

## Economic aspect of breeding Karakachan sheep in the lowlands

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### Abstract

The purpose of this study was to establish the economic results of raising Karakachan sheep in the lowlands of the country. Two sheep farms in the area of Sliven and Burgas were object of research. The production system adopted was stall-pasture, with feeding in winter and grazing in summer. Farmers rented pastures, but purchased feed at market prices during the winter feeding season. A breeding association was in charge to control animal performance and selection activities in the studied flocks. Based on financial data provided from the accounting of the sheep farms for 2019, the total revenues and costs, profit and profitability were calculated. It was found that breeding of Karakachan sheep in the lowlands under the specific conditions of the study was a source of income for the farmers and a positive balance between revenues and costs was achieved. It was mainly due to the financial support provided by the state. Positive economic performance on the farms was associated with increased animal productivity, higher prices of products and the introduction of good management practices, rather than with lower production costs.

**Key words:** Karakachan sheep, sheep farms, profit, profitability, subsidies

## Икономически аспект на отглеждането на Каракачански овце в равнинните райони на страната

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### Резюме

Целта на настоящото изследване е да се проучат икономическите резултати от отглеждането на Каракачански овце в равнинните райони на страната. Обект на изследване са две стопанства в района на общините Сливен и Бургас. Системата на отглеждане е оборно-пасищна, с подхранване на ясла през зимата и паша през лятото. Стопаните арендуват пасища, но през зимния сезон закупуват фуражи на пазарни цени. Животните в стопанствата са под селекционен контрол, който се извършва от развъдна асоциация. На база на предоставената финансова информация от счетоводните документи на проучените овцеферми за 2019 г. са изчислени общите приходи и разходи, печалбата и рентабилността. Установено е, че отглеждането на Кара-

качански овце в равнинните райони на страната и при условията на конкретното проучване се явяват източник на доход за стопаните, т.е. постигнат е положителен баланс между приходи и разходи. Основна заслуга за това има финансовото подпомагане от страна на държавата. Положителните икономически резултати в стопанствата се асоциират по-скоро с повишаване продуктивността на животните, нарастване на изкупните цени на продукцията и въвеждането на добри мениджърски практики, отколкото с влягането на по-ниски разходи в производството.

**Ключови думи:** Каракачански овце, овцеферми, печалба, рентабилност, субсидии

### Introduction

Karakachan sheep have been well known in our latitudes since ancient times. Despite the tendency of crossing in order to improve the productive characteristics of the breed from the period of nationalization of farms, part of the population has been preserved purebred to this day. Currently, animals with typical exterior and valuable qualities such as good adaptability and resistance to diseases have been raised in different parts of the country (Staykova et al., 2015). Over the years, productive traits of the Karakachan sheep have been a subject of research by a number of authors – Odzhakova (1994), Panayotov (2003), Nedelchev (2004), Kafedjiev (1997), Boikovski et al. (2004, 2005), Vuchkov (2020) etc.

The traditional habitat of the breed is the mountainous and semi-mountainous areas, due to the exceptional suitability of the animals for breeding in extensive conditions, in areas poorer in natural resources (Staykova et al., 2015). However, this does not exclude the possibility of rearing in the plains, where the feed provision and therefore the opportunity of reaching a better performance are greater.

In recent years, local breeds, including Karakachan breed, are particularly attractive to farmers, which is largely related to the introduction and implementation of Measure 214 "Agri-environmental payments" of the Rural Development Program (2007–2013), and subsequently Measure 10 "Agri-environment and climate" of the Program (2014–2020). Additional incentives have been created by the support scheme for ewes under selec-

tion control, started in 2015, as well as the scheme for single area payment, redistributive payment and agricultural practices favorable for climate and environment. As a result of the simultaneous action of these financial instruments, the population of Karakachan sheep has grown significantly and up to now stands at about 12000.

This fact confirms both the innate desire of Bulgarian farmer of breeding sheep and the successful mechanism of the current support schemes. However, empirical material is needed to demonstrate their effectiveness. Livestock and economics have certain tools providing feedback on important issues. As part of it, economic analyzes focused on the activities of individual business units, although limited and partial, answer some particular questions.

An economic assessment of rearing Karakachan sheep at the Experimental Station for Agriculture and Livestock in Smolian was made by Odzhakova et al. (2010) and profitability of 28.45% was found. In addition, Popova et al. (2011) analyzed the production and processing of milk in the same enterprise and obtained a positive economic result. At a later stage, after the introduction of current measures to support sheep farms, Slavova et al. (2021) studied the economic efficiency of breeding Karakachan sheep in the mountainous areas and reported a rate of profitability of 20.39%. However, it was found that the positive value of the indicator is mainly due to the subsidies received, representing 64.5% of the total revenues.

The aim of the present study was to establish the economic results of breeding Karakachan sheep in the lowlands of the country.

### Material and methods

The object of study were two sheep farms of Karakachan sheep in the municipalities of Sliven (Farm 1) and Burgas (Farm 2). Ewes in each flock were 260 and 250, respectively. The production system was stall-pasture, with feeding in winter

and grazing in summer. Farmers rented pastures, but purchased feed at market prices during the winter feeding season. Ewes were milked (manually) for a couple of months and the milk was delivered to dairies. The reproduction took place once a year during the estrous season (June–July). Natural mating was practiced, at 18 months

**Table 1.** Basic parameters of the farms

**Таблица 1.** Основни параметри в стопанствата

Indicators / Показатели	Farm 1 / Стопанство 1	Farm 2 / Стопанство 2
Ewes, n / Овце майки, брой	260	250
Ewe lambs, n / Женски шилета мин. години, брой	40	30
Lambs born, n / Получени агнета, брой	280	241
Ewes/rams ratio in the flock / Съотношение овце/кочове в стадото	42/1	32/1
Repair of the flock, % / Ремонт на стадото, %	15	12
Conception rate of ewe and ewe lambs, % / Норма на заплодяемост на овце и шилета, %	96	94
Fecundity, % / Плодовитост, %	100	97
Death rate of lambs from birth to weaning, % / Смъртност на приплодите от раждане до отбиване, %	1	1,5
Weaning weight of lambs, kg / Живо тегло на агнетата при отбиване, кг	20–24	20–24
Milking period, days / Продължителност на доения период, дни	90–100	90–100
Average milk yield, L per ewe / Среден добив от овца за доен период, л	38–39	34–35
Wool yield, kg / Вълнодобив, кг		
-per ewe / -от овца	2.5	2.3
-per ram / -от коч	3.5	3.4
Permanent employees, n / Постоянно заети, брой	2	2
-self-employed / -самонаети	1	2
-employed / -наети	1	
Pasture, ha / Пасища под аренда, дка	0.300 / 300	0.200 / 200
Guaranteed lamb market / Сключени договори за изкупуване на агнетата	yes / да	no / не
-price per kg live weight / -на цена, лв./кг /	6.00	4.50

of age. Part of the ewe lambs, have reached 80% of the ewes live weight, were also mated after the age of 10 months. Table 1 presents the main parameters of the studied farms.

A breeding association was in charge of providing control of the selection activities on the farms. As a result, farmers receive direct payments for ewes under selection control or transitional national aid (in case animals did not meet the criteria of the support scheme). Agri-environment payments and “De minimis” national aid were also paid. The subsidy rates have been annually regulated by an Order of the Minister of Agriculture.

Based on the financial information provided from the accounting of the farms for 2019, the total revenues and costs, net margin and profitability rate (net margin to total costs ratio) were

calculated. Data were processed using a mathematical-statistical model and Excel program. The economic results obtained were presented as a total per farm and per ewe.

## Results and discussion

In Farm 1, revenues came from milk, lambs for slaughter and breeding, wool and subsidies, and in Farm 2 – from milk, lambs for slaughter, culled ewes and subsidies (Table 2). A larger quantity of milk at a higher price per liter was provided to dairies on the first farm, revenues amounted to BGN 11550 (21.8% more than in the second one).

A larger number of lambs (260) were sold on Farm 1, at price of BGN 6 for slaughter and BGN

**Table 2.** Revenues, BGN

**Таблица 2.** Приходи, лв.

Type of revenue / Вид приход	Farm 1 / Стопанство 1			Farm 2 / Стопанство 2		
	kg, L, n / кг, л, бр.	Price / kg, L, n / ср. цена / кг, л, бр.	Value, BGN / стойност, лв.	kg, L, n / кг, л, бр.	Price / kg, L, n / ср.цена / кг, л, бр.	Value, / BGN / стойност, лв.
From milk / От мляко	10500	1.10	11550.00	8600	1.05	9030.00
From sold animals / От реализация на животни	-	-	34600.00			23030.00
lambs for slaughter / агнета за клане	220	130.00	28600.00	216	100.00	21600.00
breeding lambs / агнета за разплод	40	150.00	6000.00			
culled ewes / бракувани овце				26	55.00	1430.00
From wool / От вълна	800	1.00	800.00			
Revenues from sales, (1 + 2 + 3) / Приходи от продажби, (1 + 2 + 3)			46950.00			32060.00
per ewe / за овца /			180.58			128.24
From subsidies / От субсидии			46600.00			39512.00
Total revenues, (1 + 2 + 3 + 4) / Общо приходи, (1 + 2 + 3 + 4)			93550.00			71572.00
per ewe / за овца			359.81			286.29

6.50 for breeding. It is important to note that the farmer had a guaranteed market for lambs for slaughter (incl. restaurants), to which he annually provided with quality products. In Farm 2, 100% of the offspring were sold for slaughter at a total value of BGN 21600 and a single price of BGN 4.50 per kg of live weight. Farmer 2 had no permanent business arrangements and relied on occasional sales. As a result, the lamb revenues were higher in the first farm – BGN 34600, i.e. with 33.4%. The lower result in the second farm was also due to the large number of lambs left for flock repair after 26 culled ewes were sold in the current year. Revenues from wool amounted to BGN 800 in Farm 1, while Farm 2 did not report such.

Revenues from sales were significantly higher in Farm 1 – BGN 46950, compared to Farm 2 – BGN 32060. Per ewe they amounted to BGN 180.58 and BGN 128.24, respectively. The result reflected the larger quantities of milk, lambs and wool sold at more favorable prices on the first farm, and the better management skills of Farmer 1.

The state support was also higher in Farm 1 – BGN 46600, by BGN 7088 more, resulting from the fact that the size of subsidies under the single area payment scheme, redistributive payment scheme and for climate-friendly agricultural practices was based on pasture size.

Of essential importance for the viability of the farms and the policy in the sector is the relative share of subsidies from total revenues. In this case, it was 49.8% for the first and 55.2% for the second farm. The obtained result was an indication of the strong dependence between the farm viability and subsidy amount. Such trend was also reported by Slavova et al. (2021) for Karakachan sheep raised in mountainous areas. It was found that subsidies had the highest share of total revenues – 64.5%, followed by the sale of animals – 24.7% and milk – 10%. The established level of indicators showed that breeding of Karakachan sheep in the intensive regions of the country depended to a large extent on the availability of pastures. They provided grazing for most of the year and subsidies to achieve a positive revenues-costs ratio. With the increase

of animal performance, quantity and price of the sheep products, the dependence of revenues on the subsidies normally decreases.

Fixed and variable costs also predominated in Farm 1 (Table 3). The differences between farms in costs of membership in breeding associations and rents for pastures were small and not significant. However, they are significant in the cost for feed – 13%, which was associated with the larger quantities and price in the first farm. Farm 1 also reported higher labor costs, as one of the permanent workers was an employee, while in the second both were self-employed. For the other variable costs, the values varied.

The total costs were definitely higher in the first sheep farm – BGN 75570, by 17.6% more, which was mainly due to higher costs for feed and labor. They amounted to BGN 290.65 and BGN 248.93 per ewe, respectively. In this range was the value obtained by Slavova et al. (2021) – BGN 280.66 per ewe.

The first farm stood out with more economic advantages, which predetermines better financial results (Table 4). The higher animal performance and market price of products, the greater subsidies amount and the more successful marketing strategy were associated with higher levels of economic performance, despite of higher production costs. So that, Farm 1 was expected to make higher profits and profitability compared to Farm 2 (Table 5).

However, we should not ignore the fact that both sheep farms reported a loss before subsidies to be added, as per ewe it amounted to BGN 110.08 and BGN 120.69, respectively. The same situation was described by Slavova et al. (2021) for Karakachan sheep bred in the mountains, as well as for other local breeds such as the Karnobat breed (Staykova et al., 2017) and the Copper Red Shumen breed (Slavova et al., 2020). The profitability without subsidies calculated in our study had also negative value: 37.87% and 48.48%.

With subsidies, the obtained absolute economic result became positive – BGN 69.15 and BGN 37.36 per ewe. The same was found for the relative one (profitability) – it was calculated 23.79% and 15.01%, respectively. Higher profit-

**Table 3.** Production costs, BGN**Таблица 3.** Производствени разходи, лв.

Type of cost / Вид разход	Farm 1 / Стопанство 1	Farm 2 / Стопанство 2
	Value, BGN / Стойност, лв.	
1. Fixed costs / 1. Постоянни разходи	7710.00	6270.00
1.1. Fees for Association membership / Такси за членство в асоциации	1060.00	1020.00
1.2. Accounting service / Счетоводни услуги	2550.00	2400.00
1.3. Rent for pastures / Наем за пасища	3600.00	2400.00
1.4. Maintaining of pastures / Разходи за поддръжка на пасища	500.00	450.00
2. Variable costs / 2. Променливи разходи	67860.00	55962.00
2.1. Feed costs Разходи за фуражи	27400.00	23800.00
2.1.1. concentrates / комбиниран фураж	13200.00	12000.00
2.1.2. starter for lambs / агнета стартер	3000.00	2800.00
2.1.3. hay / сено люцерново и ливадно	10000.00	8000.00
2.1.4. straw / слама	1200.00	1000.00
2.2. Labour costs / Разходи за труд	30000.00	24000.00
2.3. Veterinary costs / Медикаменти и ветеринарно обслужване	2000.00	1800.00
2.4. Electricity / Ел.енергия и отопление	1000.00	980.00
2.5. Water / Вода	1000.00	870.00
2.6. Transport / Транспорт	1200.00	1500.00
2.7. External service / Външни услуги	1500.00	1600.00
2.8. Fuels / Горива	2000.00	1800.00
2.9. Repairs / Ремонти	700.00	780.00
2.10. Materials / Материали	500.00	432.00
2.11. Others / Други	560.00	450.00
Total costs (1 + 2) / Общо разходи (1 + 2)	75570.00	62232.00
per ewe / за овца	290.65	248.93

ability rate – 28.45%, was calculated by Odzhakova et al. (2010) for the flock of Karakachan sheep raised at the Experimental Station of Agriculture and Livestock-Smolyan, but for 2007.

## Conclusions

Breeding of Karakachan sheep in the lowlands and under the conditions of the current

**Table 4.** Economic advantages of farms**Таблица 4.** Икономически предимства на стопанствата

Farm 1 / Стопанство 1	Farm 2 / Стопанство 2
Higher fecundity / По-висока плодовитост на женските животни	Revenues from culled ewes / Реализирани приходи от бракувани овце
Lower lamb mortality from birth to weaning / По-ниска смъртност на агнетата от раждане до отбиване	Lower feed and labor costs / По-ниски разходи за фуражи и труд
Higher fertility rate / По-висока норма на заплодяемост на овцете и шилетата	
Higher average yield of milk per ewe / По-висок среден добив на мляко от овца за доен период	
Higher price of milk / По-висока изкупна цена на млякото	
Breeding lambs sold / Реализирани агнета за разплод	
Higher price per kg live weight of the lambs for slaughter / По-висока цена за кг живо тегло на агнетата за клане	
Revenues from wool / Реализирани приходи от вълна	
Larger subsidies, mainly due to the larger pasture area / По-големи субсидии, основно поради по-голямата площ на арендуваните пасища	

**Table 5.** Economic results**Таблица 5.** Икономически резултати

Indicator / Показател	Farm 1 / Стопанство 1 Value, BGN / Стойност, лв.	Farm 2 / Стопанство 2 Value, BGN / Стойност, лв.
Profit without subsidies, BGN / Печалба без субсидии, лв.	-28620.00	-30172.00
per ewe, BGN / за овца, лв.	-110.08	-120.69
Profitability without subsidies, % / Рентабилност без субсидии, %	-37.87%	-48.48%
Profit with subsidies, BGN / Печалба със субсидии, лв.	17980.00	9340.00
per ewe, BGN / за овца, лв.	69.15	37.36
Profitability with subsidies, % / Рентабилност със субсидии, %	23.79%	15.01%

study was established a source of income for the farmers, ie. a positive balance between revenues and costs was achieved. This was mainly due to the financial support of the relevant state institutions. Positive economic performance on farms was associated with increased productivity of the animals, higher purchase prices of production and the introduction of good management practices, rather than with lower production costs.

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