The Application of International Financial Reporting Standards in the Dairy Horse Breeding in Supply Chain Management

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***Abstract*-The article discusses the prospects for the introduction of the Russian accounting practice of International financial reporting standards (IFRS), the calculation of the fair value of the biological asset of horse breeding organizations under IFRS. A number of methods of calculation of fair value, a technique based on market value and calculation based on the method of profit capitalization and money flow discounting are considered to justify the effectiveness of supply chain management. To prove the necessity and effectiveness of the implementation of IFRS in the production calculations were made on the example of OJSC "Ufa horse breeding farm №119", the leading enterprise for the industrial production of medicinal mare's milk. When using the method based on market value, it is clear that the profit of the organization, when using the calculations of biological assets at fair value, is more by 4.4 million rubles, than reflected in the balance sheet. In the case of calculations based on the method of profit capitalization, the balance sheet increase by more than 7 million rubles. Calculations indicate that the carrying amount of biological assets is significantly understated in relation to the fair value. Distortion of real value indicators leads to a false assessment of the effectiveness of the use of assets in organizations producing agricultural products, as well as creates difficulties in making appropriate decisions in the management sphere. Accounting for biological assets of the organization at fair value will improve the reliability of the financial results of the agricultural organization and will help to assess the results of economic activity more accurately; it will contribute to the adoption of correct and timely management decisions on the choice of supply chain management strategy. It will significantly increase investment attractiveness of agricultural organizations and the whole industries.**

***Keywords*-** *IFRS, fair value, biological assets, investment attractiveness, market income approach, the method of profit capitalization, discounted cash flow method, the income potential, the milk horse breeding, supply chain management.*

1. Introduction

In modern conditions of constant and continuous convergence of Russian accounting standards with the international methodology, the issue of ensuring the reliability of financial results formation of their activities on the basis of the calculation of the fair value of biological assets becomes particularly relevant for agricultural producers [1, 2]. The formation of the financial results of dairy horse breeding is determined by the optimization of the industry production and the improvement of chain supply management. [3, 4, 5, 6, 7, 8,9, 10, 11]. IFRS means the rules for the preparation of financial statements adopted by the international accounting standards Committee (IASC). Their purpose is to coordinate accounting standards, to minimize differences in reporting and the possibility of comparison, to ensure the reliability of data for all users who make appropriate decisions based on this information [12,13]. One of the fundamental principles of IFRS 13 (2016) in the assets valuation and liabilities of the organization is the principle of fair value. In the economic literature they indicate that fair value leads to market prices, which are unstable and not interrelated with the rules of economic accounting [14, 15, 16, 17]. We consider the methods of the fair value calculating on the example of dairy horse breeding. Horses are recorded on the balance sheet of the agricultural enterprise at a cost not exceeding the liquidation, and their share in the structure of fixed assets is significantly reduced. It can be argued that the balance sheet data relating to fixed assets cannot be considered sufficiently reliable, they do not reflect the real value. Because of it, the basic indicators that determine the investment attractiveness of the enterprise are fund intensity and capital productivity [18]. The use of international financial reporting standards will

change this situation, it will increase not only the investment attractiveness of the agricultural organization, but also it will make information about the company more transparent and reliable [19].

For the practical application of all the above, it is necessary to use fair value for the evaluation of fixed assets. For an equivalent comparison it is necessary that the IFRS methodology and the valuation of fixed assets at fair value are used everywhere by all agricultural producers [20, 21]. Of course, this requires considerable work at all levels, from the state level to the producers themselves, but it is necessary for further effective integration into the international system. Transition to IFRS is necessary that domestic agricultural products were highly appreciated in the world market and investors. Really estimating potential of the agricultural organizations, they could invest money in their further development. The aim of the study is to substantiate the method of calculating the fair value of biological assets and to ensure the reliability of the financial results formation of dairy horse breeding, optimization of production of the industry and improvement of chain supply management. The research was carried out on the materials of JSC "Ufa horse breeding farm №119" in Ufa district of the Republic of Bashkortostan, which is the only enterprise that manufactures koumiss by folk way on an industrial scale. A unique healthy drink is bought by many Republican health institutions. The company plans to launch the production of ayran and yogurt from mare's milk [22,23]. The research is based on the application of fair value calculation methods: based on market value; profit capitalization and discounted cash flows as elements of chain supply management.

2. Fair value calculation based on market value

A clear indication of fair value is the price in an active market.

An active market can be:

1. Global, without a specific geographical location (stock exchange).

2. Local, that is to be situated in a specific area where the goods are directly placed (auctions, fairs, exhibitions) [12].

The fair value of a biological asset is its price in an active market, excluding the cost of transporting the biological asset to the place of future sale [24]. Fair value depends on the condition and location of the asset. Thus, the cost of the same mare in different regions of the country will be different [25, 26]. The fair value of a biological asset is determined with sufficient certainty, except when there is no information on market prices at all. In such a case, according to IAS 41, it is necessary for an enterprise to show a biological asset at cost less losses from its depreciation and accumulated depreciation [25, 27, 28]. When it is possible to reliably calculate the fair value of a biological asset, an enterprise should immediately use the fair value measurement minus the estimated sales costs [29]. This provision can be applied in the evaluation of finished agricultural products.

2.1. The fair value at the time of reception of the products is calculated according to the formula:

$$P=M-DC, \quad (1)$$

where ***(P)*** is the fair price of 1 kg of the finished product, RUB; ***(M)*** is the market value of 1 kg of the finished product minus the transportation costs at the time of initial recognition, RUB; ***(DC)*** is the probable distribution costs per 1 centner of finished product, RUB.

2.2. The total volume of finished products is measured at fair value:

$$Vfp=P* EAP, \quad (2)$$

where (**Vfp**) is the volume of finished products at fair value, **P** * **EAP**– gross production of finished products, centner.

The fair value of horses is determined from the market value of individuals of the same breed and age who have the same characteristics [5]. The fair value of the foal of the corresponding breed we propose to determine on the sale price of live

weight of meat or on the sale price of 1 head. The costs at the time of their occurrence include the costs of manufacturing biological assets and obtaining products from biological assets. The need to use fair value in the valuation of biological assets and agricultural products is confirmed by the calculation of the economic efficiency of dairy horse breeding (table 1).

Table1. Background information for calculating the efficiency of dairy horse breeding *

Indicators		Mares of the breed «Bashkirskaya» to produce milk	Mares of the breed «Bashkirskaya» to produce meat	Foals of the breed «Bashkirskaya»
The fair value of 1c of live weight, RUB (excluding sales costs)	At the beginning of the year Vt	17035,7	17035,7	15342,1
	at the end of the year V1	17717,1	17717,1	15955,8
Biological assets (live weight), c	At the beginning of the year Lw0	207,0	21,0	171,0
	at the end of the year Lw1	246,1	61,0	203,3

* Compiled by the author using the primary documentation of JSC "Ufa horse breeding farm №119".

$$V_t=V_{tml}+V_{tmt}=V_{ftml}*L_{wtml}+V_{ftmt}*L_{wtmt}, \quad (3)$$

where (V_t) is the total fair value of the horses at the beginning of the year; (V_{tml}) is the total fair value of horses for milk production at the beginning of the year; (V_{tmt}) is the total fair value of horses for meat production at the beginning of the year; (V_{ftml}) is the fair value of 1 kg of live weight of horses for milk production at the beginning of the year; (L_{wtml}) is the live weight of horses for milk production at the beginning of the year; (V_{ftmt}) is the fair value of 1 kg of live weight of horses for meat production at the beginning of the year; (L_{wtmt}) is the live weight of horses for meat production at the beginning of the year.

We will receive after calculations:

$V_{tml}= V_{ftml}* L_{wtml}$=17035,7 RUB/c * 207 c = 3526,4 thousand RUB;

$V_{tmt}= V_{ftmt}* L_{wtmt}$= 17035,7 RUB/c * 21 c = 357,7 thousand RUB;

$V_t= V_{ftml}+ V_{tmt}$= 3526,4 thousand RUB + 357,7 thousand RUB = 3884,1 thousand RUB.

We determine the fair value of horses at the end of the year, for this we use the formula:

$$V_1=V_{1ml}+V_{1mt}=V_{f1ml}*L_{w1ml}+V_{f1mt}*L_{w1mt}, \quad (4)$$

where (V_1) is the total fair value of the horses at the end of the year; (V_{1ml}) is the total fair value of horses for milk production at the end of the year; (V_{1mt}) is the total fair value of horses for meat production at the end of the year; (V_{f1ml}) is the fair value of 1 kg of live weight of horses for milk production at the end of the year; (L_{w1ml}) is live weight of horses for milk production at the end of the year; (V_{f1mt}) is the fair value of 1 kg of live weight of horses for meat production at the end of the year; (L_{w1mt}) is live weight of horses for meat production at the end of the year.

After calculations we will receive:

$V_{1ml}= V_{f1ml}* L_{w1ml}$=17717,1 RUB/c * 246,1 c = 4360,2 thousand RUB;

$V_{1mt}= V_{f1mt}* L_{w1mt}$=17717,1 RUB/c * 61 c = 1080,7 thousand RUB;

$V_1= V_{1ml}+ V_{1mt}$=4360,2 thousand RUB + 1080,7 thousand RUB = 5440,9 thousand RUB.

We calculate the amount of change in fair value due to changes in biological assets ΔV_b:

$$\Delta V_b=V_{mtb}+V_{pb}= V_{1mt}\ (L_{w1mt}- L_{wtmt})+V_{l1p}\ (L_w-L_{wtb}) \quad (5)$$

$\Delta V_{mlb}= V_{ftml}\ (L_{w1ml} - L_{wtml})$=17035,7 RUB./c (246,1 c – 207 c) = 666,1 thousand RUB;

$\Delta V_{mtb}= V_{f1mt}\ (L_{w1mt} - L_{wtmt})$ =17717,1 RUB./c (61 c – 21 c) = 708,7 thousand RUB;

$\Delta V_{bb} =V_{f1b}\ (L_{w1b} -L_{wtb})$ = 15955,8 RUB./c (203,3 c – 171 c) = 515,4 thousand RUB;

$\Delta V_b = V_{mlb} +V_{mtb} + V_{bb}$=666,1 thousand RUB + 708,7 thousand RUB + 515,4 thousand RUB = 1890,2 thousand RUB.

We calculate the amount of change in fair value due to price increase ΔV_c:

$$\Delta V_c = V_{mlc} +V_{mtc} = L_{w1ml}(V_{f1ml} - V_{ftml}) + L_{wtmt}\ (V_{f1mt} - V_{ftmt}) \quad (6)$$

$\Delta V_{mlc} = L_{w1ml}\ (V_{f1ml} - V_{ftml})$ = 246,1 c (17717,1 RUB – 17035,7 RUB) = 167,7 thousand RUB;

$\Delta V_{mtc}= L_{wtmt}\ (V_{f1mt} - V_{ftmt})$= 61 c (17717,1 RUB. – 17035,7 RUB.) = 41,6 thousand RUB;

$\Delta V_c = V_{mlc} + V_{mtc}$ =167,7 thousand RUB + 41,6 thousand RUB = 209,3 thousand RUB.

As a result of changes in fair value less estimated selling costs, profit is calculated as the sum of

deviations in value due to changes in price and number of biological assets:

$\Delta V = V_b + V_c$ (7)

ΔV =1890,2 thousand RUB + 209,3 thousand RUB = 2099,4 thousand RUB

As a result, using the available data, we will determine the economic efficiency of dairy horse breeding of JSC "Ufa horse breeding farm №119" (table 2).

The result of the calculations is a significant deviation of the fair value from the carrying amount. When using the method based on market value, it is clear that the profit of the organization, when using the calculations of biological assets at fair value is more than 4.4 million rubles.

Table2. Economic efficiency of dairy horse breeding, thousand RUB *

Indicators	Method of accounting	
	Based on book value	Based on fair value
The fair value of Mare's milk	Not determined	15576,3
The fair value of produced horse meat	Not determined	1769
The change in the fair value of horses	Not determined	2099
Revenue from milk sales	12461	-
Revenue from meat sales	312	-
The cost of offspring	385	-
Total income	15074	21361
Variable costs	14677	11888
Fixed costs	Not determined	2789
The cost of reproduction of the main breeding stock	209	2132
Total expenses	14886	16809
Profit	-1728	2636

* Compiled by the author using the primary documentation of JSC "Ufa horse breeding farm №119".

3. Fair value calculation based on the profit capitalization method

Let us consider the method of calculating the fair value on the example of horses of the main herd used for the production of traditional Bashkir drink –koumiss. The valuation directly at fair value is much more efficient, as this method actually reflects the financial condition of the organization and it doesn't show what amount was spent for the assets in the previous period. Since today, there is no single regulated methodology for the assessment of biological assets, we consider it appropriate to calculate the fair value using different methods. The calculation of fair value using the price in the active market was carried out earlier, now we will calculate the fair value using the income approach [30]. In the future, it is necessary that public authorities develop and adopt a common fair value measurement methodology based on reliable statistical information about market prices of biological assets in agriculture. The basis of the income approach lies in the principle of the planned future output. The most common method used when using the income approach is the profit capitalization method or the discounted cash flow method. The capitalization method is based on the basic premise according to which the value of the ownership interest in an enterprise is equal to the present value of the future income that the property will bring. We use the method of profit capitalization on the example of JSC "Ufa horse breeding farm №119". We present sample data on 10 dairy mares of the main herd (table 3).

Table3. Data on 10 dairy mares of the main herd *

№	Mare	Book value	Live weight	Productivity, l	Offspring		
					Date of birth	chip	l/w on 01.07.18
1	228716-12	54 844	320	2601	16.05.18.	54302	70
2	228279-12	51 321	330	2516	08.06.18.	335740	50

3	79106-12	55 549	320	1941	26.03.18.	335862	95
4	418-09	35 958	310	2471	21.04.18.	54033	80
5	42665-11	47 812	310	1588	19.05.18.	335604	65
6	41858-11	47 812	310	1999	08.04.18.	335819	78
7	41450-11	47 812	320	2216	14.04.18.	54074	85
8	112-04	20 904	300	2478	28.03.18.	335879	110
9	271-05	41 253	290	1988	09.04.18.	335812	80
10	293-05	41 253	290	2357	07.04.18.	335821	85
11	Total	444 518	3 100	22 155	X	X	798

* Compiled by the author using the primary documentation of JSC "Ufa horse breeding farm №119".

Using the data of table 3, we calculate the potential income from the production of mare's milk and foals (table 4).

Table4. Calculation of potential income from the production of mare's milk and foals *

№	Mare	Book value	Productivity, l	Offspring	Potential income from the sale of koumiss	Potential income from the sale of offspring
				l/w on 01.07.18		
1	228716-12	54 844	2601	70	3901,5	7140
2	228279-12	51 321	2516	50	3774	5100
3	79106-12	55 549	1941	95	2911,5	9690
4	418-09	35 958	2471	80	3706,5	8160
5	42665-11	47 812	1588	65	2382	6630
6	41858-11	47 812	1999	78	2998,5	7956
7	41450-11	47 812	2216	85	3324	8670
8	112-04	20 904	2478	110	3717	11220
9	271-05	41 253	1988	80	2982	8160
10	293-05	41 253	2357	85	3535,5	8670
11	Total	444 518	22 155	798	33232,5	81396

* Compiled by the author using the primary documentation of JSC "Ufa stud farm №119".

For comparison of fair and book value of mares of the main herd we will bring together all calculations in table 5.

Table5. The Fair value and carrying value of the main mares of the herd *

№	Mare	Potential income from the use of mares, RUB.	Fair value of mares, RUB.	Deviation of fair value from book value
1	228716-12	11 042	58113	3269
2	228279-12	8 874	46705	-4616
3	79106-12	12 602	66324	10775
4	418-09	11 867	62455	26497
5	42665-11	9 012	47432	-380
6	41858-11	10 955	57655	9843
7	41450-11	11 994	63126	15314
8	112-04	14 937	78616	57712
9	271-05	11 142	58642	17389

10	293-05	12 206	64239	22986
11	Total	114 629	603 308	158790

* Compiled by the author using the primary documentation of JSC "Ufa horse breeding farm №119".

The total fair value of mares is more than their book value by 158.8 thousand rubles. The following conclusion can be made – when the mares of the main herd are reflected in the financial statements at fair value, the organization will have a significant advantage in increasing investment attractiveness. In the main herd more than 240 heads of mares and approximately 205 heads of young animals in the breeding, the calculations were only used for 10 heads of the main herd, but if you take all the breeding stock, the currency of the balance sheet could increase by more than 7 million roubles.

4. Fair value calculation based on discounted cash flow method

Next, we consider the method of determining fair value using the discounted cash flow method. This method is universal in application. It is possible to calculate the real amount of financial flows in the future. This is very important, because financial flows over time can change, have a significant level of risk, have an unstable nature of revenues. The investor always considers any object from the point of view of receiving possible volume of profit. He estimates its appeal and advantages in comparison with other, similar offers of investment and correlates with the current prices in the market.

We use the discounted cash flow method as an example of Ufa horse breeding farm No. 119 (table 6).

Table6. Data on actual production and sales of dairy and meat products of horse breeding *

Indicators	2014	2015	2016	2017
Herd horse breeding, the main herd, heads	248	246	250	250
Gross production of koumiss	1282	1282	1317	1247
Cost of production of koumiss,c	17768	14243	15671	13950
Revenue from the sale of koumiss, thousand RUB	19352	12461	14323	12825
Profit from the sale of koumiss, thousand RUB	1584	-1782	-1348	-1125
Profitability from the production of koumiss,%	8,9	-12,5	-8,6	-8,1
Profitability from the sale of koumiss,%	8,2	-14,3	-9,4	-8,8
Received foals(offspring), heads	237	217	192	214
The output of foals per 1 mare, %	95,6	88,2	76,8	85,6
The cost of the offspring, thousand RUB	10922	9532	8978	6279
Revenue from the sale of offspring, thousand RUB	5493	8965	8208	5154
Profit from the sale of offspring, thousand RUB	-5429	-567	-770	-1125
Cost of meat production, thousand RUB	379	434	310	1197
Revenue from meat production, thousand RUB	337	312	147	3602
Profit from meat production, thousand RUB	-42	-122	-163	2405
Depreciation, thousand RUB	1597	2018	2087	2139
Subsidies for the keeping of pedigree breeding stock	1886	1979	2011	2156

* Compiled by the author using the primary documentation of JSC "Ufa horse breeding farm №119".

To calculate the forecast indicators for the production and sale of dairy and meat products of horse breeding, we use the method of average sliding growth rates, which will allow us to extrapolate the actual values for the forecast periods (table 7).

Table7. Forecast indicators for the production and sale of dairy and meat products of horse breeding

Indicators	2018	2019	2020	2021
Herd horse breeding, the main herd, heads	248	246	250	250
Gross production of koumiss,c	1236	1222	1192	1175
Cost of production of koumiss in total, thousand RUB	17768	14243	15981	15997

Revenue from the sale of koumiss, thousand RUB	19357	12467	14469	15431
Profit from the sale of koumiss, thousand RUB	1589	-1776	-1512	-566
Profitability of koumiss production, %	8,9	-12,5	-9,5	-3,5
Profitability of koumiss sales,%	8,2	-14,2	-10,4	-3,7
Received foals (offspring), heads	237	217	192	214
The output of foals per 1 mare, %	95,6	88,2	76,8	85,6
The cost of the offspring, thousand RUB	5262	4348	3426	2801
Revenue from the sale of offspring, thousand RUB	7110	6510	5760	6420
Profit from the sale of offspring, thousand RUB	1848	2162	2334	3619
Cost of meat production, thousand RUB	379	434	310	1197
Revenue from meat production, thousand RUB	2270	2394	2441	2519
Profit from meat production, thousand RUB	1891	1960	2131	1322
Depreciation, thousand RUB	2369	2501	2657	2858
Subsidies for the keeping of pedigree breeding stock	2255	2356	2483	2603
Cash flow, thousand RUB	7583	4701	5436	6978
Discount rate, %	15	15	15	15
Discount index	0,87	0,76	0,66	0,57
Discounted value, thousand RUB	6594	3554	3574	3990

* Compiled by the author using the primary documentation of JSC "Ufa horse breeding farm №119".

The total fair value of mares of the main herd made 17,7 million rubles, and balance value was 16,2 million rubles. The calculations showed that the fair value of mares is more than balance one by 1,6 million rubles, or by 9,7%. The calculation of fair value using the active market price and its calculation using the income approach: profit capitalization method and discounted cash flow method showed that the carrying value of biological assets of the organization is significantly reduced [31, 32].

5. Summary

The results of the research illustrate the differences in the methods of biological assets evaluation. They prove the need for fair value measurement to improve the investment attractiveness of the organization. Assessment of biological assets at fair value will allow to show influence of all aspects of dairy horse breeding more transparently, to improve reliability of indicators of financial result of the agricultural organization and will help to estimate results of economic activity more precisely and make proved management decisions. The calculations show that in the assessment of biological assets at fair value, the profit of the organization is more by 4.4 million rubles than in the assessment of their market value. In the case of calculations based on the method of profit capitalization, the currency of the balance sheet increase of 7 million roubles. And in applying the method of discounted cash flows it increases on 1,6 million rubles in comparison with the data reflected in the balance sheet of the organization under study. Distortion of real value indicators leads to a false assessment of the effectiveness of the assets use in organizations producing agricultural products, as well as creates difficulties in making appropriate decisions in the management sphere. Evaluation of biological assets at fair value ensures the reliability of the financial results formation of dairy horse breeding which will optimize the production of the industry and improve chain supply management.

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