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**ECONOMIC ANALYSIS OF DATA FEATURING ANIMAL HEALTH  
AND USE OF MEDICINES AT DAIRY FARMS IN WEST-  
TRANSDANUBIAN REGION**

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## **1. MAIN OBJECTIVES OF RESEARCH AND RESEARCH HYPOTHESES**

Political transformation in 1989-90 induced remarkable changes in Hungary's agriculture. The transition hit animal husbandry more seriously than plant growing and resulted in a controversial situation. While the importance of animal husbandry shows an increasing trend in the world in food processing all over the world, in Hungary the consumption of animal products decreased owing to different economic changes. This tightened the internal market of animal husbandry sectors and enhanced the problems coming from the transition.

Political transformation threw the cattle sector into confusion. As a result the sector performance continuously decreased and stopped at a very low level. One of the reasons of the decline is the lack of incomes in the sector. Difficulty in obtaining ownership of property also contributed to lessening of performance. The out-of-date housing technology and equipment, financial problems in development also reduced the productivity of the sector, which lead to increased production costs and decreased the returns of milk production. As a result the number of cattle reduced by 30% during the past 12 years, several dairy farms closed as well.

The author intends to answer the questions: What are the most frequent disease at the farms in the West-Transdanubian Region between 2000-2002;

How high is the rate of culling because of diseases; What is the level of production like; What is the fertility index like and how does the time between two calving develop? Statistical methods are used to analyse the relationship between the diseases.

The author analyses the effect of medicine costs on production costs, their role among the factors influencing the profitability of milk production for selling, below it their role among the variable costs and total costs.

## 2. MATERIAL AND METHODS

We collected data from questionnaires from 30 dairy farms in counties: Győr-Moson-Sopron, Vas, and Zala of the West-Hungarian Region during the years 2000-2002. 80% of data came back from county Győr-Moson-Sopron and Zala. We sent out 80 questionnaires and we could evaluate 30 out of them. The questionnaire asked for data on animal health, rate of cow culling, size of livestock, milk production and technological details of the dairy farms. Further on questions were put about the most frequent diseases like mastitis, metritis, placenta withdrawal, and foot diseases and intervals between two calving and fertility index.

In order to analyse the relationship between medicine costs and production data of the dairy farms we chose 3 dairy farms owned by shareholding companies.

In our investigation of medicine usage we first analysed the production data of the dairy farms and compared them in the interval between 2000-2002. Then we calculated the yearly sum of medicine costs per product group at the dairy farms. We did not consider the rate of inflation per year. We investigated the average medicine costs per cow and the tendency of medicine-application during the relating 3 years. We compared the milk yield and calve-offspring per cow with the total specific medicine costs, and calculated medicine costs per litre of milk. Finally we calculated the recover of medicine costs per dairy farm.

### **3. RESULTS AND CONCLUSION**

We introduce the indexes of livestock health of dairy farms, the number of cows, the number of milking cows, the fertility index, the period between two calving, proportion of most frequent diseases, sub-clinical and clinical mastitis, foot diseases, placenta withdrawal and the metritis at dairy farms between 2000 and 2002. We prepared the tables on the basis of own questionnaires. Most dairy farms, 14 in number, keep 596 cows on average, that makes 27.21% of all dairy farms, followed by 10 farms keeping 305 cows on average and two farms with 80-100 cows, another two farms with 101-200 cows and finally two farms keep a very high number of cows: 801-1200.

Most cows are owned by co-operative farms, the second largest dairy farms are run in the form of shareholding companies, others by Ltd-s, deposit companies and other forms of enterprises.

In 2000-ben dairy companies under investigation kept 466 cows on average, 368 cows out of them were milked, fertility index was 2.4, and the time between two calving amounted 409 day, a relatively high number of days. Mastitis (sub-clinical and clinical) was the most frequent disease in the year of investigations followed by placenta withdrawal, metritis and foot diseases. The rate of cow culling because of disease was 20.1%.

Based on summarized data of the year 2001 the average number of cows was 463 less than in 2000. There were 367 milking cows, the fertility index reduced from 2.4 to 2.3 and the number of days between two calving from 409 to 408 days. The rate of mastitis (sub-clinical and clinical) changed

by 2.4%, placenta withdrawal by 2.1%, metritis by 1.4% and foot diseases by 0.9%. The rate of cow culling because of diseases increased from 20.1 to 26%.

Based on summarized data of the year 2002 the average number of cows was 463, the number of milking cows was 367. Fertility index and the time passed between two calving correspond with the data of the foregoing year. The rate of mastitis reduced from 20.2 to 19.3%, placenta withdrawal reduced by 0.2% and metritis by 0.5%. Foot diseases increased by 0.9% compared to the foregoing year. Because of diseases the rate of cow culling reduced by 1% in the year of investigations.

Summarized data of 30 dairy farms show that the farms keep 464 cows on average. The average rate of fertility index was 2.3 and 408 days passed on average between two calving in 2000-2002. The reproduction data are much higher than the optimum especially those referring to the time passed between two calving. Livestock health problems include the most frequent sub-clinical mastitis of 11.9%, placenta withdrawal of 11% and metritis of 8.5% and clinical mastitis of 8.7%. So we can conclude that mastitis (sub-clinical and clinical together) were the most recurrent livestock diseases (20.6%). The rate of foot diseases was relatively low: 3%. According to the responds of the farm experts the causes of lameness caused by foot diseases can be bound to damaged or improper floor covering and bedding.

The average rate of cow culling as a result of diseases is higher than 25%, it means that very few cows can be culled from the livestock for the purpose of breeding if calculated with an average rate of 25-30%, so the pressure of selection on genetic performance is quite low. According to the

results of the questionnaires the most frequent cause of cow culling is acetoaemia (mainly sub-clinical acetoaemia) as well as the fatty liver syndrome – these metabolic problems can be the cause of the high rate of frequent placenta withdrawal and metritis, which again are bound to feeding failures. In this case we should not only think of quantitative failures in feeding but qualitative ones, namely qualitative feeding should be in accordance with the production requirements. It is very important to feed cows according to the season, to their metabolic profile and to production requirements. Much lower is the culling loss owing to the position change of abomasums, which can be bound to feeding failures in most of the cases.

Investigations aimed at medicine use were focused on production indexes of the dairy farms. –Based on 3 years of investigations – the milk quantity per year, sold by the dairy farms, increased. At dairy farm „A” the quantity of sold milk increased by 439litre, at farm „B” by 163 litre, and at farm „C” by 76litre. Similarly the number of cows changed a little in 2002, i.e. at dairy farm „A” it decreased by 7, at farm „B” it increased by 30, and at farm „C” it also increased by 10. Therefore the specific quantity of sold milk increased year by year. Dairy farm „A” sold 1313litre more farm „B” sold the same quantity farm „C” sold 60litre more milk, so milk yield reached quite high a level by 2002. Fertility indexes were quite similar in the given years: dairy farm „A” reduced the number farm „B” increased by 12 and „C” by 16, though these indexes are especially low. The rate of animals for slaughter (culling) was very high, between 22.5-40.9% in the years of investigations. The very good improvement of nominal production indexes could be explained by

the very high rate of culling. There was no emergency slaughtering and rate of death remained very low, between 1-4% during the 3 years.

We analysed the use of medicines as per product group and indication. We grouped medicines as follows: antibiotics, disinfectants, vitamins, mineral materials, hormones, vaccines, anti-parasitic formulae, anti-inflammatory drugs, painkillers, other products of surgery, internal medicine and diagnostics, as well as vet therapeutic equipment.

Research results show that medicine costs increased year by year. At dairy farm „A” it increased by 4572 thousand HUF, at farm „B” by 1954 thousand HUF, at farm „C” by 1534 thousand HUF. Medicine costs per cow per year were the highest in 2002, which is a direct result of the price increase of antibiotics, vitamins and vaccines. In all 3 years antibiotics produced the main part of medicine costs. The second highest rate of expenditures produced vitamins and vaccines. The rate of hormones was also very high in the total costs in 2001, i.e. at dairy farm „A” it reduced by 694 thousand HUF, but at farm „B” it increased by 16 thousand HUF and at farm „C” it increased by 241 thousand HUF, therefore a notable decrease could only be observed at farm „A”. The rate of costs of vaccines doubled or got much higher, at dairy farm „A” it was fourfold, at farm „B” it increased by 1.6, at farm „C” by 1.4, which means an improvement. Costs of anti-parasitic formulae increased at dairy farm „A” by 378 thousand HUF, at farm „B” by 155 thousand HUF, and at farm „C” by 52 thousand HUF. The rate of disinfectants also increased, at dairy farm „A” by 631 thousand HUF, at farm „B” by 286 thousand HUF, but at farm „C” it increased by only 50 thousand HUF within total costs of medicines. The rate of antibiotics costs also increased during the years passed,

e.g. at dairy farm „A” by 1331 thousand HUF, at farm „B” by 636 thousand HUF, but at farm „C” it increased by 1029 thousand HUF!. This happened in spite of the fact that there was a cost increase in the applied preventive products. The increased costs of antibiotics cannot only be explained by the rate of application but we have to mention that there was a considerable price increase during the investigated period between 2000 and 2002.

In order to evaluate the recover of medicine costs, we calculated how much litre of surplus milk production was needed to cover the medicine costs per cow. Agro-economic conditions of the year 2002 were considered as the basis, because this year was the middle year among the three investigated years, therefore the price changes per year might somehow be balanced. So we calculated with a milk price of 69.03 HUF/litre. Calculated for the three dairy farms an average amount of 351litre surplus milk production would cover the medicine cost per cow. This would mean at dairy farm „A” 349litre surplus milk production, at farm „B” 376litre milk and at farm „C” 329litre respectively.

**Based on the research results we can make the following suggestions:**

- Good milk yield is due to conscious selection work and good genetic background. Therefore the genetic potentials of the animals should be utilised, because high level of milk yield increases incomes. Surplus incomes enable the farms to improve the system of conditions of feeding, housing technology and human environment.

- In the future it would be a realistic objective to use less antibiotic and to replace them by cheaper drugs having the same effect and as a result the medicine cost per cow could be reduced as well.
- It is very important for a dairy farm to analyse costs and revenues continuously, so that one could intervene if required to prevent unfavourable incidents.
- If the time passed between two calving could be reduced by 10 days, it would have a positive influence on the profit through having more calves and more milk yield.

#### 4. NEW RESEARCH RESULTS

Based on the foregoing chapters new and novel research results are summarized as follows:

1, At 30 dairy farms of the West-Transdanubian Region, where 464 cows are kept on average, **the average fertility index was 2.3 and 408 days passed between two calving** in 2000-2002. These reproduction data are much higher than the expected optimal values, especially those referring to the time passing between two parturitions.

2, Research results show that **among livestock health problems sub-clinical mastitis and placenta withdrawal are the most frequent diseases with a rate of 11%, but metritis and clinical mastitis reached a value of about 10%. So we can say that the most frequent livestock disease is mastitis (clinical and sub-clinical together: 20.6%).** Foot diseases show a **relatively low frequency rate of 2.7%.**

3, **The average rate of cow culling because of disease is more than 20%**, showing that relatively few cows can be chosen for breeding, so the selective pressure is quite to enhance genetic progress. **According to the results of the questionnaires the main cause of culling are acetonaemia** (first of all sub-clinical) and **fatty liver syndrome.** These metabolic disturbances are in the background of the high rate of placenta withdrawal and metritis as a result of feeding failures. Here on should not only mention quantitative feeding problems but performance related qualitative feeding as well. Feeding should be based on requirements in accordance with the seasons, with the metabolic profile and the performance of the cows. Much lower is the

culling loss owing to the position change of abomasums, which can be bound to feeding failures in most of the cases.

4, We compared production data with medicine costs according to different aspects. As a result the return of applied medicine costs could be expressed numerically. We calculated that medicine costs per cow amounted 24 252 HUF in average of the three dairy farms and three years. Antibiotics represented the highest rate of costs, about 50%, followed by hormones with 12% vaccines with 9.6%, disinfectants with 8.1%, vitamins also with 8.1%, surgery and internal medicine diagnostic equipment 7.5%, anti-parasitic formulae with 2.7%, vet therapeutic equipment with 1.2% and anti-inflammatory formulae and painkillers with 0.7% according to product groups.

5, We calculated that medicine costs used for treating diseases could be cleared by **351 litre surplus production of milk on average**.

## **5. LIST OF THESIS RELATED SCIENTIFIC PUBLICATIONS AND LECTURES**

### **Scientific publications published in Hungarian in edited journals:**

**Varga Noémi – Ózsvári László:** Egy tejelő tehenészet gyógyszer-felhasználásának ökonómiai elemzése. Acta Agronomica Óváriensis 2004. (46. évf) 1. sz. 93. old

**Bertalanné Várallyay Erika – Varga Noémi – Salamon Lajos:** A minőségi tejtermelés, Gazdálkodás, 2004. (48. évf.) 5. sz. 67. old

**Varga Noémi – Bertalanné Várallyay Erika – Salamon Lajos:** Két tejtermelő szarvasmarha telep összehasonlító vizsgálata, Gazdálkodás, 2005. (49. évf.) 4. sz. 27. old

### **Scientific publications published in a foreign language in edited journals:**

**Varga Noémi – Bertalanné Várallyay Erika – Salamon Lajos:** Most frequent bovine diseases in cattle herds in the West-Transdanubian Region  
Acta Agronomica Óváriensis

**Lectures published in full volume in Hungarian language:**

**Varga N. – Várallyay E.:** Szarvasmarhatartó telepek jelentős gazdasági kárt okozó betegségei és ebből adódó gyógyszerköltségek. Debreceni Egyetem Agrártudományi Centrum, AVA, 2003. 04. 01-02. (előadás)

**Várallyay E. – Varga N.:** Az EU hatása a tejágazatra – avagy a hazai tejvertikum alakulása 2004 után. Debreceni Egyetem, Agrártudományi Centrum, AVA, 2003. 04. 01-02. (előadás)

**Varga Noémi – Várallyay Erika:** Szarvasmarhatartó telepek állományegészségügyi mutatói a Nyugat-Dunántúli Régióban, valamint egy tehenészet gyógyszerfelhasználásának ökonómiai elemzése. XLV. Georgikon Napok, Keszthely, 2003. 09. 25-26. (CD-kiadvány)

**Várallyay Erika – Varga Noémi:** A minőségből eredő árbevétel kiesések vizsgálata tejelő tehénállomány esetén. XLV. Georgikon Napok, Keszthely, 2003. 09. 25-26. (CD-kiadvány)

**Varga Noémi – Bertalanné Várallyay Erika:** Két tejtermelő szarvasmarha telep termelési mutatóinak és gyógyszerköltségének összehasonlító vizsgálata. IX. Nemzetközi Agrárökonómiai Tudományos Napok, Gyöngyös, 2004. 03. 25-26.

**Bertalanné Várallyay Erika – Varga Noémi:** A minőségből eredő árbevétel kiesések alakulása a 305 napos laktációs tejtermelés alapján tejelő tehénállományok esetén. IX. Nemzetközi Agrárökonómiai Tudományos Napok, Gyöngyös, 2004. 03. 25-26.

**Abstracts and summaries published in Hungarian language:**

**Varga Noémi – Bertalanné Várallyay Erika – Varga Petra:** Tejtermelő szarvasmarha telepek gyógyszerfelhasználásának összehasonlító vizsgálata, Within the European Union, Nemzetközi konferencia, Nyugat-Magyarországi Egyetem Mezőgazdaság- és Élelmiszertudományi Kar Mosonmagyaróvár, 2004. 05. 06-07.

**Bertalanné Várallyay Erika – Varga Noémi:** A tejminőség minőség és árbevétel kiesések vizsgálata a szomatikus sejtszám alakulásának függvényében, Within the European Union, Nemzetközi konferencia, Nyugat-Magyarországi Egyetem Mezőgazdaság- és Élelmiszertudományi Kar Mosonmagyaróvár, 2004. 05. 06-07.