

Costs, income and economic efficiency of dairy sheep flocks

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The objective of this study was to analyse costs and incomes from milk/cheese and lamb production in dairy sheep flocks and to evaluate their economic efficiency by calculating the profit/loss that is expressed as the difference between these two economic indicators. Costs were calculated taking into account their individual item structure, revenues were calculated taking into account sales of milk/cheese and lamb production. The analysis included three-year period i.e. years 2017, 2018 and 2019. The object of investigations were twelve and thirteen dairy sheep flocks per year, respectively. Economic indicators were expressed in Eur per feeding day (costs) and/or in Eur per ewe and year (costs, sales, subsidies, profit/loss). Milk and lamb sales did not cover up costs spent on production and accounting for subsidy improved economic efficiency of dairy sheep only to a lower extent. Sheep farming thus produced with the loss. Across years, milk and lamb sales almost unchanged, whereas costs notably increased. No ability to cover up costs with revenues could become an obstacle for further survival of this livestock sector. The increase of both milk yield and lamb production is therefore needed.

Keywords: small ruminants, expences, revenues, profit/loss

1 Introduction

Sheep population represents about 4% of total livestock units in Slovakia (Eurostat, 2016). In the remaining countries of Visegrad group (Czechia, Poland and Hungary) the proportion of sheep population is about 1 to 3% of total livestock units. Ewe milk production in Slovakia is the highest from these countries and represents about 10.3 million kg per year (Faostat, 2019). Despite of milk production of dairy sheep in Slovakia being lower than in Romania (also European Union country in transition with annual milk production of about 630 million kg according to Faostat (2019)), dairy sheep sector has social, economic and environmental functions. Regardless of type of company, its main goal is to produce the profit and avoid the loss. Rational utilisation of inputs and their target relationship to the value of outputs is one of the most important preconditions of effective production (Krupová et al., 2014). To our best knowledge and despite calculations done by experts from institutes acting under the umbrella of the National Agricultural and Food Centre (e.g. Krupová et al., 2013; Oravcová et al., 2020; Trubačová et al., 2020), the only study aiming at detailed analysis of the development of base economic factors in dairy sheep of Slovakia was recent study of Michaličková et al. (2014).

In this context and having in mind fact that sheep sector is of the low political weight at the European level (de Rancourt et al., 2006), the objective of the current study was to analyse costs and incomes from milk/cheese and lamb production in dairy sheep flocks and to evaluate their economic effectiveness.

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2 Material and methods

2.1 Data

The data (costs, incomes and other economic indicators) of 12, 13 and 12 dairy sheep flocks in the period between years 2017 and 2019 were analysed taking into account information from available flock documentation. Flocks were predominantly kept in extensive (historically known as Carpatian) and semi-intensive production systems characterised with pasture of ewes after lambs were weaned. The following breeds: Improved Valachian, Tsigai and recently acknowledged Slovak dairy breeds were kept in flocks included in analyses. Breeding is characterized by seasonal production and lambing in winter months (January to March). After weaning of lambs, at about 53 or 55 days after parturition, ewes are milked twice daily since April and dried off in September or October (Oravcová and Peškovičová, 2008).

2.2 Economic indicators

Costs. Costs spent on milk/cheese and lamb production were expressed as A. costs per feeding day (FD) that either included or not included costs of by-product and B. annual costs per ewe calculated as costs/FD \times 365 (from total costs not taking into account costs of by-products that were calculated with regard on value of manure, wool and lambs born alive). Individual cost items were expressed in accordance with Krupová et al. (2012) and were as follows: labour costs, costs of feeds produced on the farm (own feeds), costs of purchased feeds, other material costs (e.g. costs of disinfection, medicine, office material), costs of maintenance and repairs, depreciation of long-term property (e.g. buildings, installations, equipment), depreciation of stock, other direct primary costs (e.g. pharmaceutical and veterinary services, social security fees and insurances, electricity), other direct secondary costs (e.g. assurance, association fees, costs of own trucking), production and management overheads.

Incomes. Income was expressed as sum of sales of milk/cheese and lambs calculated per ewe and year. Subsidy was calculated as sum of various types of subsidies expressed per ewe and year.

Profit/Loss. Profit/loss per ewe and year were calculated as A. difference between sales and costs and B. difference between sales increased by subsidy and costs.

3 Results and discussion

Costs. There were 320 to 730 ewes kept in dairy sheep flocks involved in analyses (an exception was flock accounted for 1,500 heads). Costs expressed in Eur/FD (Table 1) made us possible comparing them across years (in period between 2017 and 2019) regardless of flock size. Total costs were increasing: by 12% between 2017 and 2018 and by 13% between 2018 and 2019, respectively. In 2017 the main component of costs calculated from sheep economic evidence were feed costs (own and purchased together), whereas labour and feed costs in 2018 equalled and in 2019 labour costs exceeded feed costs. The proportion between purchased and own feed costs was unfavourable in 2017, in the remaining years their proportion changed (i.e. from 0.5 in 2017 to 0.2 in 2018 and 2019, respectively). It is commonly agreed that farms producing feeds instead of purchasing feeds have more advantageous position to diminish production costs (Gunlu et al., 2003; Michaličková et al., 2014). The increase of labour costs reflected significant changes in wages paid to employees for work on weekend, holiday and at night that were introduced in 2018 and 2019, respectively. The further important element of costs in dairy sheep flocks were other direct primary costs. Despite of pharmaceutical and veterinary services these included social security fees and insurances that were about 35% of labour costs, thus through higher social costs, higher salaries also influenced the amount of other direct primary costs.

Compared to study of Michaličková et al. (2014), who analysed dairy sheep farms according to the same methodology in the period between 2006 and 2012, higher total costs were found in the current study (from 174.47 to 225.94 vs. 160.12 Eur per ewe and year) as given in Table 2. Obviously, important changes in price of cost items were observed due to different periods investigated. The main component were feed costs (28% of total costs), labour costs (18% of total costs) and other direct primary costs (13% of total costs). As a difference to the current study (feed costs found between 19 and 23%), higher proportion of feed costs (between 35 and 62%) were found by Tzouramani et al. (2011), Milan et al. (2014) and Pamukova and Momchilov (2017). Labour costs were about 20% in the majority of studies (social security fees and insurances considered within labour costs) mentioned above (an exception were labour costs equal to 28% in Greek organic sheep farms was reported by Tzouramani et al. (2011)). Because of different assumptions and methodologies used, comparisons with literature need caution.

Table 1 Cost structure in dairy sheep flocks (in Eur per feeding day)

Item	Year		
	2017	2018	2019
Labor	0.116	0.122	0.191
Own feeds	0.083	0.100	0.104
Purchased feeds	0.041	0.022	0.022
Other material costs	0.012	0.018	0.016
Maintenance and repairs	0.006	0.009	0.009
Depreciation of BIE*	0.033	0.033	0.038
Depreciation of stock	0.050	0.048	0.048
Other direct primary costs	0.101	0.110	0.144
Other direct secondary costs	0.045	0.076	0.043
Production overhead	0.030	0.034	0.039
Management overhead	0.015	0.016	0.019
Total costs per feeding day	0.528	0.588	0.673
Costs of by-product per feeding day	0.050	0.053	0.054
Total costs – costs of by-product	0.478	0.535	0.619

* – bldings, instalations, equipmet

Table 2 Annual costs, incomes and profit/loss in dairy sheep flocks (in Eur per ewe)

Item	Year		
	2017	2018	2019
Annual costs per ewe	174.470	195.275	225.935
Annual income from milk per ewe	86.600	86.340	79.870
Annual income from lambs per ewe	26.590	30.110	32.660
Annual income per ewe	113.190	116.450	112.530
Profit (+)/loss (-) per ewe	-61.280	-78.825	-113.405
Annual subsidies per ewe	26.810	29.530	47.630
Profit (+)/loss (-) per ewe*	-34.470	-49.295	-65.775

* – profit (+)/loss (-) per ewe taking into account subsidy

Incomes. Incomes (Table 2) involved annual sales of milk/cheese and lambs and payment per ewe (subsidy). In comparison to previous period analysed by Michaličková et al. (2014), total incomes increased by one third (112.53 to 116.45 vs. 76.13 Eur per ewe and year). The main component of income were milk sales that accounted for 70 to 75% of total revenues (Table 2). This is a result of fact that farmers focused more on milk yields due to raised demands for dairy products accompanied by a higher increase of milk price (0.78 Eur/l of milk vs. 0.98 and 1.02 Eur/l of milk in the current study). According to study of Michaličková et al. (2014), lamb sales contributed to total income by 35%. Milk sales were the main component of income (0.85 vs. 0.15) in Spanish dairy sheep farms (Milán et al., 2014), whereas in Bulgaria a more balanced proportion (0.5 vs. 0.5) between milk and lamb sales was reported (Pamukova and Momchilov, 2017).

Profit/loss. Loss (Table 2) in economic efficiency of dairy sheep flocks was found in analysed period of time (sales allowed to cover up 50 to 65% of costs). When subsidy was involved in calculations, incomes allowed to cover up 70 to 80% of costs. On the contrary, sales and costs were almost balanced in Spanish dairy sheep (Milan et al., 2014). No balance between incomes and costs found in the current study agreed with recent findings of Michaličková et al. (2014) and Trubačová et al. (2020), who also reported that dairy sheep farms were unable to produce the profit. No

ability to cover up costs with revenues could become an obstacle for survival of this livestock sector. Nevertheless, the findings showed that few dairy sheep flocks included in the analysis were able to avoid the loss.

4 Conclusion

The results of the current study showed that dairy sheep flocks produced with negative economic efficiency. At the company level, the situation may seem better: revenues are not drawn exclusively from sheep farming as other activities are performed (crop production is mostly profitable). From long-term point of view, it is alarming that no improvement was observed through years. Both milk/cheese and lamb revenues changed minimally, whereas costs increased to a higher extent. Agricultural companies may leave sheep farming behind, and make it possible that sheep numbers decrease importantly.

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