Theses of doctoral (PhD) dissertation

ANALYSIS OF THE ECONOMICS AND TECHNOLOGY LEVEL OF SHEEP FARMS OF THE GREAT HUNGARIAN PLAIN

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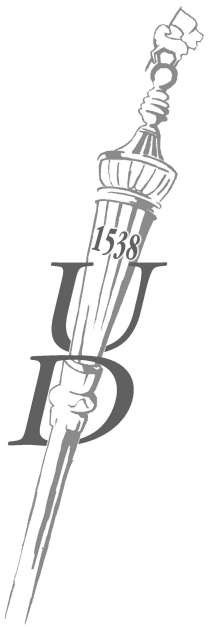

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1. Premises and objectives of the thesis

In Hungary the sheep branch has been showing a wavering efficiency for decads. The economic significance of the branch has been decreased and at the present it provides only 1% of the GDP of agricultural origin in Hungary

The failure of the sheep branch could originate from the unproper use of varieties and the low technology level resulting low yields. The complete lack of processing industry, unfavourable prices and purchasing background makes the problem even worse. These circumstances resulted a low profitability level and a decreasing size and significance of the branch.

The thematics of the thesis were set up in 2002. I aimed to qualify through a quastionaire the sheep farms in the Northern and Southern Great Plain Region, and to follow the results and utilization of their developments. I repeated the survey in 4 consecutive years between 2003-2006. Using my results I intended to mark the main parts of the branch that sould be developed in order to put the branch on a developing course again. During my investigations I thought to be absolutely nececcary to evaluate a method for the determination of the level of intensity and technology of the farms.

I composed a quastionaire suitable and detailed enough for the qualification of sheep farms and also for creating a database necessary for an economic-optimising program. I wanted to examine sheep farms where sheep breeding is not only a secondary activity therefore branch developements and innovations are probably presented. I supposed that a minimal number of ewes is a necessary basis for the development of the farms. I determined that minimal number in 100 ewes per farm.

As a result of the lack of capital decreasing further the improvement possibilities and worsened by the unqualified human resource stagnant yields, weaker quality and relatively decreased incomes characterizes the sheep branch of our country.

According to my hypothesis in the examined sheep farms the natural yields and the economical results were determined by the following factors: use and utilization of varieties, size of the factory, intensity level of the technology, technology level human resources and the state of animal wellfare.

I supposed to find a farm where concious or instinctive innovation appeares in the level of technology. Those result however do not show up and appeares systematicaly and in a coordinated way under the given economic, cultural and political circumstances. Hence they remain in a close circle and their effect and role is fading with time.

Through my thesis explaining the correlation between the examined factors and the economical results I would like to get a picture of the cardinal points having the greatest importance in the sheep branch of Hungary. With detailed analyses I would like to point out the possible tools available for the farmes and the branch itself and the possibilities of their efficient usage. The thesis could help the further development of the national branch strategy and provide ideas for the practitioners.

2. Methods

Examined period and region

I carried out my research work between 2004-2007 collecting the results of the economical years 2003-2006. The database of my thesis was collected through my own quastionaires. In the selection of the sampling area the first principle was the representation of the most siginicant sheep keeping regions. The sampling area extends to the Great Hungarian Plain and partly to the Duna-Tisza köze including Jász-Nagykun-Szolnok, Hajdú-Bihar and Bács-Kiskun counties.

Selection of the sheep farms

In my thesis I analysed the datas of sheep farms that carry out their breeding activity not from necessity but confined about their possibilities in the branch. Therefore - beyond taking the number of ewes into consideration- I selected farms stating in the survey that the rate of incomes originating from sheep production is higher than 20% of the total incomes or the calculated net income is more than 1,3 million Ft. For those reasons I considered farms of 100 ewes to be worth for analysis because of there significant manpower and substancial demands and the significance of sheep breeding even in a mixed profile.

Yield-Income

Analysing the results of my research work I took incomes into account as the for-year-average in a each farm because there were no significant difference between the profitability of the single years. I calculated with the average price level of the given product in case of each breding stock. The price is identical with the mathematical average of the datas collected from the examined farms in the given year. Therefore the income in my thesis practically represents the cumulated yield. Using income in my calculations the economic significance of the different yields can be jugded more clearly. With the help of this method I can compare the yields of the identical farms and their relative productivity.

Level and intensity of the technology

During surveying the level of intensity of the farms I used two evaluating methods. In the first case (subjectiv method) farms could estimate themselves their intensity level following the instructions of the interviewer. In the second case I applied my own method to classify the farms into intensive, half-intensive and extensive technology groups according to the answers of the questionaire about technology level. Depending on the intensity I examined identically the technology level taking into account the modern technological solutions (application of mechanized feeding, round feeder), age and installation of the livestock and infrastructural fitment. I also used my own made method for the exact determination of the technological level of a single farm.

Outgoings-costs

In my thesis I aimed at demonstrating the costs independently from the differences because of the location, farm size and other economic circumstances but mirroring only the actual outgoings just as in case of yield-incomes examinations. Therefore determining the costs I calculated with the same price-level (purchasing, cost and market price) in case of each farm.

Statistical methods applied in my thesis (Sváb, 1967):

- Simple arithmetic average
- Weighted arithmetic mean• t-test (P = 5%)
- T-probe (P = 5%)
- Analysis of variance of sets of data of different element number (P = 5%)
- • Determination of the coefficient of variation
- • Correlation test, regression analysis (P = 5%)
- • Control of elevated values with Dixon's method

3. Main observations of the thesis

A general discription of the examined sheep farms.

I examined the four-year average of the production of 18178 ewes in total in 38 farms. In relation of the examined farms it meant an average number of 478 ewes. A surveyed 1.6 % of the total number of ewes and 0.57 of the livestocks of the country in my thesis. The average flock size of the examined livestocks differed significantly from the hungarian average (150 ewes/flock). Figure 1. shows the distribution of the examined farms according to their type of enterprise.

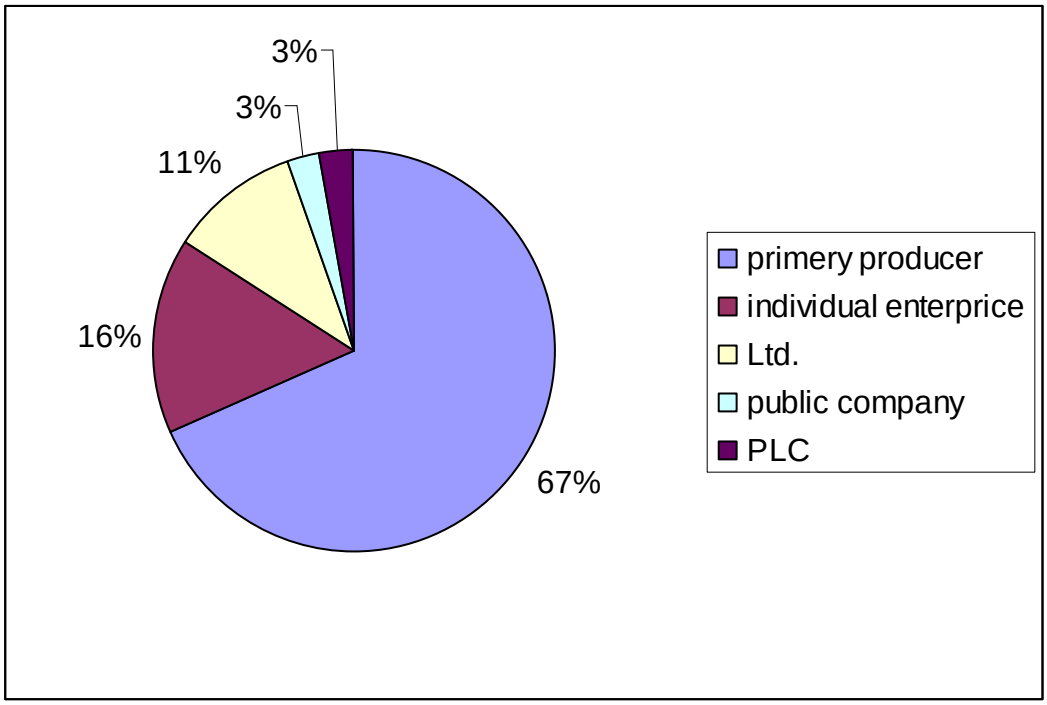
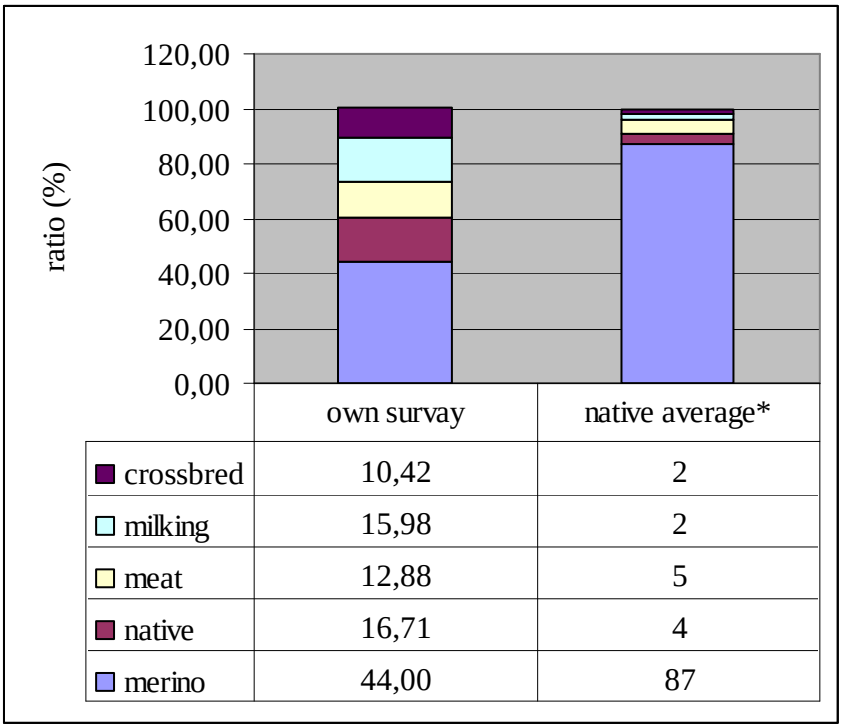


Figure 1. The distribution of the examined farms according to their type of enterprise.

Primery producers and individual enterprices were represented in the highest rate (68+16 %) in the sample group, that is lower than the hungarian average (96%). Sheep livestocks in the possession of individuals were about 96 % of the hungarian quantity at the millenium, individuals had the 80 % of the livestocks while the rest 20 % belonged to other enterprice types. (www.elotisza.hu/download.php?id=164, 2004). The ratio of companies is 11% in the examined farms while corporations are represented in 6 % (3 % public company, 3 % PLC). I experienced during my survey – in accordance with national surveys- that corporations and companies possessed larger livestocks than SMEs.

Variety and mode of utilization

The cultivar structure of the examined sheep farms differs significantly from the national average (Figure 2.) where the ratio of merino genotype measures up to 87 % .



	own survay	native average*
crossbred	10,42	2
milking	15,98	2
meat	12,88	5
native	16,71	4
merino	44,00	87

*MJSZ, 2004, I classified the registrated varieties bred in Hungary into genotype groups according to the same principles I used in case of my survay.

Figure 2. Distribution of the genotypes in the investigated farms (2003-2006) and in Hungary (2004)

The national cultivar structure is not reflected in my survey. The merino genotype had the highest rate (44 %), while the meat sheeps (16 %), the crossbred stocks (10 %), milking sheeps (16 %) and native genotypes also were presented in a remarkable ratio. The unilateral character of the national cultivar structure were not so dominant in the examined livestocks.

My examination ont he lamb and milk production – determining the way of utilization – showed that farms using merino and meat genotypes produce solely lamb as the main product. Farms with crossbred livestocks practiced also milking in 7 % beside lamb production.

In case of farms with native genotypes (gyimesi racka, one farm overall) milking gave the 20 % of the production, while in case of milking genotypes it measured up to 50 %. Among the 38 examined farms there were only 4 practicing milking wich means 10 % of the farms.

Genotype and lamb-yield

There was no statistically traceable difference in lamb-yield results shown in table 1. between native, meat, milking and crossbred types compared to merino, which can be explained with the large standard deviation because of the low number of examined farms (milking crossbread genotypes) or also with a really small difference between the groups (merino-native, meat type).

Table 1.: Utilization of varieties and yields of weaned lambs

genotype group	Literature data	selected own survay data	Relative yields of lambs (%)
	weaned lambs (ewe/year)		
merinó	1.3-1.5	1.16	100.00
native	1.1-1.2	1.10	94.91
meat type	1.4-1.8	1.17	100.85
milking type	1.1-2.0	1.51	129.54
crossbred	No data	1.23	105.30
National average*	No data	0.7-0.8	60-70

**source: Jávor (2008) number of marketed lambs (2003-2006), that do not contain the number of young females kept for breeding wich is not higher than 0.1 weaned lamb/ ewe/year*

According to the survey in case of genotypes with small element number (4 milking and 14 crossbred) there is a larger absolute and relative deviation compared to merino.

The lamb yields of nativeand meat genotypes groups do not differ significantly from that of the merino genotypes. During the evaluation of the results we must take into consideartion the fact that in case of merino genotype the 1.16 lamb/ewe/year can't be considered as a good result however exceeding the national average but falling behing the literature datas.by 10 %. The growth of the native genotype meat the expectations. Those livestocks are working according to their objective that is preserving genetic diversity and maintaining the variety.

In milking farms (4 livestocks, at one site native gyimes racka sheep) where the utilization contained 3 segments (lamb, milk, wool) milk-yield had great significance. Among the examined livestocks there was such intensive milking stocks that produced 262 l milk/ewe/lactation in for-year-average, half-intensive variety with a yield of 131 l milk/ewe/lactation and an extensive milking stock producing 53 l milk/ewe/lactation in the average of the years of examination.

Genotype utilization – incomes

Table 2. shows the income strucutre of the examined genotype groups and value of incomes in the utilization groups. I wanted to emphasize the evaluation of the average income per ewe according to genotype groups independently of the average results of the farms. This way I could determine more accurately the production of different genotypes than using the average natural production of the farms. In course of my examinations I compared merino group to the other genotype groups.

The income structure of native group also differs from merino the difference appearing in lower lamb-related income and less significant milk-related income. It appeares also in the total income/ewe. The variation coefficient shows that the yield of the native group could be considered well balanced.

The difference between merino and meat genotypes is produced by the elevated lamb-yield of meat types compared to merino. There is no significant difference in the total incomes per ewe. The same tendency is observable comparing groups of farms keeping crossbred varieties to the group of merino varieties. The variation coefficient revealaed a high level of heterogenity in each group probably originating from the different level of intensity of keepeing.

3. táblázat: Composition of the average income/ewe according to groups in the examined livestocks (2003-2006)

	merinó	native	meat	milking	crossbred	total average
lamb	13702	9180	15087	7216	15703	12292
wool	432	356	359	315	370	386
spoilage	1106	1327	1474	1357	1898	1315
breeding young ewe	0	0	0	1352	64	223
young ewe	768	287	361	1161	133	633
ram B	338	21	120	163	0	194
ram A	753	25	314	330	12	431
milk	0	4592	0	28644	330	5382
total	17099	15787	17716	40539	18511	20855
CV%	38.25	11.94	43.37	48.02	66.05	-

Comparing merino group to the group of milking varieties we can state that there is a significant difference in the total yield and in it's derived value, the income. The average income was twice of the incomes of the merino. The income of the milk-yield and breeding stock marketing is outstanding that refers to the spreading of the genotype. On the contrary the income of lamb-yield is lower than that of the other groups. Tha variation coefficient

shows the heterogenity of the milking group. This value will play a significant role in the examination of technological intensity.

The utilization of traditional merino groups mentioned in my thesis showed a more favourable result than the national average (Nábrádi-Jávor, 2002). However even in these farms further „refinement" should be carried out in order to improve incomes through strict selection.

Size-yield-incomes

The number of ewes of the livestocks showed a great difference by genotypes compared to the national average (table 3.). The average number of ewes of farms with merino, native and meat genotypes is higher than the national and regional average. The flock-size of these farms is near to the optimal size defined in publications. The number of ewes of farms with crossbred genotypes was only slightly higher than (practically equal to) the national average. The size of farms with milking type however was significantly (nine-times) greater than the national average..

I suppose that it is impossible to define a size valid for all variety and utilization mode in the whole country, so I evaluated size-optimatization according to utilization groups.

Table 3.: The average flock size of the examined livestocks in case of different genotypes (2003-2006)

genotype	Average number of ewes in livestocks
merino	281.3
native	309.8
meat type	256.5
milking type	1392.3
crossbred	158.9
averega flock size	478
national average	150

During my research work I also examined that where is the upper scale limit of the producing capacity of sheep keeping under the given economic and ecological circumstances. In my analysis I formed three size groups. To the first group belong the farms with 100-300 ewes. I reckoned in the second group the farms with 300-600 ewes. Farms with over 600 ewes were classified to the third group including corporations.

The size-income correlation analysis showed a positive correlation between the variants (r= 0,178; kritikus r= 0,3044) but statisticly significant correlation couldn't be shown.

It is obvious however that the specific income is the highest in the second size category. It exceeded the first group with 63% while also the third group produced a 23% higher income compared to the first group (Table 5.). There was a statistically justifiable difference between the 1. and 2. group in the value of income per ewe (t= 2,6, critical t=2,03).

Table 4.: Relationship of flock size and incomes in the 3 size group in four-year-average

Group	flock size (number of individuals)	average income/ewe/year (Ft)	ratio of incomes
1	0-300	16252	100%
2	300-600	26542	163.3%
3	600-	19968	122.9%

There were no significant difference between the 1. and 3. size group(t=0.9) and between the 2. and 3. size groups(t=1.4). Results confirm that in the average of the examined farms the yield and income per ewe decreased about the size of 600 ewe/farm.

Furthermore I examined the variation of incomes in a certain size group according to genotype groups (Table 5.). Data reveals that that in the 2. size group examined farms produced higher yield and so higher incomes in case of each genotype than the memebers of the 1. and 3. size groups. This income-matrice demonstrates the higher yields of milking genotypes and of farms with 300-600 ewes.

*Table 5.:*Average income per ewe incase of different genotype groups and flock sizes (Ft)

genotype / flock sizes	Group 0-300 income (Ft/ewe/year)	Group 300-600 income (Ft/ewe/year)	Group 600- income (Ft/ewe/year))
merino	15551.59	28741.23	16601
native	17281.74	n/a	17310
meat type	17819.21	24023.45	13672
milking type	17669.61	53522.68	26012
crossbred	17058.81	29438.22	19113

Analysing the 1. and 2. size category we can state that up to the flock size of 600 individuals there was a statistically justifiable loose correlation between the size and the incomes of farms (n=30; r=0,38; kritikus r= 0,34). With the further increasing flock size (over 600 ewe/flock) the lamb yield/ewe decreased but there was no detectable statistical difference (Table 5.).

Technological intensity, level and yield-income

Considering the delivering system I stated the sheep breeding in the examined farms to be certainly more intensive than the national average. The more than 42% rate of frequent delivery is not a satisfying result in a survey where 83 % of the examined farms with economic goal of quantitative and qualitative development of lamb-production.

According to the used insemination methods sheep farms also appeared to form a group with no perspectives. While in the leading sheep-breeder countries artificial insemination is determined as the basis of succesful breeding and keeping – basis of the production of quality and genetical improvement, Kukovics et al., 2009 – in my survey I found a less than 9 % rate of artificial insemination in sheep farms. This result is more than four times higher than the national average. On the contrary free mating represents 71 % in the examined farms. (Figure 3.).

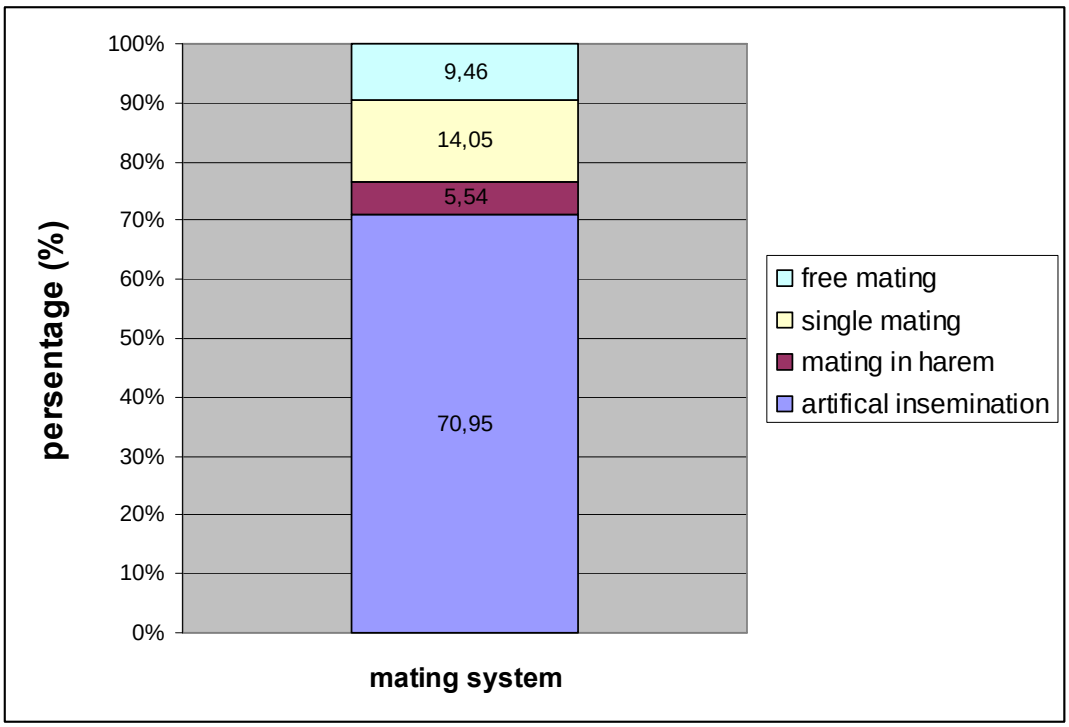


Figure 3.: Method of insemination in the examined farms (2003-2006)

I approached the intensity of the examined farms in two ways. I determined the intensity partly on the basis of the statement of the producers and partly according to my classification based on my survay reflected in tha data of the Table 6. The ratio of the number of elements of the intensive groups – according to the statements and my own classification – was 18 and

26 % of the examined farms, while that of the extensive groups was 5 and 24 % while the most determinative half-intensive group had 76 and 50 % (Table 6.).

Table 6.: The intensity of the examined farms according to their statement and my assumption and the four-year average income in the intensity groups.

group number	Intenzitási csoportok	Based on producer's statement		Based on my classification		Average income/ewe/year Ft
		db	%	db	%	
1	extensive	2	5.3	9	23.7	17077.09
2	half-intensive	29	76.3	19	50	18112.47
3	intensive	7	18.4	10	26.3	26971.31

There was statistically detectable difference in the incomes and yields of the three groups (Table 7.). The 1. and 2. groups did not show significant difference verified by Table 23. On the contrary there were a significant, justifiable on the P=5% level difference between groups 1-3. and groups 2-3.

Table 7.: Statistical difference between the yields of the three intensity groups in the examined farms. (2003-2006)

Groups	t-value	results
t extensive-half-intensive (groups 1-2)	0.32	no significance
t extensive-intensive (groups 1-3)	2.71	significance
t half-intensive-intensive (groups 2-3)	2.79	significance

*Significant difference P= 5%

My research work revealed that with the increasing intensity further factors – technology, keepeing conditions, professional practice, stock size, infrastructure and other factors not investigated by myself- should be taken into consideration for the exact determination of the intensity. Therefore intensive groups should be differentiated further. Unfortunately the limited number if farms in my survey limited the possibility of further differentiation.

My results confirmed that the half-intensive keeping technology widespread in Hungary is not so favourable in case of merino sheeps. According to my survey merino is suitable for the utilization of an even more intensive technology since it prospered well in the intensive group. The native individuals were kept under half-intensive and extensive circumstances as well. Presumably the increased intensity level of the technology is not justified in their case. Milking farm provided almost only intensive keeping conditions for their sheeps. In case of

sheep farms with crossbred stocks the level of intensity can be classified into the extensive and half-intensive group, where the increase in intensity level can be reasonable.

The results of meat-type groups show that the intensity level induced only scarcely different results. Higher level of intensity did not produced a surplus in yield. I think that farms couldn't satisfy the eocological and technological demands of the varieties.

On the basis of my research work I certainly considere the level of the sheep farms of our country to be low that is manifested – on the basis of my classification system of the technology level – in the low achieved associated average score and the correlation (r= 0,54, P = 5%) of the scores and the income. In order to set the sheep farms of our country on a developing course it is crucial for the farms capable of development – selected for my investigations – to achieve an increased technology level to hold up a model for their follower farms. I consider to be essential among technology factors – according to my survey – the modernization of mechanization and insemination.

Human recources

Figure 4. shows the qualification of the employees of the examined farms.

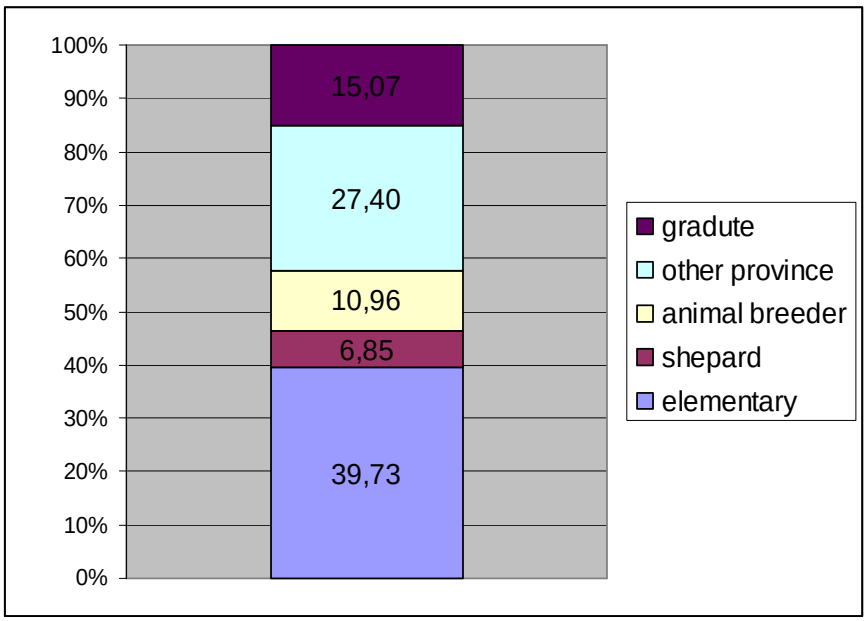


Figure 4. : Distribution of the employees of the examinated farms according to their qualification. (2003-2006)

Most of the employees (~40%) have only elemental knowledge. The ~ 27% of the employees has a profession not connected to sheep keeping. Nearly 18 % of the employees has special professional qualification (shepard, stockbreeder) while only the 15 % of the farms has employees with higher education.

I evaluated two things in relation with the connection between human resources and income: the qualification of the leader of the farm and the number of ewes per employes referring to the work strain.

There were no significant difference in incomes between the groups formed according to qualification. This suggests that there are other human factors beside the qualification of the leader that I couldn't detect but affects the profitability.

Analysing the relationship between incomes and the work strain (number of ewes / employees) I stated that there is no corralation between the two factors regarding to all of the examined farms. Forming different groups according to work strain the relationship was different. I formed three groups according to work strain just like in case of the cathegories according to the stock size (Table 8.).

Table 8.: Relationship between the incomes of examined farms with different work strain (2003-2006)

	200 ewe/employee	200-400 ewe/employee	400 ewe/employee
average income (Ft)	15577.16	24503.78	17264.55
number of elements	20	12	6

Analysis of variance of the three groups showed no significant difference between the average incomes of the groups (F=2.99, ctritical F = 3.28). On the contrary the t-probe between 1. and 2. verified a significant difference (t=2.67, critical t=2.03). There were no significant difference in incomes between the other (1. and 3., 2. and 3.) groups.

On the grounds of my results I can decleare that the productivity of a farm is determined by the number of ewes per employees ratio.

Animal welfare and productivity

The relationship of the animal wellfare and the income was investigated. The results are summerized in Table 9. where I summerized the correlation between the incoma and the different factors affecting animal weelfare directly or indirectly. The investigation of veterinary cost and income showed a weak correlation.

Table 9.: Relationship between the investigated factors of animal welfare and income in my survey

Relationship of the investigated factors	r - value
Income – veterinary costs	-0.24
Income – veterinary contract	0.17
Income – percentage of dead lambs untill weaning	-0.11
Income – percentage of dead ewes	-0.11
Income – sheep bathing	-0.17
Income –frequency of protection againts parasites	0.05
Income – preventive vaccination of lambs	0.35
Income – stock vaccination	0.26

Source: datas of my own survay
*r critical = 0.31; P = 5 %

There was also a negativ correlation between the percentage of dead ewes and lambs and the income. It met the expectations but the correlation wasn't verified statistically. Naturally the lower ratio of dead animals suggest better care and animal wellfare resulting higher incomes in a farms with healthy livestocks.

The correlation between frequency of protection againts parasites and income also couldn't be statistically verified.

The correlation between the frequency of preventive vaccination of lambs and the income was statistically verified. In case of stock vaccination there was an obvius but statistically not verified positive effect on the income. In this case a weak-medium correlation can be assumed between the factors and the income. The protection of the lambs and the ewes promote the lamb fostering that is the most important source of income in sheep farms.

Outgoings and costs

The formation of the average cost structure can be seen in Table 10. The ratio of the staff cost was 34 % of the total costs while the feeding costs were 38 %. This ratio was in contrast to the literature datas (Nábrádi in: Jávor-Kukovics-Molnár, 2006). The literature data ont he ratio of forage was 60-65 % and the ratio of staff costs was 10 %.

Table 11.: The cost structure and profitability of incomes in the examined farms

	cost types	**Költség (Ft/anya/év)**	**Aránya a költség-szerkezetben (%)**
1.	total feeding costs (2+3+4)	7513.0	37.5
2.	- Bulk food (2/1+2/2)	3750.5	18.7
2/1	o own	3386.7	16.9
2/2	o purchased	363.8	1.8
3.	- forage (3/1+3/2)	1503.3	7.5
3/1	o own	711.1	3.5
3/2	o purchased	792.2	4
4.	- pasture grass	2259.2	11.3
5.	other supplements, medicine	315.8	1.6
6.	external service costs	440.7	2.2
7.	staff costs	6878.7	34.3
8.	auxiliary costs (1,5 %-a a11.)	276.7	1.4
9.	amortization costs	100.5	0.5
10.	other costs (rent, insurance, veterinary, insemination, utilities, pup raising)	3196.7	16.0
11.	Direct costs (1+5+6+7+8+9+10)	18722.1	93.5
12.	Indirect costs (7%-a 11-nek)	1310.5	6.5
13.	Total production costs (11+12)	20032.7	100.0
14.	income/ewe	18883.4	94.3
15.	income from production (14-13)	-1149.2	-5.7

I compared my results with the national average finding that the total costs of farms in my survey in the average of the 2003-2006 period approaches the cost level of a half-intensive farm or rather its upper level. It corresponded with my results from intensity examinations showing that most sheep farms were classified to the half intensive group.

Income

According to my research work sheep farms could not produce income based on only the production int he four-year-average (Table 11.). The loss originated primarely from the low yields.

Table 11.: Cost-income-profit in the examined farms (2003-2006)

Denomination	value (Ft/ewe)	ratio compared to costs (%)
Total production costs	20032.7	100.0
income/ewe	18883.4	94.3
income from production	-1149.2	-5.7

However investigating the incomes according to the genotype groups (Table 12.) I stated that there are significant differences in the incomes.

Table 12.: The average cost-income-profit int he investigated farms according to genotypes

	merino	native	meat	milking	crossbred	total
Total income (Ft/ewe/year)	17099	15787	17716	40539	18511	18882
Total income (Ft/ewe/year)	22786	17047	17689	23222	19655	20033
Total income (Ft/ewe/year)	-5687	-1260	27	17317	-1144	-1159

Among the five genotypes the merino produced the worst results (Figure 4.) with 5000 Ft/ewe/year deficit. Farms classified in native and crossbred genotype groups also realized deficit but its extent was fare more lower (- 1144; -1260 Ft/ewe) than in case of farms in the merino group.

Farms belonging to meat genotype group produced a positive, but rather moderate result (27 Ft/ewe) in the period of the examination.

The best economic – outstanding - results were produced by farms belonging to milking genotypes (17000 Ft/ewe income).

However grants and tender resources provided a further income in the period of the survey for the sheep-keepers building on pasturing animal breeding. This resource could pratically revert the profitability of a farm.

In Table 13. I present the assumed profitability attained with maximal and minimal grants. Farms entitled for further grants and able to cover large grasslands with sheep-keeping activity could achieve a rather significant production through grants. In a sheep farm keeping native varieties in an extensive way it could be possible to earn larger part of income from grants than from production. Cost-related profitablity could exceed even 200 % (Table 12.). Low producing level can be explained with the fact that sheep farms are maintained not for the cost-remanency but for achieving grants.

Table 13.: Assumed profitability on terms of minimal and maximal grants

Denomination	Minimum grant	Maximum grant
Female grant (Ft/ewe)	1452	1452
Native sheep grant (Ft/ewe)		5209
SAPS grassland grant (Ft/ewe)	2834	14214
AKG grassland (Ft/ewe)		10878
Ewe grant KAT (Ft/ewe)		1008
KAT grant (Ft/ ewe)		16341
Income from production (Ft/ewe)	-1149	-1149
Income (Ft/ewe)	3137	47953
Total production income (Ft/ewe)	20033	20033
Cost related incomes (%)	16	239

Survaying sheep farms it became obvious (based on the interviews with the managers) that in several farms number of ewes is maintained only for the grant conditions. It resulted a lack of developement (genetic, technological, knowledge) in several farms. It can explain the status of the branch lagging behind the international competitors.

4. New and novel scientific results of the dissertation

New results

1. Based on my investigation I established that the optimal flock size to be between 300-600 ewe/flock in point of the income per ewe. The result of this flock size exceeded with 40 % that of the sheep farms with flocks below 300 and above 600 ewe.
2. Comparing the different producing systems I established that applying intensive technology the possible income will exceed with 30-35 % that of the half-intensive and extensive sheep farms.
3. Investigating the relationship of the average summerized technological level and the average income per ewe I established that there is a moderately strong correlation between the two factors.
4. Investigating the relationship of the work strain / employee and the attainable income I established that the optimal work strain of shepherds was between 200-400 ewe/individual.
5. Comparing the income from production to the production costs I established that the production level of the sheep farms was not profitable (the average income from production was -1149.2 Ft/ewe), but requiring grants set the overall balance of the activities positive. Beside traditions grants could maintain the sustainability of the national sheep branch.

Novel results

1. .My investigations confirmed that because of the unproper technology level the genetic potential is not exploited in the sheep branch therefore milk and lamb yields are below the possible level.
2. Milking farms are more stabile due to their more diversified profile than farms keeping merino, native, meat and crossbred genotypes.

5. Practical utilization of results

1. The quastionairre - created for collecting database forming the basis of my thesis - with further refinements would be suitable for the formation of a database that could be the basis of a decision-facilitating program applied in the everyday practice of sheep farms and also in education.
2. The intenzity level can be determinated egzactly by the used method with development. This method can help the research work for the determination o intenzity.
3. The used methon with more development to determinate the technology level also can help the work of the researchers.
4. In determining the optimal number of ewes of a sheep farm variety, mode of utilization, and intensity of keeping must be taken into consideration. We can't define an optimal size suitable fore each farm but I can offer the 300-600 ewe's flocksize for the farmers. The working strain of shepherds and the number of ewes per capita can be raised only to a certain level. The decreased performance of overstrained shepherds can decrease the productivity of the farm. I offer that the number of the ewe for one shepard do not need more than 400.
5. The technology development can not be successful without usable knowledge of workers. The branch needs an middle level education system.
6. My investigations suggest that there is a need for the evaluation and invention of a complex animal welfare program applied for all members of the branch.
7. Most of the sheep farms is interested in the maximalization of grants. Therefore a grant system must be evaluated that inspire sheepkeepers to move along with the principles of national strategy on sheep branch. The grants system must help to create the suitable breed utilization, technology level and the optimal flocksize.

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