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## **Efficiency analysis of a sheep farm**

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### **SUMMARY**

Our study shows an analysis of a sheep farm. The present farm was chosen for analysis due to the fact that it is run under special natural conditions and as for the sheep farming, it has quite a few non-typical features. These raise some economic issues, which have to be analysed, questions have to be answered that may result in useful conclusions.

Since sheep farming does not seem to be able to overcome its difficulties on its own, the EU support system could give the initial step necessary for the success and would also help to sustain sheep farms. The amount of grant that is usual in the EU could provide for the sustainability of this sector, the relative safety of sales, the equal chances of the farms operating under different capabilities and if possible it could also reduce the fluctuation in the producers' prices.

In 2005 the farm could only apply for the single area payment and was not entitled to receive the grant based on the number of milk-ewe older than one year. This condition changed by 2006 and therefore they had access to those grants. In the following years if support funds could be used at a maximum level, the earning ability of the sector would change significantly.

Since 2006 the available support funds can be requested from several sources for the above mentioned farm. If these sources can be assured for the farm it is also necessary to work out the professional conditions and efficiency and profitability shall be taken into consideration.

**Keywords:** ewe, production cost, yield, production value, results of sector.

### **INTRODUCTION**

After joining the EU, sheep breeding got a new type of consideration in Hungary. In the EU extensive sheep breeding is one of the supported areas of animal farming, with respect to the realization of sustainable regional development.

Our study analyses a sheep farm. The present farm was chosen for analysis due to the fact that it is run under special natural conditions and as for the sheep farming it has quite a few non-typical features. These raise some economic issues, which have to be analysed, questions have to be answered that may result in useful conclusions.

## LITERATURE REVIEW

The objective of the researchers and breeders is to increase the revenues of sheep breeding and farming in the shortest possible time, in order to improve efficiency and profitability. According to *Harcza* (2004) Ile de France, and Suffolk breeds show significant results and seem to be able to increase the efficiency of Hungarian sheep breeding as well. Furthermore the Bábolna TETRA breed can also contribute to the efficiency increase. Its outstanding reproductiveness and good lamb producing ability enables it to improve the maternal characteristics of the merino breed by cross breeding and therefore it creates starting populations for several cross breedings.

Not only in Hungary, but also in the whole world the efficiency and profitability of sheep breeding is defined by its reproductiveness (*Árnyasi et al.* 1999). *Bromley et al.* (2001) considers reproductiveness as one of the main defining economical factors that along with other characteristics can be a suitable tool for an effective and economic based selection.

According to *Harcza* (2004) based on the month of birth, the time between two births can be shortened by even 2 months, therefore the reproductiveness can increase with 0.05 lambs. Choosing the right time for insemination the time between the two births can remain well within a year and the average reproductiveness can increase by 0.09 lambs. *Harcza* (2004) stated based on his research that the environmental abilities – age-group effect – the time of birth and insemination can influence the life performance of the animal, the difference of the two limits can even produce 4 births or 5 lambs as well.

Principally it must be admitted that the increase of profitability of sheep breeding can only be reached by increasing the specific yields. At the same time higher yields require higher standard of feeding. The question is if it is worth using a genotype that is more sensitive to fodder and is using more marketable fodder, or we should prefer a less demanding type with lower fodder costs (*Jávor and Lakatos* 1993).

*Kukovics* (1998) says that for the survival of the sector it is mainly important to increase meat production. The offsprings sold for meat give about 90% of the revenues in traditional shepherds and in the milk producing farms it is approx. 60%. In the European Union the meat production is given priority in order to improve the index of reproductiveness and to decrease the loss of growing of the breed (*Kukovics* 1998). The solution could be to increase meat production and it is the form and size of ewes that must be changed and the reproductiveness is to be increased and the lamb producing ability improved.

The main problem of the sector according to *Nábrádi and Jávor* (2001) is in the low yields, while *Zsemkó* (2005) thinks it is the workforce. From the point of view of employees the

main problem is the sheep tenders. According to *Molnár* (2005) due to the time consuming labour young people do not want to be shepherds, since they do not want this type of job to live on.

## MATERIALS AND METHODS

The analysis of the main measures of the sector includes the years 2002–2005. In this study the yields per ewes, the revenues and costs, the coverage contributions and the results of the sector were examined.

To complete the studies we got access to the books and records of the farm, the breeding diary, and personal information received from the managers of the sector.

The data were processed with the use of Microsoft Excel. In order to get a clear picture on the situation of the sector the managers of the farm, the sheep tenders and the consultations with the shepherds were helpful for us.

The calculation of the funds contribution and the results of the sector were completed with the method used both in the EU and also in Hungary by AKII. The coverage contribution I. (FH I.) means the contribution of one ewe to the Standard Coverage Contribution (SFH) functioning as EU factory and size typology.

Since sheep breeding can be characterised by natural measures calculated upon one ewe, therefore we were able to define the weight of lambs per ewes per year, the sold meat lamb, the quantity of milk and wool produced and all the characteristics modifying these parameters.

The examined farm is one of the old traditional farms of the North-Hungary region. The farm is run on approx. 1900 hectares of land; out of that 800 hectares are arable land 900 hectares grass and 200 hectares are forest. Due to the topographical forms the ratio of grasslands and pastures is significant and their utilisation is mainly by grazing. The area of pasture is 650 hectares, which is in Hungarian relations very high. The grassland gives 7–8 tons of hay perhectare, which is enough to feed 4 ewes.

The ewes are on the pasture most of the time. They are only bordered in to the lambs for suckling. Grazing determines the condition of the animals. Grazing is mainly on wild grass, planted-on grass and sometimes on stubble-fields. The pastures are well supplied with water as drinking water comes from wells. Natural shade is also very important for the animals especially at noon for the better utilisation of fodder. In spring the animals are taken on pastures that were planted on, because the grass grows there earlier. The wild grassland starts growing at the beginning of April only. Sheep prefer wild grass for grazing because there are shorter grasses of different varieties.

Sheep breeding is the main animal breeding activity on the farm. Main activity of this sector is to supply – above the supplementation of their own stock – the domestic sheep breeders with modern, meat breeding animals (buck, gimmer), as well as to give meat lambs and sheep meat for the market, and supply the family farms with crossbred stock. Two breeds controlled by pedigree: Suffolk and Hungarian merino are involved into breeding. There are approximately 2000 animals on the farm and half of them are under pedigree control.

Due to the tradition of sheep grazing in this area, the farm employs skilled shepherds and tenderers, who have the experience and knowledge to work effectively.

## RESULTS

The information collected during our study is shown in *Table 1*. and the results of the study are shown in *Tables 2* and *3*.

*Table 1.* Main data of sheep breeding in the given farm

Description	2002	2003	2004	2005
<i>Closing headcount XII. 31. (pcs)</i>				
Ewe	1180	925	908	853
Lambs, suckling	71	56	55	52
Lambs.	24	19	18	17
Meat sheep	25	28	36	39
Buck	11	13	11	12
Total	1311	1041	1028	973
<i>Nominal yields</i>				
Number of lambs on 100 ewes (pcs)	119.4	120.0	128.1	138.2
Wool production per one ewe (kg)	3.7	3.4	3.8	4.2
Milk production per one ewe (l/year)	–	–	–	–

Source: Own summary, based on the farm data (2006)

Analysing the results we proceeded as follows:

1. The variable cost trends within the cost structure, mainly the fodder costs.
2. Calculation of the production value and yield per ewe along with these variable costs.
3. Determining the FH I. per ewe (production value – direct variable cost).
4. After the deduction of the indirect variable costs, the value of FH II., most important items of the fixed costs and the results of the sector.

The costs of fodder played a significant role in the evaluation of the variable costs. Based on the data shown in the tables we can declare that in 2002 the costs of fodder was HUF 5,691, in 2003 it was HUF 5,492, in 2004 HUF 7,464 and in 2005 it cost HUF 7,948 per ewe. These extreme differences are due to the fodder prices, although the own produced fodder and mass food represented a very high amount. The explanation of that is that in this farm the use of own produced fodder is very high and there is no need to purchase a huge quantity of fodder. Grazing is also a cost reducing factor. Food of the animals means basically come from grazing from spring to autumn, only the mothers close to giving birth and those suckling get a supplementation of 0.8–1.0 kg food. In winter mass fodder – hay and corn silage – gives the food required. If the quality of the fodder is problematic and also depending on the reproduction situation of the animals, they receive supplement food, which can reach 1.0–1.5 kg per day.

Table 2. Cost and revenue of farming one ewe in the given farm (HUF/ewe)

Description	2002	2003	2004	2005
<i>Production value</i>	14436	16542	18899	17418
Breed animals depreciation	5348	4559	4231	3372
Own production fodder	2392	1342	860	2325
Bought fodder	28	1721	3059	1282
Own production mass fodder	3183	2355	3403	4215
Other fodders	88	74	142	126
Veterinary costs	583	294	276	528
Electricity	173	509	425	461
Other energy sources	18	3	2	50
Water	191	512	426	509
Other direct variable costs	318	297	264	315
<b>Direct variable costs total</b>	<b>12322</b>	<b>11666</b>	<b>13088</b>	<b>13183</b>
<i>Coverage contribution I.</i>	2114	3876	5811	4235
Variable machine costs	389	382	412	603
Repair shop variable costs	112	98	119	73
<b>Indirect variable costs total</b>	<b>501</b>	<b>480</b>	<b>531</b>	<b>676</b>
<i>Coverage contribution II.</i>	1613	3396	5280	3559
Wage	2933	3501	4453	4737
Allowances of the wage	1290	1399	1694	1932
Depreciation	270	353	443	291
General costs	1251	522	688	525
<b>Total fixed costs</b>	<b>5744</b>	<b>5775</b>	<b>7278</b>	<b>7485</b>
<b>Production costs total</b>	<b>18567</b>	<b>17921</b>	<b>20897</b>	<b>21344</b>
<b>Result of sector</b>	<b>-4131</b>	<b>-1379</b>	<b>-1998</b>	<b>-3926</b>

Source: Own summary, based on the farm data (2006)

Table 3. Average production value of the shepherd broken down on an ewe in the given farm

Description	2002	2003	2004	2005
Born lambs/ewe (18.0 kg average weight)	1.2	1.2	1.3	1.4
Average sales price (HUF/kg)	583	690	714	593
<i>Revenue (HUF/lamb)</i>	12593	14904	16708	14944
Wool production (kg/ewe)	3.7	3.4	3.8	4.2
Average sales price (HUF/kg)	125	155	160	160
<i>Revenue /wool/ (HUF/ewe)</i>	463	527	608	672
Produced milk (liter/ewe)	–	–	–	–
Sales of eliminated breed animals (HUF/ewe)	1380	1111	1583	1802
<b>Production value (HUF/ewe)</b>	<b>14436</b>	<b>16542</b>	<b>18899</b>	<b>17418</b>

Source: Own summary, based on the farm data (2006)

For four weeks of time before the insemination the gimmers and ewes get supplementary food – 0.5–0.8 kg fodder, this is the so-called flushing. The flushing is to finish at the end of the second week after the insemination, in order to help to impregnate the fertilized zygotes in the womb.



The changes in the costs of vet and medication for the animals is mainly due to the regulations, which differ year by year, this is an item that the sector can have the least influence on. The material costs for the animal health may also increase.

The depreciation of the breeding animals accounted in the first year of the period examined exceeds the amount accounted in the last year of our study by HUF 1,976. The reason for this is that in the autumn of 2001 there was a strict selection and in order to increase the population the selection was smaller in number.

The dramatic increase of the energy costs increased all the other cost types significantly: higher energy costs result in the increased costs of additional services, the price of fodder etc. The big difference seen by this cost factor (on average it is 30% lower on this farm than the national figures) is due to the relatively modern buildings and equipment used in this farm in comparison to other farms of the country. Another reason is that there is a continuous cost efficiency project on this farm for several years. There is a slight increase to be foreseen in the price of energy costs if they are able to utilise the rationalising options for the use of energy.

An increase in the other direct costs can also be expected, since services are getting more and more expensive. Rental fees are expected to increase above inflation rate, both for the buildings and for the pastures. Insurance cost increase together with the increase of the value of animals, since they are calculated based on the value of animals. The interest and the lockup of capital costs will hopefully decrease, as slowing down of inflation may result in the decline of interests on loans.

Taking into consideration the size of population, there was a decline to be observed (*Table 1.*). Compared to the first year of the period examined the number of ewes decreased by more than 30% in the year 2005. The total number of stock showed the highest decline from 2002 to 2003, the reason for that was the strict selection at the end of autumn 2001 as well as the death of animals: 61 ewes died and 112 were eliminated. The number of deaths declined in the following years of the period examined – and so did the number of eliminated animals. The consequence of that was that the number of mothers put to production also decreased, however the number of lambs separated from their mothers increased.

However the time between two births is an important measure from economic point of view the average reproduction is a more important factor (*Table 3.*). In 2005 the number of lambs born was 1.4 per mother, which was much higher than the performance of the previous years. The two limiting values were 1.2 (2002, 2003) and 1.4 (2005), though the result of years were changing, and showing a slight decline. The average reproduction was influenced according to the fact, which month the lamb was born, or rather which month the mother was fertilized. This factor is significant, because you can see the months and periods of time when it is worth fertilizing. This way the number of sellable lambs and reproductiveness can be increased.

In the average of the four years the weight of lambs at the time of separated from their mothers was 18.0 kg. In the last year of the examined period the average of lambs was

the afore mentioned 1.4 lambs, which meant 25.2 kg of weight, although in the first year a weight of only 21.6 kg was registered. The reason for that were again the strict selection and the suitable foddering of animals.

In the followings we show the revenues per lambs. The average sales price comes from the average kilogram price of the suckling lambs and the gimmers selected and those of the buck lambs. Market price is not stable, but it is changing rapidly, first there was an increase then a significant decline. In 2005 HUF 593 per kilogram was the achieved market price.

Most of the lambs were sold to the Western European countries, mainly to Italy. For domestic sales lower quality – and mainly the reject – ewes and lambs were available. Export sales is continuous all the year round, there are high seasons like Eastern, the middle of August (Ferragosto) and Christmas. It is characteristics of the sales and buying prices that during the seasonal periods the prices are higher than in other times of the year. Depending on the season there can be a 40–50% price difference.

Along with the sales there is further revenue generated by the wool, which could be sold any time, but nowadays its significance is minor. However the revenue generated from the wool does not have any margin content, since the clipping of sheep and preparing the wool for sales and its delivery is more expensive than the revenue generated.

Milk is not a source of revenue for the farm, since ewes are not milked but the suckling lambs are fed with it.

To sum up, the yields resulted in an increase of production value till 2004, and then in 2005 there was a significant decline. The reason for this is the decrease in market prices.

In 2003 FH I. proved to be the best due to the increase of yields. The defining factors of FH II. its additional services, such as the machine and repair costs are insignificant every year. There are wells on the pastures that ensure continuous water supply there is no need to use water-waggons, because the rivers going through the pasture do not dry out even in big drought.

One of the main ratios of the fixed costs includes the wages and allowances. There was a decrease in the number of employees, while there were 15 people working in the farm in the first year of the period examined, this number decreased to 9 by 2005. One of the reasons for that is that there was a reduction in the population of animals, and it was also a problem to find the required number of skilled and experienced shepherds. The farm has good relationship with the Labour Exchange Office, but still they are not able to find the necessary workforce, although the buildings and pastures are available.

The overhead costs per mother show a continuous decline from year to year, this is due to the reduction in stock. Furthermore most of the costs come from different carry-overs, which do not necessarily mean actual increase of expenditures, partly a question of accounting what is charged on a sector.

Examining the results of the sector we can define that the loss of the sector was dramatic for the farm during the years examined. This was due to the high costs and the market prices defining the production value.

### ***Support – At the bottom of the bag?***

Since sheep farming does not seem to be able to overcome its difficulties on its own, the EU support system could give the initial push necessary for the success and would also help to sustain the sheep farms. The amount of grant that is usual in the EU could contribute to the sustainability of this sector, the relative safety of sales, the equal chances of the farms run under different capabilities and if possible the fluctuation in the producer's prices could also be induced.

In 2005 the farm could only apply for the single area payment based on the size of its area and was not entitled to receive the grant based on the number of milk-ewe older than one year. This condition was changed by 2006 and therefore there was an access to the grants. In the following years the sector fully may utilise the support funds so the earning ability of the sector can change significantly. Since 2006 there are support funds available and the farm can apply for several sources. If the sources can be assured it is also necessary to work out the professional conditions for their utilization with respect to efficiency and profitability.

## **CONCLUSIONS, SUGGESTIONS**

The extensive fodder producing areas could be best utilised by sheep breeding. The available pastures and the excellent reproduction characteristics of the stock would give chances for better utilization of the production capacities, by increasing the sheep stock. Apart from these two important factors beside others – such as the range and amount of funds available and the number of available professional – must be taken into consideration.

The special abilities of the region play an important role both in the variable costs and in the fixed costs as well, and profitable production is only sustainable with further additional expenditures.

It is advisable to achieve better cost efficiency in this sector due to its internal economical regularities. The realistic opportunity to decrease the fodder costs lies in the maximum utilization of the pastures. To cut back on the veterinary costs there is only one way, to change the standard of the environment and fodder, which causes excess expenditures on the above-mentioned areas and therefore results in higher costs.

The sheep sector with the store-sheep production was not able to gain profits during the examined years (2002–2005). This study also proves that the improvement of funding itself is not enough to sustain the profitability of the activities.

When working in this sector it is only the significant increase of funds due to joining the EU that can have a result that is high enough to be a source for subsistence and developments. Without supports the position of income is unfavourable in this sector. Based on our studies it can be stated that in the case of maximum utilisation of the support funds the revenue generating ability of the sector can be improved.

Considering the fact that it is a stirpiculture, the pedigree stock sales could also generate significant revenue. Due to the disappointing revenue situation of the sector, not only the qualified female supply is neglected upon compulsion by the farmers, but even the quality of the end product, the number of lambs for sale, which could be significantly improved with the purchase of bucks.

As the area is unique it is very important to practice farming with pasture management. In our opinion and from the point of view of environment management and eco-social aspects sheepbreeding farm of the region Borsod-Abaúj-Zemplén is on the right place.

## Egy juhászatra specializált gazdaság eredményessége

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Tanulmányunk egy gazdaság juhászatának elemzéséről számol be. A vizsgálat alapjául szolgáló gazdaság választását az indokolta, hogy speciális természeti adottságok között működik, a juhtartást tekintve pedig tipikusnak nem mondható sajátosságokkal rendelkezik. Ezek számos ökonómiai kérdést vetnek fel, amelyek megválaszolására irányuló elemzések hasznos következtetéseket eredményezhetnek.

Mivel a juhágazat jelenlegi helyzetéből önerőből kilábalni nem látszik képesnek, ezért az EU támogatási rendszere megadhatná a későbbi sikeres működéshez elengedhetetlenül szükséges kezdőlökést, valamint elősegítené a juhászatok „talpon maradását”. Az EU-ban megszokott nagyságrendű támogatás megteremthetné az ágazat jövedelemtermelő képességét, az értékesítés viszonylagos biztonságát, az eltérő adottságok között dolgozó juhászatok esélyegyenlőségét, valamint lehetőség szerint csökkentené a termelői árak hullámzását.

2005-ben a gazdaság csak a területalapú támogatást igényelhetette, az egy év feletti anyajuh támogatásra nem volt jogosult. Ez az állapot 2006-ra megszűnt és ezzel megnyílt a kapu a támogatások felé. A következő években a támogatási források maximális kihasználása esetén az ágazat jövedelemtermelő képessége jelentősen javulhat.

2006-tól a rendelkezésre álló támogatások több forrásból is igényelhetők a szóban forgó gazdaság számára. Ezen források biztosítása mellett a felhasználás feltételeinek szakszerű kidolgozása a hatékonyság, illetve a jövedelmezőség szempontjából elengedhetetlen.

**Kulcsszavak:** anyajuh, termelési költség, hozam, termelési érték, ágazati eredmény.

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