Economic analysis of production results from raising North-East Bulgarian merino sheep – Shumen type

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Citation: Slavova, S., Staykova, G., & Tsonev, T. (2022). Economic analysis of production results from raising North-East Bulgarian merino sheep – Shumen type. *Zhivotnovadni Nauki*, *59*(5), 22-29 (Bg).

Abstract

The aim of the present research was to estimate some economic indicators of raising sheep of the North-East Bulgarian merino breed (Shumen type). Study was conducted at the sheep farm of the Research Agriculture Center – Targovishte for the period from 2018 to 2020. The production system applied at the farm was semi-intensive, with stall-pasture regime. The annual repair of the flock was 20%, breeding animals being of own production. Conception rate of females was about 92%, and prolificacy varied from 70 to 90% on average for the study period. Most of the feeds were produced at the farm and valued at cost, and only part of them were purchased at market prices. The farm is a member of the „Association for breeding of thin-wool sheep", which performs selection control of the animals in the flock. Data were provided by the accounting department of the enterprise and processed using mathematical-statistical model and computer program Excel. Therefore, revenues from sales and subsidies, production costs, profit and profitability were calculated. It was found that the sheep farm generated financial loss, based on the difference between revenues from sales and total costs, and the positive annual value of the profit and profitability was due to the received subsidies. Efforts need to be focused on increasing animal performance, reducing costs per ewe and using all available opportunities to receive subsidies by the state.

Key words: North-East Bulgarian merino sheep, revenues, costs, profit, profitability

Икономически анализ на производствени резултати от отглеждане на овце от Североизточнобългарската тънкорунна порода – шуменски тип

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Резюме

Целта на настоящото изследване е да се проучат някои икономически показатели при отглеждането на овце от Североизточнобългарската тънкорунна порода (Шуменски тип). То е проведено в периода 2018–2020 г. в овцефермата на Националния център по земеделие в гр. Търговище. Производствената система в стопанството е полуинтензивна, оборно-пасищна. Годишният ремонт на стадото е 20%, като разплодните животни са от собствено производство. Заплодяемостта е около 92%, а плодовитостта варира от 70 до 90% средно за периода на изследването. По-голяма част от фуражите се произвеждат в стопанството и се остойностяват по себестойност, като само част от тях се закупува на пазарни цени. Стопанството членува в „Асоциация за развъждане на тънкорунни овце – АРТОБ“, която извършва селекционен контрол на продуктивните признаци в стадото. Данните са предоставени от счетоводния отдел на предприятието и са обработени с помощта на математико-статистически модел и компютърна програма Excel. Изчислени са приходите от продажби и субсидии, производствените разходи, печалбата и рентабилността. Установено е, че овцевъдното стопанство генерира финансови загуби на база на разликата между приходите от продажби и общите разходи, като положителният годишен финансов резултат и рентабилност се дължат на получените субсидии. Необходимо е да се насочат усилия към повишаване продуктивността на животните, редуциране на разходите за овца майка и реализиране на всички възможности за получаване на субсидии от държавата.

Ключови думи: Североизточнобългарска тънкорунна порода овце – Шуменски тип, приходи, разходи, печалба, рентабилност

Introduction

The fine-wool sheep breeds in Bulgaria represent a valuable genetic resource for the national economy, despite their highly reduced population in recent decades - from 1 541 000 in 1989 to 5 000 ewes in 2015, due to changing the emphasis of production from wool to milk and meat traits. In 2013, merino breeds were declared endangered, therefore farmers have been given subsidies for keeping and maintaining flocks (Stancheva et al., 2017). However, a certain revival of the market of young breeding animals was achieved after the introduction of Measure 214 „Agroecology" and at later stage of Measure 10 „Agroecology and climate", concerning merino breeds that have been developed and raised in the country (Slavova, 2020). As result of the outflow of farmers from raising fine-wool sheep, the existing genetic and genealogical structures were disrupted, and the breeding programs were replaced with programs for conservation of merino sheep populations. In 2011, a general „Program for breeding of merino sheep in Bulgaria for the period 2011–2020" was issued by the „Association for breeding of fine-wool sheep in Bulgaria" (Stancheva et al., 2020).

According to data provided by the breeding organization, as of 2018 – 5 210 merino sheep have been under selection control, of which 4 058 sheep of three merino breeds developed in Bulgaria – North-East Bulgarian fine-wool breed – 3 686, Thracian fine-wool breed – 204 and Karnobat fine-wool breed – 168. The North-East Bulgarian breed still has the largest number of fine-wool sheep in the country, and over the years has continued to be the subject of research by researchers as Slavov (2007), Staikova and Stancheva (2009), Tsonev (2014), Stancheva et al. (2015), Stancheva et al. (2017), Stancheva et al. (2020 a, b, c) etc.

However, scientific interest has been focused mainly on the genetic structure of the breed and productive characteristics of animals, as well as on the possibilities for improving productivity. Slavov and Georgiev (2008) made an economic assessment and analyzed the effect of factors on the absolute live weight gain in lambs from

the North-East Bulgarian merino breed and its crosses with Australian Merino and Ile de France breeds. Economic analysis of raising North-East merino sheep were performed by Slavova (2020) and Stankov (2020), as well. In order to make comparative studies between different flocks and enterprises, further research is needed in this area. The specificity of this productive direction requires a targeted strategy for adaptation to current and future economic conditions.

Analysis of economic indicators in merino sheep was made by Rosas et al. (2014) in Spain and Wallace et al. (2021) in Australia. Young et al. (2020) found that the most profitable flock structure in Australia, being the largest producer of merino sheep, is running Merino ewes and turn off finished Merino or first-cross lambs. The profitable selection of these flocks was found robust to commodity price variation but did require the farmer to give more attention to sheep management. In their study, Farrell et al. (2021) demonstrated a whole flock transition from Romney to 3/4 Merino ¼ Romney flock in New Zealand, where most wool produced is coarse wool, which has lost its relative value while shearing costs have increased. Transition was found profitable and achievable without large variation in sheep feed demand, although the scale of benefit compared to maintaining a Romney flock was determined by changes in sheep and wool sale prices.

The aim of the present study was to estimate some economic indicators of raising sheep of the North-East Bulgarian fine-wool breed (Shumen type) and to calculate profit and profitability as key indicators of economic efficiency.

Material and methods

The object of research was the sheep flock of North-East Bulgarian merino breed (Shumen type), raised at the farm of the National Center of Agriculture – Targovishte. The data processed was for a period of three years (2018–2020). Production system practiced was semi-intensive, keeping animals indoor in the winter, and grazing on pasture in the summer. Breeding lambs were weaned at about 100 days after birth, and lambs for sale when reaching about 26 kg of live weight. The annual repair of the flock was 20%, with lambing once a year. Breeding animals of own production were intended for reproduction in the flock. Artificial insemination was applied, and only females, which were object of research were treated with hormones. The fertility rate of ewes and ewe lambs was about 92% on average for the study period. Most of the feeds were of own production, and only partially purchased at market prices.

The average live weight of the ewes was 62–64 kg, wool production varied from 5 kg to 6.8 kg per ewe, and prolificacy ranged widely from 70% to 90%, depending on the year.

The farm is a member of the „Association for breeding of thin-wool sheep in Bulgaria – ARTOB" and received direct payments for ewes under selection control, and transitional national aid for the animals that did not meet the relevant criteria. During the study period, subsidies were paid for under „Single Area Payment" scheme, for „Agroecology and climate", and „De minimis".

Based on the financial information provided by the accounting department of the farm for the period 2018–2020, the total revenues (including revenues from sales and subsidies), and total costs were estimated. The difference between the revenues from sales and total costs was indicated as profit before subsidies, and the difference between total revenues and total costs – as profit after subsidies. Profitability (before and after subsidies) was also calculated as a ratio between profit (before and after subsidies) and total costs. Data were processed using mathematical-statistical model and computer program Excel. The main economic indicators were estimated as a total for the farm and per ewe and year.

Results and discussion

At the studied farm, 482 ewes and 39 rams were raised on average during the study period, and the number of lambs born varied from 338 in 2019 to 476 in 2018 (Table 1).

Revenues from sales included sales of lambs for slaughter and breeding lambs, breeding rams, culled sheep and wool (Table 2). Milk was used only for suckling lambs.

The price of lambs for slaughter was relatively constant for the period - between BGN 4.50 and 5.00 per kg of live weight, as the average in the country for the specified period. Breeding lambs were sold at a price of BGN 6 per kg of live weight. Their relatively high proportion is impressive, indicating for a demand of young breeding animals of the breed during study pe-

Table 1. Number of animals in the farm

Gategory	2018	2019	2020	On average for the study period
	number			
Ewes	518	481	447	482
Rams	38	45	33	39
Lambs	476	338	369	394

Table 2. Revenues, BGN

Revenue	2018			2019			2020		
	kg, number	Unit price	Value BGN	kg, number	Unit price	Value BGN	kg, number	Unit price	Value BGN
1. Revenues from sale of animals	-	-	64984.00			44633.00			52944.00
1.1. lambs for slaughter (about 22 kg live weight)	302	5.00	33220.00	254	4.50	25146.00	201	5.00	22110.00
1.2. lambs for breeding (about 26 kg live weight)	174	6.00	27144.00	84	6.00	13104.00	168	6.00	26208.00
1.3. rams for breeding	6	420.00	2520.00	9	360.00	3240.00	4	400.00	1600.00
1.4. culled sheep	42		2100.00	50		3143.00	38		3026.00
2. Revenues from sale of wool	3480 kg	2.00	6960.00	2818 kg	2.00	5636.00	2240 kg	1.50	3360.00
3. Revenues from sales /1 + 2/			71944.00			50269.00			56304.00
4. Revenues from sales per ewe			138.89			104.51			125.96
5. Revenues from sunsidies			105673.41			121668.70			95826.66
5.1. per ewes under selection control			20896.00			33674.20			19821.51
5.2. national transitional aid related to production			1894.68			987.45			2541.31
5.3. according to Measure 10 „Agroecology and climate"			20189.52			18404.05			12078.93
5.4. „De minimis" aid			5560.00			5310.00			5470.00
5.5. area payment (SEPP)			57133.21			63293.00			55914.91
7. Total revenues /3 + 5/			177617.41			171937.70			152130.66
8. Total revenues per ewe			342.89			357.46			340.34

riod. Moreover, breeding rams were also sold annually. The price of culled sheep per kg of live weight was not specified, depending on the health status of the animals sold. Revenues from wool were relatively high, given the higher wool production of the breed and the average price of about BGN 2 (significantly higher than the average for the country - about BGN 1 per kg).

Revenues from sales were the highest during the first year of the period - BGN 138.89 per ewe, which was associated with the number of ewes - 518, and lambs and wool sold, respectively.

Revenues from subsidies significantly prevailed over revenues from sales. The farm has declared 321.740 ha of grass areas, for which received subsidies under the „Single Area Payment Scheme", meeting the criteria of 0.15 animal units per ha (Agriculture State Fund, https:// www.dfz.bg/bg/dp-2014- 2020 / schemes-2015 / -sepp- /).

After subsidies, the total revenues increased to BGN 342.89 in 2018, BGN 357.46 in 2019 and BGN 340.34 per ewe in 2020, respectively. In the last year there was been a decline compared to the previous year, as revenues from subsidies were reduced.

The structure of revenues presented the average share (in %) of each category of revenue for the analyzed period (Fig. 1). The relative share of the revenues from subsidies in total revenues was twice as high as that of revenues from sales – 64.4% to 32.4%, and the revenues from wool had limited economic importance for the farm.

Production costs are presented in Table 3. The membership fee paid to the breeding organization was the single fixed cost indicated. The rest costs were variable costs, labour having the largest share, followed by the feed costs. According to the data of the accounting department of the farm, the permanent employees were 8 persons. In the last year there was a serious increase in labour costs compared to the previous one – from BGN 69.354 to BGN 94.636 as being extremely difficult for the farmers to hire skilled employees, which required higher wage rates due to high demand and limited supply. The cost of feeding animals was significantly lower than that of labour, given that most of the feed was produced at the farm. At the end of the period there was a serious increase in the total costs – from BGN 254.68 to BGN 331.63 per ewe, which was directly related to increasing labour costs.

The economic results based on the difference between revenues from sales and total costs showed that the farm could not rely on its own production to gain profit and remain viable (Ta-

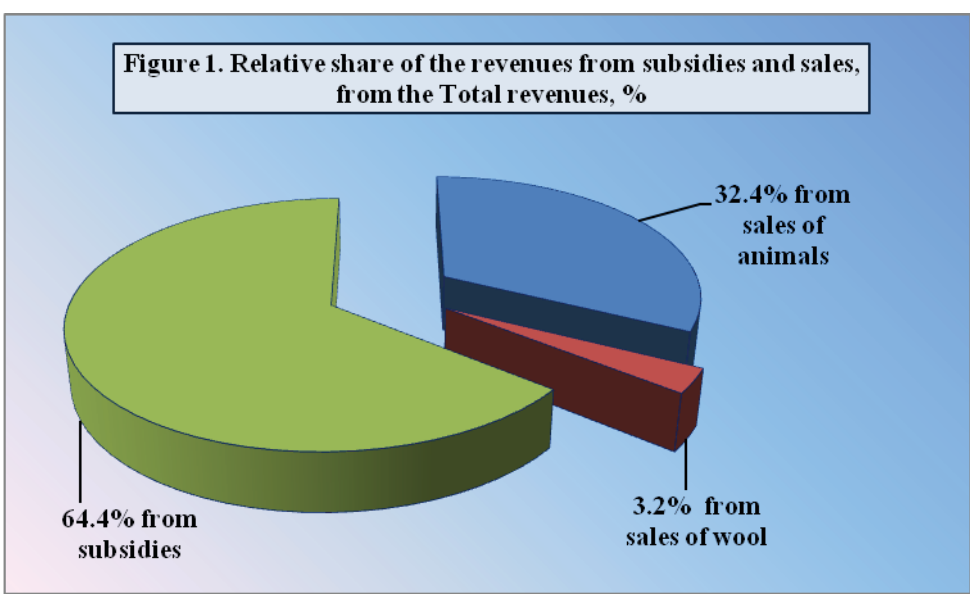

Fig. 1. Relative share of the revenues from subsidies and sales, from the Total revenues, %

ble 4). Losses increased for the analyzed period - from BGN 127.43 to BGN 205.67 per ewe, and the profitability decreased from -47.85% to -62.02%, respectively. After adding subsidies, the financial result turned to positive, in the last year being significantly lower - BGN 8.71 per ewe, and profitability - 2.63%. As already mentioned, this was largely due to the rising labour costs, as well as decreasing subsidies. Similar result reported also Stankov (2020) for a sheep flock of North-East Bulgarian merino: BGN -76.3 and BGN 3.70 per ewe before and after subsidies, respectively.

Table 3. Production costs, BGN

Costs	2018	2019	2020
	Value BGN		
1. Fixed costs	2200.00	2338.00	3925.00
1.1. Membership fees	2200.00	2338.00	3925.00
2. Variable costs	135755.00	120165.00	144312.00
2.1. Feed costs	36499.00	37655.00	37510.00
2.1.1. concentrates	2681.00	3434.00	1027.00
2.1.2. starters	3250.00	2600.00	2600.00
2.1.3. hay	4862.00	5066.00	3623.00
2.1.4. sillage	11420.00	13011.00	8148.00
2.1.5. straw	1486.00	1325.00	1684.00
2.1.6. others	12800.00	12219.00	20428.00
2.2. Labour costs	67013.00	69354.00	94636.00
2.3. Veterinary costs	8750.00	5462.00	6472.00
2.4. Electricity	900.00	1200.00	874.00
2.5. Transport	150.00		
2.6. External service	3240.00	3000.00	3600.00
2.7. Fuels	464.00	500.00	320.00
2.8. Repairs	14000.00		
2.9. Material	2550.00	2544.00	900.00
2.10. Others	2189.00	450.00	
3. Total costs /1 + 2/	137955.00	122503.00	148237.00
4. Total costs per ewe	266.32	254.68	331.63

Table 4. Economic results

Indicator	2018	2019	2020
	BGN, %		
Profit before subsidies, BGN	-66011.00	-72234.00	-91933.00
Profit before subsidies per ewe, BGN	-127.43	-150.17	-205.67
Profitability before subsidies, %	-47.85%	-58.97%	-62.02%
Profit after subsidies, BGN	39662.41	49434.70	3893.66
Profit after subsidies per ewe, BGN	76.57	102.77	8.71
Profitability after subsidies, %	28.75%	40.35%	2.63%

In own study, Slavova (2020) reported a negative financial result and profitability for a five-year period (2010–2014) in a sheep farm of the North-East Bulgarian merino breed (Dobrudzha type). Negative values for profit and profitability received also Slavova and Slavova (2021) for a sheep flock of the Thracian merino breed.

In search of solution to increase the economic results in fine-fleece sheep, Slavova (2020) recommended to apply hormonal treatment and early insemination in order to receive more lambs in periods related to increased demand for lamb meat. Popova et al. (2015) found that the hormonal stimulation of animals of the Thracian merino breed led to increase in profitability. This would imply certain costs, which however could be compensated by the income from sold progeny.

According to Stankov (2020), it would be necessary for the European Commission to revoke wool's status as a side product. Wool should be bought at fair prices that cover the expenses of production. In addition, selection needs to focused on increasing fertility and meat yield of fine-wool sheep. In this respect, Staykova and Stancheva (2009) suggested that the analysis of the current state of fine-wool sheep breeds in Bulgaria shows that a new breeding policy was needed in order to increase economic efficiency. The authors pointed out the need to develop a strategy for the development of the sector based on modern research, analysis and assessment of genetic diversity.

The trends in recent years and especially those related to the effect of the post-Covid 19 crisis worldwide are related to the accelerated increase in the prices of basic production resources such as feed and accompanying ones – electricity, fuels, materials, consumables, services. Against this background, a major problem for livestock enterprises remains the lack of skilled employees, which means that the cost per man-hour is expected to rise rather than maintain its level. On the other hand, the prices of basic sheep products are also rising, but it is not yet clear to what extent they are able to compensate for the escalating production costs. In such sheep flocks as studied in this paper, the main income is subsidies, as high productivity of animals cannot be relied on, especially since milk as a product is not sold. In this regard, it is of great importance for the survival of the sheep farms to make every effort to successfully implement the subsidy criteria under the relevant existing schemes and measures. An advantage in this case is the own production of feed, as well as the significant areas declared under the Single Area Payment Scheme, which confirms the great importance of the availability of pastures and arable land for the viability of livestock farms.

Conclusions

Studied farm had negative results in terms of benefit from own production, and thanks to the received subsidies the values of profit and profitability were positive. Therefore, it is necessary to focus efforts on increasing animal performance and reducing costs per ewe, together with meeting the criteria for receiving subsidies on farms.

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