

STRUCTURE OF INVESTMENT COSTS OF DAIRY SHEEP BREEDING FARMS IN BULGARIA

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Abstract

The purpose of the research was to analyze the structure of the investment costs for the establishment of dairy sheep breeding farms in Bulgaria, as well as to explore some indicators, characterizing the activity of the farms under this study. The data were collected by visiting and questioning the owners of 5 sheep farms and on the basis of own calculations. The structure of the investment costs of the dairy sheep farms was explored. The amount of investments per 1 ewe in each farm was also calculated. Average milk yield, age of inclusion in the main flock of ewes and rams, average number of lactations of ewes, average number of years of using rams and prolificacy were analyzed. Although we couldn't prove it statistically, we saw a tendency for reduction of the investment costs per 1 ewe with an increase in the number of animals in the main flock. The largest share of the investments occupied the purchase of animals, followed by the land purchase and the expenses for agricultural buildings. The interviewed farmers bought predominantly used tractors and other agricultural machinery, mainly because of their lower prices. The ewes in the five farms were inseminated naturally. They were kept in renovated old buildings. During the summer season, the animals grazed on pastures; concentrated fodder as a supplement was used in only one of the farms. The farmers used their agricultural lands mainly to produce meadow hay and alfalfa occasionally wheat and barley. The average milk yield in the farms ranged from 80 to 170 liters per year. These large ranges of variation were due both to the raised sheep breeds and to the specifics farms' activities. Nulliparous ewes and rams were included in the main flock at 12-18 months of age. The sheep remained in the main flock on average of 6 lactations with a variation from 5 to 8 lactations. The rams were used on average for 2 years with variations from 1 to 4 years. Prolificacy in the farms ranged from 100 to 154%.

Key words: dairy sheep breeding; investment costs; milk yield; prolificacy; Bulgaria

INTRODUCTION

Over the last 30 years, sheep husbandry in Bulgaria has undergone dramatic changes. Pursuant to FAO data in 1990, sheep number was 8,130,305 and in 2017 it fell to 1,360,087 [12]. Also the priority of the sector has changed - from the finewool production to the dairy direction. In Bulgaria, sheep in the dairy sector account for 70–75% of the total sheep number and the most widely represented breed is Bulgarian Dairy Synthetic Population (also named Synthetic Population Bulgarian Milk (SPBM), registered in 2005 [10]. The developed crossbreeding schemes for creation of SPBM involved East Friesian and Awassi breeds, as sire breeds and local breeds, as dame breeds. For the last 10 years, there is an interest from the sheep farmers to introduce sheep from world famous milk breeds – Awassi, Assaf, Lacaune.

Average milk yield and prolificacy of the SPBM breed vary in accordance to the number of lactation and lambing [4], [9]. The reported mean for the milk production of the flock at first lactation is 88.07 l, 94.4 l at second, and 100.04 l at third; the mean fecundity varies from 1.2 to 1.7 [4].

Searching for alternatives for raising farm income is essential to redeem investment costs. The performance of livestock sector (including dairy sheep husbandry) in Bulgaria can be improved by new technologies' implementation, which can help the sector to become a competitive one [2].

It has been established [1] that with a suitable reproductive model the net income of the holding can be increased. A number of authors are studying the economic effectiveness of raising SPBM breed in different regions of Bulgaria [6], [7] as well as the economic outcomes of raising local sheep breeds [11].

Investments in a dairy sheep farm in Serbia with 200 ewes in the main flock, were calculated and it was found that Pay back of return on investment was 4.2 years with Internal rate of return of 20% [8]. In our previous research [3], we were calculated different categories of cash flows and some indicators for effectiveness assessment of a dairy sheep breeding farm in Bulgaria with 300 ewes in the main flock and we found out that the Discounted payback was 10 years.

The purpose of the research was to analyze the structure of the investment costs for the establishment of dairy sheep breeding farms in Bulgaria, as well as to explore some indicators, characterizing the activity of the farms under this study.

MATERIALS AND METHODS

The paper examined the structure of the investment costs of 5 dairy sheep farms in Bulgaria. The amount of investments per 1 ewe for each farm was also calculated.

The data were collected by visiting and questioning the owners of the sheep farms, as well as on the basis of our own estimations. The ewes' number in the farms was respectively: 26 ewes, 83, 90, 314 and 325. Average milk yield, age of inclusion in the main flock of ewes and rams, average number of lactations, average number of years of using rams and prolificacy were analyzed. Prolificacy was calculated as a ratio between the number of lambs born for one year and the number of ewes, multiplied by 100.

The farms raised the following sheep breeds: Synthetic Population Bulgarian Milk (SPBM), Sofia sheep (local sheep breed, not endangered from extinction), Stara Zagora sheep (endangered from extinction) and local crosses. The ewes from the five farms were inseminated naturally, artificial insemination was not applied. The farms' buildings were renovated. During the summer season, the animals grazed on pastures, which are important source for the production of ruminants' forages [5]. Concentrated fodder as a supplement was used in only one of the farms (the holding with 26 ewes), which recorded the highest average milk yield

among the analyzed farms. In the winter season, each farm had adopted its own combination of rough and concentrated forages for feeding the sheep. Only 1 farm did not manage land and therefore did not produce feed for the sheep. Four of the farms received subsidies for the animals and three farms - for the lands they managed.

RESULTS AND DISCUSSIONS

Figure 1 shows the investments in EUR per 1 ewe in the main flock. The largest value of this indicator had the farm holding with 26 ewes (1,396 EURO), and the smallest - the farm with 325 ewes (200 EUR).

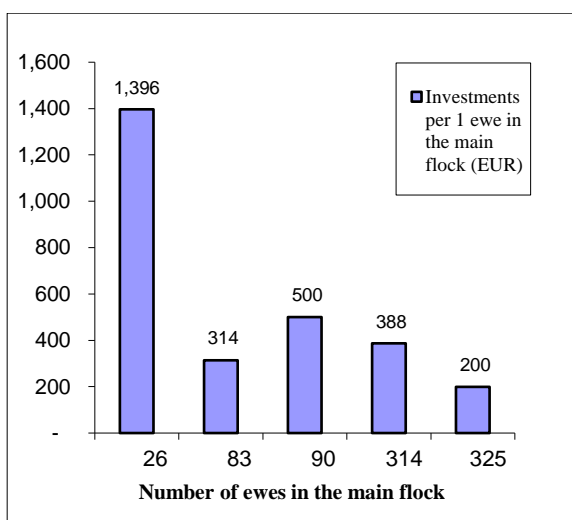


Fig. 1. Investments per 1 ewe in the main flock (EUR)
Source: Data collected from questionnaires and own estimates

Investments per 1 ewe in the smallest farm were almost 7 times higher than these in the farm with 325 ewes. The indicator was 314 EUR for the farm with 83 ewes, ie. the value was close to that for the farm with 314 ewes (388 EUR). On the other hand, in the farm with 90 ewes, the indicator was 1.6 times higher than that for the farm with 83 ewes, although the two farms had almost the same number of animals in the main flock.

Investments per 1 ewe varied widely, depending on the farms' specific characteristics. Although we couldn't prove it statistically, we saw a tendency for reduction of the investment costs per 1 ewe with an

increase in the number of animals in the main flock.

Table 1 shows the mean, standard deviation, minimum and maximum of the shares of the respective investment cost.

Table 1. Structure of investments in dairy sheep breeding farms

Investments	Mean	Minimum	Standard deviation
		Maximum	
Farm buildings (%)	24.80	5 / 47	16.10
Agricultural lands (%)	25.00	0 / 73	28.13
Animals (%)	26.00	8 / 46	13.77
Agricultural machinery (%)	11.20	0 / 22	10.43
Milking equipment (%)	0.40	0 / 2	0.89
Inventory (%)	8.60	0 / 28	12.10
Vehicles (%)	3.80	1 / 8	2.59

Source: Data collected from questionnaires and own estimates

In terms of the mean percent for each category of investment cost, the largest share took the purchase of animals (ewes, rams and lambs) - 26% (with variations from 8 to 46%), followed by the expenditures for agricultural lands (arable land and pastures) - 25% (from 0 to 73%) and the purchase of farm buildings - 24.8% (from 5 to 47%). The share of agricultural machinery (tractors, mowers, balers) was 11.2% with variations from 0 to 22%. The milking equipment took a mean value of 0.40%. Machine milking with a sheep milking bucket was practiced only in the farm with 325 ewes, in other farms the animals were milked manually. The mean percent of inventory (hay cutters, forage grinders, plows, seed drills, cultivators, disc harrows, brush cutters and other) was 8.60%. The mean percentage of vehicles was 3.80%, varying from 1 to 8%.

The studied sheep farmers used their agricultural lands mainly to produce meadow hay and alfalfa, occasionally wheat and barley. Alfalfa was given to sheep in fresh (faded) form during the summer and in the

form of hay during the winter. From the wheat and barley, besides grain (concentrated fodder), straw was also produced, which was used as a rough forage and for animal bedding.

Farmers reported that the purchase price per animal varied according to breed and age: 75-100 EUR for SPBM sheep and 100-150 EUR for a lamb from the Stara Zagora sheep breed. The studied farmers were found to buy predominantly used tractors and other agricultural machinery, mainly because of their lower prices. Farmers said they had bought tractors at prices of 2,500-4,000 EUR per tractor; a baler for 1,750 EUR; a mower for 1,050 EUR; a forage grinder for 150-300 EUR; a hay cutter for 75-100 EUR; a sheep milking bucket - 675 EUR.

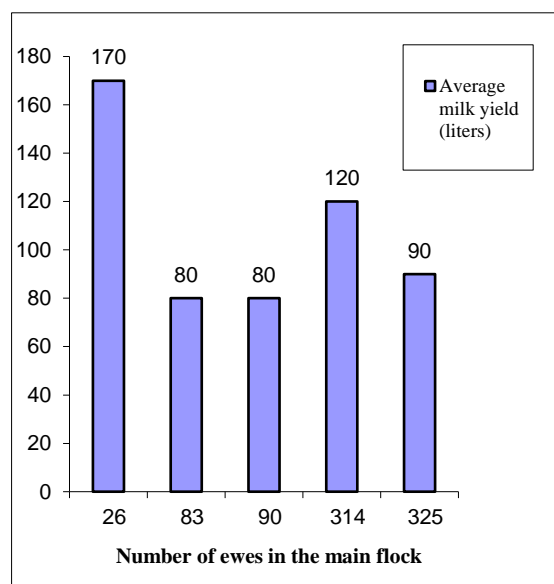


Fig. 2. Average milk yield, realized in the dairy sheep farms

Source: Data collected from questionnaires and own estimates

The average milk yield of ewes from the 5 farms varied widely from 80 to 170 liters per year (fig. 2). Highest milk productivity (170 liters) was reached in the farm with 26 ewes, where SPBM breed was raised. The high milk productivity of this farm, according to us, was due not only to the sheep breed, but also to the individual attendance for each animal. The individual attendance was partly due to the small number of sheep, kept on the farm. The lowest milk productivity had the farms with

83 and 90 ewes in the main flock. In the farm with 83 ewes, SPBM breed was raised, and in the farm with 90 ewes, the animals were from the Stara Zagora sheep breed. In the farm with 314 ewes, the sheep were from SPBM breed and from Sofia sheep breed. Local crosses were bred as well. In the largest farm (325 ewes) the animals were from local crosses and from the SPBM breed.

These large ranges of variation in average quantities of milk yield on a farm level were due both to the raised sheep breeds and to the specifics farms' activities.

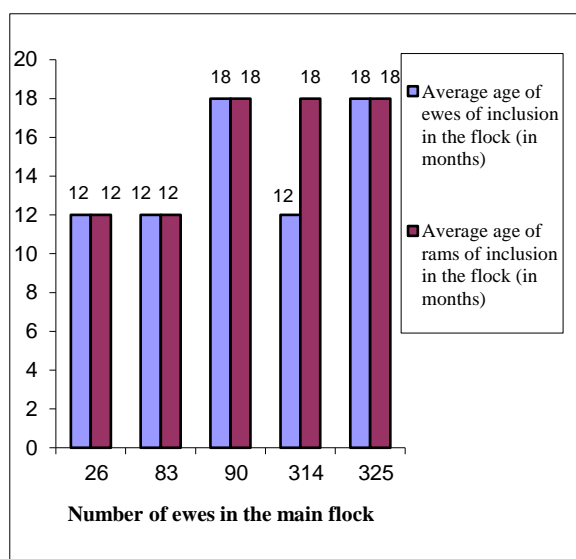


Fig. 3. Average age of inclusion in the main flock
 Source: Data collected from questionnaires and own estimates

Nulliparous ewes are included in the main flock after their first insemination, and rams - after reaching sexual maturity. In the analyzed farms, rams and nulliparous ewes were included in the main flock at 12-18 months of age (fig. 3). The ewes from the farms with 26, 83 and 314 ewes were included in the main flock earlier than the other two farms. Only in farms with 26 and 83 ewes, the rams were included at 12 months of age. The age of inclusion of rams and nulliparous ewes in the main flock is an important indicator, because the animals begin to return the invested resources for their rearing (labor, fodder, medication, services, buildings) after their inclusion in the main flock. They return the investments in the form of animal production (sheep milk, wool and lambs) and in the form

of meat, skin, or money when they are culled or sold.

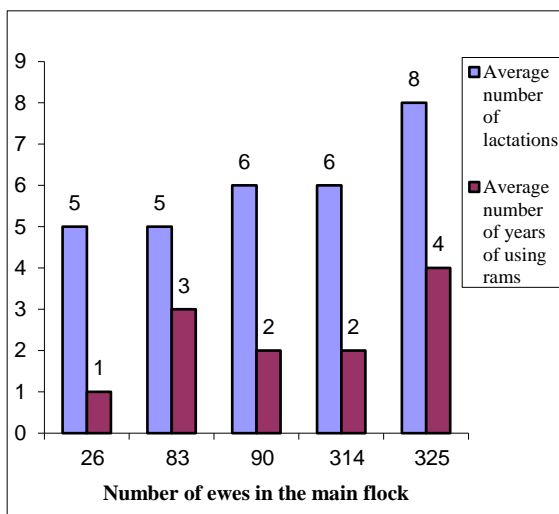


Fig. 4. Average number of lactations and average number of years of using rams
 Source: Data collected from questionnaires and own estimates

According to fig. 4, the ewes remained in the main flock for 6 lactations on average with variations from 5 to 8. The rams were used for 2 years with variations from 1 to 4 years.

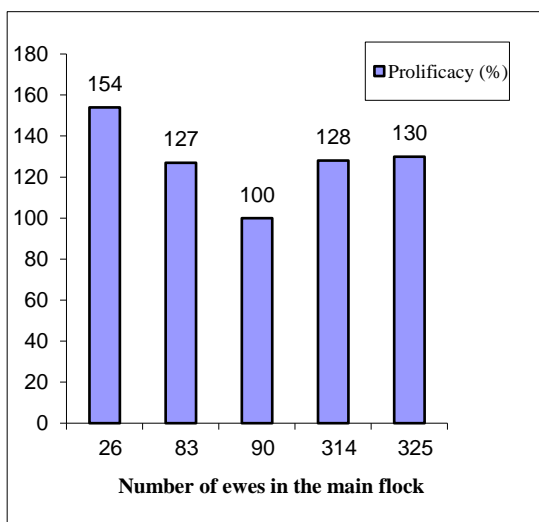


Fig. 5. Prolificacy, realized in the dairy sheep farms
 Source: Data collected from questionnaires and own estimates

Prolificacy ranged from 100 to 154%, with the highest value in the farm with 26 ewes (fig. 5). The lowest percent was observed in the farm with 90 ewes, which was probably due primarily to the raised breed (Stara Zagora sheep). The other three dairy farms had similar prolificacy rates (127-130%).

CONCLUSIONS

Investments per 1 ewe in the main flock varied widely, depending on the farms' specific characteristics. Although we couldn't prove it statistically, we saw a tendency for reduction of the investment costs per 1 ewe with an increase in the number of animals in the main flock. The largest share of the investments occupied the purchase of animals, followed by the land purchase and the expenses for agricultural buildings. The interviewed farmers bought predominantly used tractors and other agricultural machinery, mainly because of their lower prices. The ewes in the five farms were inseminated naturally. They were kept in renovated old buildings. During the summer season, the animals grazed on pastures; concentrated fodder as a supplement was used in only one of the farms. The farmers used their agricultural lands mainly to produce meadow hay and alfalfa occasionally wheat and barley. The average milk yield in the farms ranged from 80 to 170 liters per year. These large ranges of variation were due both to the reared sheep breeds and to the specifics farms' activities. Nulliparous ewes and rams were included in the main flock at 12-18 months of age. The ewes remained in the main flock on average of 6 lactations with variation from 5 to 8 lactations. The rams were bred on average for 2 years with variations from 1 to 4 years. Prolificacy in the farms ranged from 100 to 154%.

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