly to external users, who have a certain relation to the firm, such as the owners and the potential investors, creditors (banks and non-financial corporate bodies and natural persons), business partners (suppliers and customers), stock markets, countries, regions and public. It can be helpful even to the management (respectively to other employees), though the information source for internal needs of management are the personal information systems of the company, e.g. the managerial accounting (Edwards and Bell 1973).

For the purposes of fulfilling this fundamental mission, the accounting created its own philosophy (in the form of the generally accepted accounting prerequisites, principles and policies), methods and techniques (in the form of accounting standards). Unlike in the Anglo-Saxon countries, in the Czech Republic these principles and rules are legally codified (in the form of the Accounting Act, executive directives and the Czech accounting standards) and their breach leading to the violation of the main

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principle (i.e. the principle of fair and true view) is legally pursuable and fined. The accountancy is regulated by the accounting legislation in all economic sectors, including the agricultural accounting, if the enterprises became an accounting entity[1].

In comparison with other economic branches, the agricultural activity is characterized by specific activities that require the appropriate accounting attitudes. Accounting legislation does not provide the necessary accounting solutions to agricultural activities, not even the financial statements compilation processes and publication of accounting information. It regards the controlled breeding of live animals' or plants' biological transformation (biological assets) designated to sales, agricultural production or creation of another biological assets. This assets transformation runs under the conditions of a raised risk caused by the natural processes that are mostly too difficult to be fully controlled by the humans. Besides climatic conditions, another specific factor is the risk of animals' and plants' infection by pests and diseases. The seasonal character of agricultural activities is also connected with the biological character of the production. It causes non-uniform cash inflows during the business year and the employment fluctuations as well. The biological assets transformation is conditioned by the continuous production and thus restricts the possibility of flexible reaction to the market demand. Agricultural activities are typical by the combined production that generates several products depending on the physical and chemical nature of the process, which makes their reliable valuation difficult. The valuation risk is deepened by the two-way linking of the plant and animal production processes in the course of the chargeable costs assessment concerning the main product transfer and the by-products transfer into the accounting unit.

The aforementioned risks, resulting from the base of the agricultural activity itself, cause obscurities and disputes in using the traditional accounting models (Kovanicová 2003). Models based on historical costs and the realization principle can only with difficulties cope with the critical moments connected to biological transformation like the growth and degeneration, production and reproduction which change the nature of biological assets. Therefore, all over the world, people look for the approaches that would make it possible to furnish the reliable information about economic processes of agricultural enterprises based on reliable and broadly accepted accounting principles (Dietrich et al. 2000). The aim is finding an outright determination of three fundamental agricultural accounting problems:

– asset or liability posting (its acknowledgement in accounting, recognition, identification),
– asset or liability valuation,
– reporting and publication.

A certain solution of these three problems is offered in the newly accepted international agricultural accounting standard IAS 41 (International Accounting Standard).[2] International standards are worldwide accepted accounting rules published as recommendations for the particular countries and their acceptance is non-committal. In the Czech Republic, there is an obligation of financial statements presentation and the annual report publication according to the International Accounting Standards adapted in accordance with European Communities law only for companies that issue securities registered at a regulated market in the EU member states.

Just the valuation models analysis in accordance with the Czech and supranational regulation (IFRS 2005) as one of the agricultural accounting key problems, together with their comparison, including the assessment of possibilities of their use in the Czech conditions, is the point of this paper.

MATERIAL AND METHODS

The subjects of the analysis are the valuation bases defined partly in the Czech accounting legislation[3] and partly in the international standards (Svoboda 2007). More detailed procedures of the assets and liabilities valuation are included in the internal directives of a particular company, e.g. matching of an asset (a liability) type to the particular valuation model, the components of an asset or liability valuation, the valuation point, respectively test point. For the purposes of valuation, there is a possibility to use the

[1]Following the Accounting Act, the accounting entities are all corporations and also those natural persons, who reached the limit of 25 million CZK regarding their turnover during the elapsed fiscal period.

[2]Standards are issued by a private institution, founded in 1973 based in London, called The International Accounting Standards Committee, whose members are **the noted professional organizations of accountants and auditors from** countries all over the world. International stock exchanges, financial, business and legal organizations, banks etc. are their supervisors.

[3]Act No. 563/1991 Coll., on Accounting and Executive Directive No. 500/2002 Coll., valid for businessmen charging in the double-entry bookkeeping system.

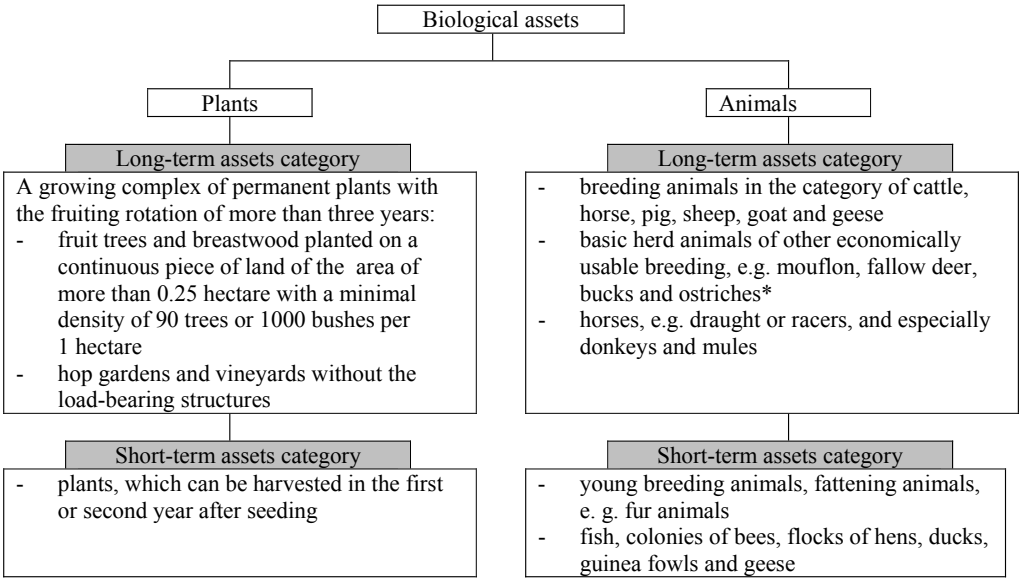

Figure 1. Biological assets classification scheme

*Depending on the decision of the company management

agricultural assets classification, according to their presenting in the company balance sheet, for plants and animals as well. The biological assets classification is schematically demonstrated in Figure 1. Animals and plants are further subdivided, in the same way as other enterprise assets, according to the lifetime, into long-term and short-term ones. The long-term ones are defined as assets utilised by the company for the duration of more than one year.

In order to place a biological asset on account and to put it into the company's balance sheet, it must satisfy the conditions as follows:

(a) there is a reasonable certainty that the asset will bring an economic profit in the future, which will flow into the enterprise,
(b) the right to manage and control this profit (the ability to prevent other subjects from draining the profit for themselves) was given to the company on account of a previous transaction or an event,
(c) the purchase price of this asset can be reliably set.

The above-mentioned criteria for the account 'recognition' of a biological asset must be screened in the course of its use, especially as far as its ability to create the economic benefit is concerned, as well as its value in accounting must be adjusted proportionally to the losses of this ability (Meigs and Meigs 1992).

Following the realization principle, the asset recognition (identification) is done at the moment of its purchase, its changes within the asset use and its discarding (Fess and Warren 1987). The bookkeeping in the literal sense is then realized on an accrual principle basis, i.e. the costs and revenues matched to the asset are charged in the period, with which it is objectively and timely related with, regardless of the cash flow.

The future profit can be commonly assessed by the valuation of the substantial physical characteristics of biological assets. In terms of the agricultural activity, the asset control can be proved for instance as a proprietary right to cattle by calibration or in a different way of cattle marking at its purchase, birth or discard.

In terms of time, the biological assets valuation issue must be considered in two instants:

1. at the moment of the biological assets initial valuation (primary charge),
2. at the subsequent valuation (at financial statements presentation).

RESULTS AND DISCUSSION

Valuation models used in Czech agricultural accounting are analyzed separately and then they are compared with the models following the International Accounting Standard IAS 41.

Valuation models in Czech agricultural accounting

According to the Czech accounting legislation, there is a possibility to use the the following valuation bases for the biological assets valuation:

– purchase price, i.e. price of a purchased property plus the related costs,
– reproduction purchase price, i.e. price of a property, which would be purchased at the time of its charge,
– factory costs that represent direct costs expended on the production or other activities concerning self-produced inventory, eventually a part of indirect costs related to production or other activities[4],
– factory costs that represent direct costs expended on production or other activities concerning self-produced long-term assets, and indirect costs related to the production or other activities defined in compliance with the accounting methods.

The purchase price is then used when purchasing tangible assets, the reproduction purchase price in the case of a gratuitous asset purchase, and the factory costs in case of tangible assets created by own activity. The increments of animals are valuated by the factory costs as well.

Regarding the subsequent valuation (at the end of the balancing day), accounting units are bound by the law[5] to consider all predictable risks and possible losses, which are related to assets and liabilities and which are known at the moment of the financial statements presentation, as well as all depreciation regardless of whether the company realizes profit or loss. A biological asset is then presented and publicized in a new (revaluated) book value, which results from the purchase costs reduced by the accrued depreciation and other possible losses. A cost model is used for this purpose. It requires an asset surcharge if its book value is higher than the actual (real) value of the asset at the particular moment. The asset depreciation is charged in the profit and loss statement (Figure 2) as the costs of current accounting period.

Plants

At purchase, plants are valuated by the purchase price, and in the case of own production, the factory costs spent on the sowing, planting or agriculture cultivation are used.

A growing complex of permanent plants is charged with the value of a biological part, other costs related to the purchase of the permanent plant, e.g. the constructions of hop gardens and vineyards are a part of other long-term assets (buildings). At the subsequent valuation, the total depreciation and all losses of the planted permanent herbage are projected in accounting valuation. After reaching the full fertility of a growing complex of permanent culture, depreciation is started. It represents a permanent decrease in the asset's value. It is depreciated indirectly as a part of the current period costs by the means of depreciation reserves. The temporary depreciation of a permanent culture is charged indirectly as well, in accordance with the cost model by creation of the so-called adjusting entries. In the period from the planting till the full fertility, the economic benefit of assets is not counted, neither is the unfinished production generated, as in many of the unfinished long-term assets category.

Plants, which **are not among the long-term assets**, are valuated by the factory costs spent in connection with their growing. These are direct costs, such as the costs of the soil preparation, seeding, eventually sowing of seedlings, the costs of plants grooming and harvest. A part of indirect costs related to plant production can be also included into the valuation. The spent costs are gradually activated in the form of the variation in the unfinished production and after the harvest, it represents the product's store value. Likewise the long-term assets, when surcharging, the total plants depreciation must be included according to the cost model, conforming to the prudence principle[6].

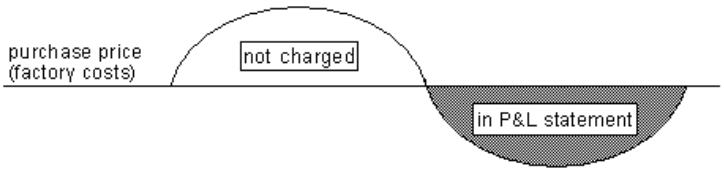

Figure 2. Cost model – purchase price combined with the prudence principle

[4]The level of factory costs is determined either in advance with the aid of **the so- called pre-calculation or operational** costing, or after **the product has been made, with the aid of the so- called final calculation, which reflects the actually** spent costs.

[5]See § 25 subsection 2 of Act No. 563/1991 Coll., on Accounting, as amended.

[6]This generally accepted accounting principle does not allow the enterprises to surcharge assets and revenues and vice-versa, to undercharge liabilities and costs. Only the really attained economic profit or loss reduced by **the total anticipated losses** or risks, which are known to the company at the moment of the financial statements presentation, can be shown.

Animals

Purchased animals are valuated by their purchase price, i. e. including the related purchase costs.

As far as the animals transferred into **long-term assets** from own breeding are concerned, the valuation is at the level of the expended factory costs raised by the possible external costs concerning the transfer, e.g. transportation costs or the costs of the veterinary control. The basic (reproduction) herd animals and other long-term livestock are depreciated during the lifetime, which is set by the accounting unit. Draught animals, racehorses and studs are depreciated individually, other animals by groups. The depreciation is set per one feeding day. Within the frame of the depreciation entry price, the salvage value of an animal can be considered, e.g. at the level of the anticipated revenue after the end of depreciation. Beside the depreciation, in the process of surcharge of animals among long-term assets, it is also important to consider the total decrease in value according to the cost model.

Animals ranked as the **short-term assets** (as inventory) are then surcharged depending on their growth or weight increase by way of gains (in weight or in growth). The write-up of fattening or young animals is determined by the calculation of expended factory costs per kilogramme of the growth gain or per feeding day. The increments without the possibility to find out the factory costs are valuated by the reproduction purchase price and for the purposes of the variation capture after the discard, the factory costs are used (Dvořáková 2007). Beside the appreciation, it is important to take the total depreciation into consideration in the process of surcharging animals among short-term assets, e.g. in consequence of a price decline at the balancing day.

Valuation models in international accounting

The international standards regulate the accounting presentment of biological assets and agricultural production at the moment of the harvest. They do not regulate biological assets after the harvest, e.g. turning the vine grapes into wine by the wine maker, who grew the grapes. Further processing of the product harvested from biological assets is regulated by another standard, e.g. the IAS 2 – Inventory. The agricultural activity is defined as the biological transformation of biological assets intended for sale, agricultural production or creation of other biological assets (e.g. animal husbandry, forestry, annual or perennial harvest, seeding, orchards and plantations cultivation, flowers grooming, water resources management including fish farming etc.) controlled by a company. Biological assets are living animals or plants capable of biological transformation.

Biological transformation covers the processes of growth, degeneration, production and reproduction, which cause qualitative or quantitative changes of a biological asset. Biological transformation is facilitated by the management of change through improvement or at least stabilization of the conditions necessary for the realization of a particular process (e.g. nourishment level, humidity, temperature, fertilizing and light conditions). This kind of management separates the agricultural activity from other activities, e.g. the exploitation of resources originated in the open air, such as the deep-sea fishing and deforestation. One of the control function's component parts is monitoring of the changes in quality (genetic features, density, maturity, fat pad, protein content and staple thickness) or the quantity (descendants, weight, size, staple length, diameter and buds quantity) incurred by the biological transformation. The biological transformation results in:

(a) assets changes during the processes of growth (quantity gain or animals' or plants' quality improvement), degeneration (decrease in quantity or animals' or plants' quality deterioration) or reproduction (rise of other animals or plants),
(b) agricultural products gain, such as wool, tea leaf, latex and milk.

The harvest represents the separation of a product from a biological asset or interruption of the biological asset's life processes.

Biological assets, pursuant to the international standard IAS 41, must be valuated essentially by **the fair value cut by the estimated retail costs** as early as the first charge and subsequently at the moment of every surcharge done at the balancing day. Agricultural production harvested from the company's biological assets is, at the moment of the harvest, valuated in the same way and this price turns into the purchase costs, if the production is still stored as inventory according to the IAS 2. Among the retail costs, there can be found provisions to the negotiators and businessmen, regulatory bodies, commodity exchanges, tax and customs payments. Transportation and other costs necessary to launch an asset are not included in the retail costs.

The standard IAS 41 presumes that the asset's fair value can be reliably determined during its whole lifetime in a company. It admits the only exception at the primary charge of an asset, when the price set by the market is not available and the alternative fair value estimations are apparently unreliable. In this case, it is possible to valuate biological assets by **the**

purchase price cut by depreciation reserves and depreciation losses.

The fair value should reflect a common market, where a trade-willing buyer and seller can make deals (Ryska and Valder 2006). The listed price at an active market is a suitable base to determine the fair value. If an enterprise has the access to several markets, it uses the price of a market that is relevant for the enterprise (the market, which is intended to be used by the enterprise). If there is no active market, the company uses some of the below mentioned possibilities for the fair value determination:

– the last reached market price of a transaction if there has been no significant economic changes since the transaction date until the balancing day,
– market prices of similar assets with an adjustment considering differences (Damodaran 2001),
– sector criteria (benchmark), e.g. expressing the orchard's value by the quantity of the harvested fruit (measured by the amount of crates or baskets) or by the area in hectares; cattle values measured through the kilogrammes of meat,
– present value of the anticipated future net cash flow of a particular asset discounted by the current market pre-tax interest rate (if the price set by the market is not available for a particular biological asset),
– expended primary purchase costs, if a small part of the biological transformation has proceeded since the costs were expended (e.g. fruit tree seedling planted out just before the balancing day) or a non-significant influence of the biological transformation into the price is assumed (e.g. in the early growth stages of a pine tree grown in a production cycle of 30 years),
– as far as the combined assets are concerned (e.g. a tree in a cultivated forest), the biological asset's fair value is found out by subtracting the fallow land fair value from the combined asset fair value (trees with a piece of land).

The purchase price or the factory costs cut by the depreciation reserves and depreciation losses can be used for the biological assets valuation in the only case – at their primary charge, when the price set by the market is not available and the alternative fair value estimations are apparently unreliable. Pursuant to the standard IAS 41, agricultural production at harvest is always reliably measurable, hence it is valuated by the fair value cut by the estimated retail costs at all events.

Differences appearing at the primary valuation of a biological asset and agricultural production by the fair value or at the subsequent valuation are charged in the operation statement as a profit or a loss of the current period (Figure 3). During the biological asset's primary valuation, a loss can arise as a result of subtracting the estimated retail costs or, on the contrary, a profit can arise, e.g. at a Jersey calf birth. The primary valuation of agricultural production resulting from harvest can be the cause of a difference representing a profit or a loss of the current period.

The Czech and international valuation model comparison

The Czech accounting legislation does not consider the different character of agricultural activity, which consists mainly of the controlled biological transformation of living animals or plants. It has not implemented an independent accounting standard related to agriculture either, and it uses generally the true accounting principles, standards and methods even for these specific conditions. Thus a definition of the basic terms related to agriculture, the procedures of determination (distinction) of biological assets and agricultural production, valuation and the presentation methods are missing (Sedláček et al. 2005).

Pursuant to the Czech accounting rules, models based on historical costs (cost model) are used for the valuation of biological assets and agricultural production. The primary valuation cannot be raised when surcharging but, on the contrary, it must be reduced by the anticipated losses. The assets depreciation is projected as a permanent or temporary cut in profits, respectively as a deepening of the company management loss in the particular accounting period.

The fair value model reflects better the reality, because as the primary asset recognition in accounting and at every surcharge done at the moment of the financial statements presentation, it approximates its valuation to the market value to the utmost (Aboody et al. 1999). According to the standard IAS 41, a change of the physical characteristics of a living ani-

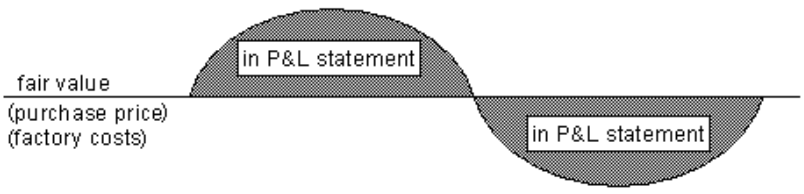

Figure 3. Fair value model – at the fair value basis

mal or plant during the course of agricultural activity expressed by a fair value change directly increases or decreases an agricultural enterprise's (a farm's) economic profit. Thus the revaluation difference has an impact on the presented company's efficiency in the particular period depending on its character – both positively and negatively.

The international accounting standards prefer the fair and true view principle to the prudence principle in the process of the accounting valuation.

As far as the structure, form and amount of data requested for presentation are concerned, the international accounting standards are much more demanding.

The company must publicize a description of each biological assets group in the form of word or numeric data. Where necessary, it is recommended to distinguish biological assets designated for consumption (harvested as agricultural production or sold as biological assets) and reproduction biological assets, which are not included in agricultural production, more likely they just reproduce themselves (e.g. the cattle that produces milk, fruit trees etc.). Within both groups, it is also possible to distinguish whether there are mature assets (e.g. assets for harvest or for securing the regular harvest) or immature ones.

The enterprise must present separately the total earnings or the total loss reached in the current accounting period from the primary valuation of biological assets and agricultural production by the fair value and from the fair value change. Fair value changes could be caused by physical or price changes of an asset. The separate presenting of the reasons of changes is useful for the company's efficiency evaluation in the current period and for the future development estimation, especially if the multi-annual product cycle is concerned (Horngren et al. 2005). Mainly the physical change of a biological asset influences the future economic profit. Thus the paper surcharge profit is separated from the presented profit of the enterprise (Table 1).

The different concepts of both approaches in accounting are shown partly also in the presented balance of the agricultural enterprise and partly in the reached trade yields (Střeleček et al. 2006).

CONCLUSION

The supra-national accounting rules aspire to make a truer view of economic processes in agricultural activity than the Czech accounting legislation. They define the fundamental accounting terms and accounting solutions related to agricultural activity. They reflect the whole process of the controlled biological transformation of living animals or plants designated to sale, agricultural production or other biological assets production. The accounting solution includes the procedures during the course of the biological assets growth, their degeneration, production and reproduction and the primary valuation of agricultural production at the harvest.

The historical costs model established in the Czech accounting is an objective standard of the biological assets' value only at the moment of the purchase. In the next periods, it works asymmetrically – only in the way of the temporary or also permanent depreciation. On the contrary, instead of historical costs, the international agriculture standard introduced the fair value model, which is regarded as the only suitable and reliable method of the biological assets and agricultural production valuation at the harvest. Thus the assets are surcharged always at the moment of the financial statements presentation by the value, which is as close to the market value as possible, regardless of the fact whether the primary accounting value has been increased or decreased. For instance, if an enterprise engaged in forestry

Table 1. Calculation of the change in the fair value induced by physical and price influences

At 1st January 2008 there was a herd of ten 2-year-old animals. At 1st June 2008 one 2.5-year-old animal was purchased for the value of 108 and one animal was born at the same time. No animal was sold or lost during the year of 2008				
Unit fair values cut by estimated retail costs	1st Jan	1st Jul	31st Dec	ΔFV-price
2-year-old animal (100 × 10 animals on the 1st Jan)	1 000		1 050	50
2.5-year-old animal (108 on the 1st Jul)		108	111	3
recently born animal (70 on the 1st Jul)		70	72	2
half-year-old animal (80 on the 31st Dec)			80	
3-year-old animal (120 × 11 animals on the 31st Dec)			1 320	
Change in the fair value due to physical changes (1 320 – 1 050 – 111 + 80 – 72 + 70)			237	
Total fair value cut by estimated retail costs equals 1 400	1 000	108	237	55

uses the accounting model based on historical costs, it cannot present the revenues until the first harvest and sale, i. e. approximately for the period of 30 years. On the other hand, following the present fair value model, an enterprise presents the changes in the fair value during all the time between the seeding and the harvest.

When there is no active market, problems can arise, complicating the reliable assets valuation by the fair value, and the companies are forced to use alternative estimations that may lead to the paper profit presenting. Therefore, enterprises are recommended to monitor the reached profits or losses in the financial statements separately from the fair value changes resulting from the physical and price changes in assets.

In such way, the international standards apparently prefer the fair and true view principle in accounting unlike the Czech regulation, which sticks to the prudence principle causing the asymmetry in the valuation of the companies' assets. Thus, using the fair value model leads to presenting of a more real trading income of agricultural enterprises that reflects not only the anticipated losses and risks, but the present market valuation of the produced assets as well (Loja and Vojáčková 2005). Though the small-scale or middle-size enterprises cannot use the fair value model at the particular moment, there is no place for doubts about the fact that its implementation will result in affecting the presented balance amount as well as the companies' trading income.

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