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BREEDING HOLSTEIN OR NORWEGIAN RED IN ALBANIA?

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Abstract

The study was carried out to assess the economics of small (up to 4 cows) and medium (more than 6 cows) sized dairy farms breeding Holstein and Norwegian Red (NRF) breeds with reference to the Income per Farm including milk and meat sales, Income per Farm only milk sales, and the cost of production in Albania. Data on production, expenses and returns were recorded on a monthly basis for 160 farms (80 for each breed) over a period of 12 months. The "Income per Farm (IpF) " method was used to calculate the farm income. The "IpF" (including milk and meat) for Holstein farms ranged from 1969.9 Euro (small farm) to 8036.6 Euro (medium farm) and for NRF farm from

Key words: *Holstein and NRF breed, economic analysis, income per farm, small and medium sized farms.*

INTRODUCTION

Norwegian Red (NRF) is one of the new cattle breeds introduced in the last 15 years in Albania. Since 1994, NRF breed began to spread out in our country through the importation of semen from Norway. Up to now are imported around 400.000 dose of semen (ADE, 2010; Gjoni 2007). The Norwegian-Albanian association was establish in Elbasan district, supported and financed, at beginning, from a Norwegian project and this is the reason that we find NRF breed mainly in the above mention region. In addition to milk production, farmers likes NRF breed also for good indicator of daily body gain and higher milk fat content compare with Holstein.

During 2010, in Albania were operating 219,952 farms with cattle, out of 350,654 farms in total or 62,7%. The average of cows per farm is 1.5 units. Only 14.5% (3188 unit) of the farms have more than 6 cows and they produce 20% of the total cow milk (MAFCP, 2010).

During the last decade we are witnessed for the emergence of the so-called medium size dairy farms owning 6-20 cows. These farmers have been looking at dairying as an economic activity and they are looking forward to modernize their activities. Another reason to study farms with more than six cows is the Instruments Pre-Accession and Rural Development-Like (IPARD) program which will support such farms.

In Albania, is lacking information on the economics of production on the small and medium size dairy farms, and especially for the farms managing NRF breed. Also farmers are not keeping the financial records for each crop or animal separately. This study was therefore undertaken to collect on farm data pertaining to revenue and expenses on both types of farms and both breeds (Holstein-most spread out breed and NRF breed) and make an economic analysis.

MATERIALS AND METHODS

The research was conducted in the central part of Albania (Elbasan district) where the Norwegian-Albania Association, which imports the NRF semen, has the head-quarter. 80 small size farms (40 per each breed) and 80 medium sizes (40 farms for each breed) were monitored. Data collection lasted from September 2011 till August 2012. Small farms were defined as those having 2 to 4 cows and medium farms those having 6 or more cows.

***Data collection*:** Each farm was visited monthly over a period of 12 months (bi monthly visits). The following data were recorded (according to the questionnaire prepared and tested):

A. Income and expenses: (i) Expenses for the fodder production, like alfalfa, corn, etc., (ii) Expenses for the animal feed bought in the market, (iii) Expenses for veterinary service, including insemination, (iv) Expenses for fuel, electricity, water, trips, lease on land, and land tax, (v) Estimated cost of labor (unpaid labor) needed to take care of the herd per year at Euro 2,150 (Bernet et al., 2000), (vi) Incomes per Farm from sales of milk and meat (IpF milk+meat); (vii) Incomes per Farm from sales of milk (IpF milk); (viii) Incomes per Cow from sales of milk and meat (IpC milk+meat); (ix) Incomes per Cow from sales of milk (IpC milk); (x) Milk yield: the amount of milk produced by each cow during one lactation; (xi) Milk price per liter; (xii) Calves price per kg live bodyweight; (xiii) Quantity of milk sold in the market or to the dairy processor (quantity and price).

B. Technical data, such as: Insemination (artificial or natural mating), milking (milking machine or by hand), type of animal feed used (including microelements or premix), animal health (diseases and parasites), training needs.

***Data analysis*:** A model was developed in Microsoft Excel program for data analysis, and statistical data processing was done with Statgraphics Centurion XVI.

RESULTS AND DISCUSSIONS

Data on number of cattle and cows, milk yield, Incomes per Farm (IpF milk + meat), IpF (milk), milk cost (Bernet et al., 2000; Frank et al., 2001), the ratio milk quantity sold in the market vs. total milk production, prices of milk and meat sold, the manner of milking the cows and method of insemination, are summarized in Table 1, as shown below:

Table 1. Technical data

Number of heads	No of cattle per farm		No of Cows per farm		Milk yield (liter)		IpF (milk+meat) Euro		IpF (milk) Euro		Milk cost (Euro/kg)	
	Holstein	NRF	Hol	NRF	Hol	NRF	Hol	NRF	Hol	NRF	Hol	NRF
2-4 cows	4.25	4.15	3.05	3.08	4525	4480	1969.9	2416.2	784.1	958.8	0.34	0.36
6+ cows	11.92	12.42	9.67	10.17	4838	4780	8036. 6	9235.7	5208. 4	6541.2	0.25	0.28

Table 2. Milk data

Number of heads	Milk sold vs milk produced (%)		Price of milk sold (Euro) By hand (%)		Price of meat sold (Euro)		Milking				Insemination			
							By machine (%)				Natural		Artificial	
	Hol	NRF	Hol	NRF	Hol	NRF	Hol	NRF	Hol	NRF	Hol	NRF	Hol	NRF
2-4 cows	78.4	82.0	55.0	60.0	421	479	100	100	0	0	0	0	100	100
6+ cows	89.0	86.7	49.6	57.2	402	417	35	22.5	65	77,5	0	0	100	100

From table 1, we can see that cows of small and medium farms breeding Holstein produced 45-58 kg milk more milk (1-1.2%) than farms bred NRF. However the farms with NRF breed are taking more incomes compare with Holstein farms (14.9-25.6%). The differences are coming as result of milk and meat price sold which is higher for the farms breeding NRF, because the fat content of milk produced by NRF breed is higher than Holstein and the daily gain also (Gjoni, 2007; Bernet et al., 2000).

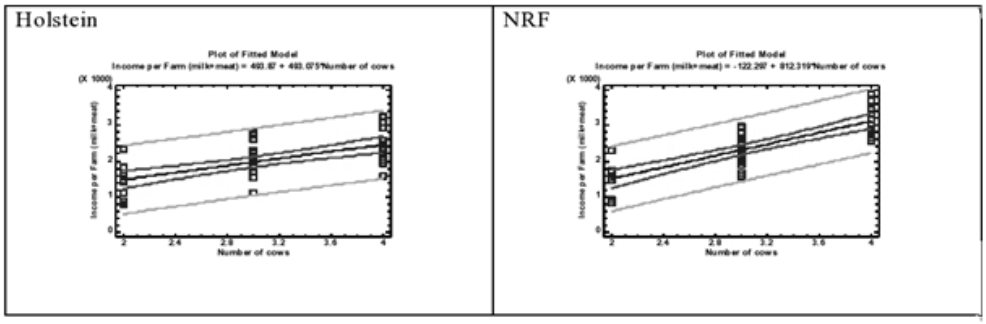

Figure 1. Holstein and NRF small farms IpF (milk+meat) vs Number of cows per year

Holstein: Income per Farm (milk+meat) = 493.87 + 493.075*Number of cows. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Income per Farm (milk+meat) and Number of cows at the 95.0% confidence level.

NRF: Income per Farm (milk+meat) =-122.297 + 812.319*Number of cows. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Income per Farm (milk+meat) and Number of Cows at the 95.0% confidence level.

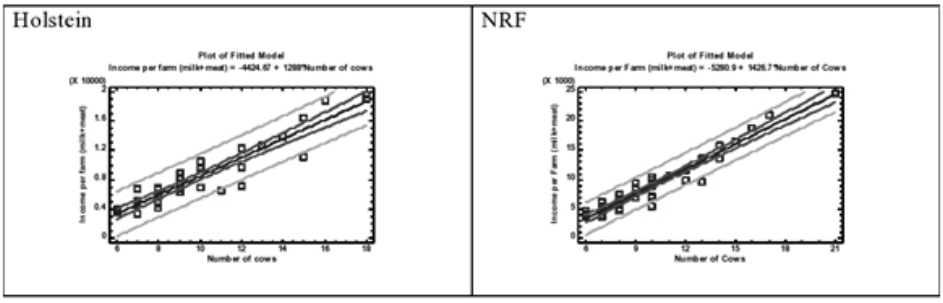

Figure 2. Holstein and NRF medium farms IpF (milk+meat) vs Number of cows per year

Holstein: Income per Farm (milk+meat) = -5280.9 + 1426.7* Number of Cows. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Income per Farm (milk+meat) and Number of Cows at the 95.0% confidence level.

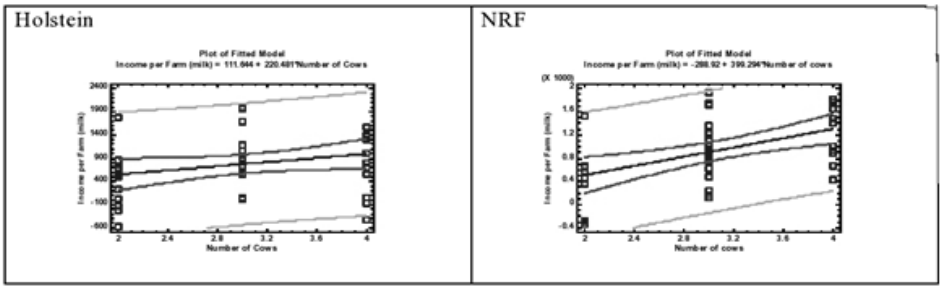

Figure 3. Holstein and NRF small farms IpF (milk) vs Number of cows per year

Holstein: Income per Farm (milk) = 111.644 + 220.481*Number of Cows. Since the P-value in the ANOVA table is greater or equal to 0.05, there is not a statistically significant relationship between Income per Farm (milk) and Number of Cows at the 95.0% or higher confidence level.

NRF: Income per Farm (milk) =-288.92 + 399.294*Number of cows. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Income per Farm (milk) and Number of cows at the 95.0% confidence level.

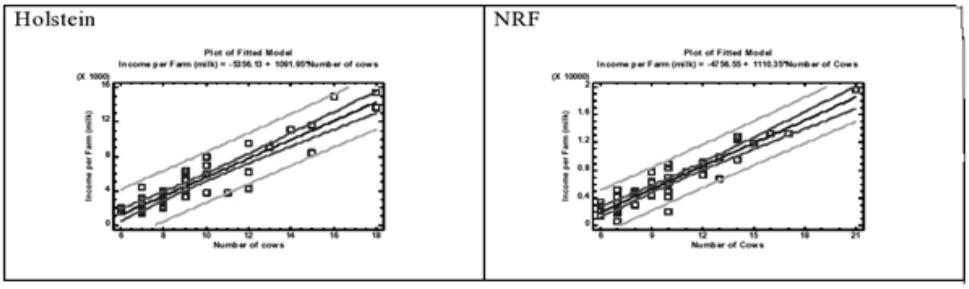

Figure 4. Holstein and NRF medium farms IpF (milk) vs Number of cows per year

Holstein Income per Farm (milk) =-5356.13 + 1091.95*Number of cows. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Income per Farm (milk) and Number of cows at the 95.0% confidence level.

NRF: Income per Farm (milk) =-4756.55 + 1110.35*Number of Cows. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Income per Farm (milk) and Number of Cows at the 95.0% confidence level.

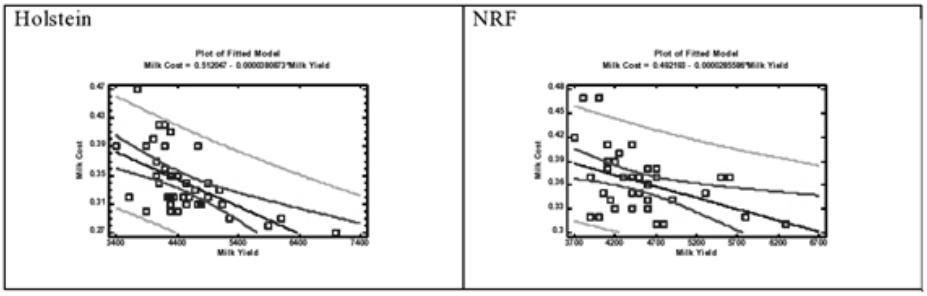

Figure 5. Holstein and NRF small farms Milk yield vs Milk cost

Holstein: Milk Cost = 0.512047- 0.0000380873*Milk Yield. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Milk Cost and Milk Yield at the 95.0% confidence level.

NRF: Milk Cost = 0.492193- 0.0000285586*Milk Yield. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Milk Cost and Milk Yield at the 95.0% confidence level.

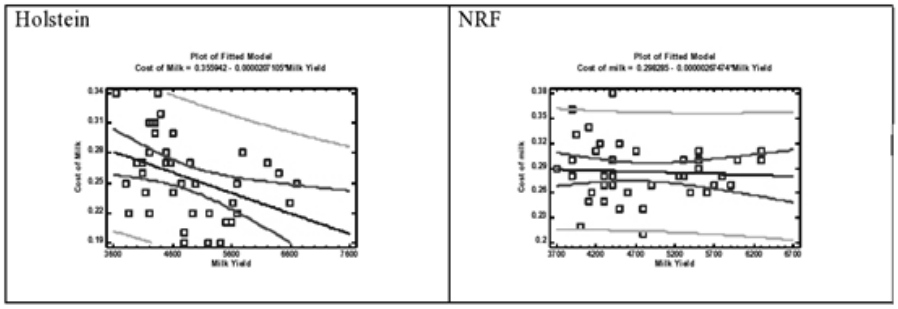

Figure 6. Holstein and NRF medium farms Milk yield vs Milk cost

Holstein: Cost of Milk = 0.355942-0.0000207105*Milk YieldSince the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Cost of Milk and Milk Yield at the 95.0% confidence level.NRF: Cost of milk = 0.298285-0.00000267474*Milk Yield.Since the P-value in the ANOVA table is greater or equal to 0.05, there is not a statistically significant relationship between Cost of milk and Milk Yield at the 95.0% or higher confidence level.The comparison of IpF (milk+meat) data for Holstein and NRF breed are shown in Table 3 and Table 4:

Summary Statistics

	IpF NRF (milk+meat)	*IpF Holstein (milk+meat)*
Count	40	40
Average	2416.2	1995.5
Standard deviation	726.711	600.53
Coeff. of variation	30.0766%	30.0942%
Minimum	811.0	783.0
Maximum	3891.0	3236.0
Range	3080.0	2453.0
Stnd. skewness	-0.51395	-0.314459
Stnd. kurtosis	-0.464041	-0.326298

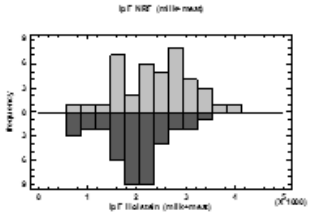

Figure 7. Summary Statistics of small farms IpF (milk+meat) for the two studied breed

This table shows summary statistics for the two samples of data. Values of these statistics outside the range of-2 to +2 indicate significant departures from normality, which would tend to invalidate the tests which compare the standard deviations. In this case, both standardized skewness and standardized kurtosis values are within the range expected.

Summary Statistics

	IpF NRF (milk + meat)	IpF Holstein (milk+meat)
Count	40	40
Average	9235.75	7840.68
Standard deviation	5011.48	4542.65
Coeff. of variation	54.2617%	57.9369%
Minimum	3560.0	0
Maximum	24710.0	19624.0
Range	21150.0	19624.0
Stnd. skewness	3.26985	3.253
Stnd. kurtosis	1.87978	1.5152

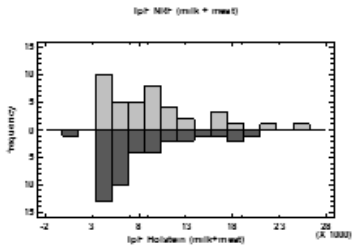

Figure 8. Summary Statistics of medium farms IpF (milk+meat) for the two studied breed

This table shows summary statistics for the two samples of data. In this case, both samples have standardized skewness values outside the normal range while the standardized kurtosis values are within the range expected.

The R-Squared statistic indicates that the model as fitted explains 41.8129% to 88.9456% of the variability in IpF (milk+meat) of Holstein breed and 65.2775% to 93.0524% of the variability in IpF (milk+meat) NRF breed. The correlation coefficient equals 0.646629 to 0.94311 for Holstein breed and, 0.807945, to 0.964637, i for NRF breed indicating a strong relationship between the variables

The average cost of producing a liter of milk for small and medium farms was 0.24 Euro/liter (Holstein) and 0.28 Euro/liter (NRF). Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Milk Cost and Milk Yield at the 95.0% confidence level for small and medium sized farms of Holstein and for small farms of NRF but not for the medium farms of NRF.

In addition the farms bred Holstein are selling 78-89% of their milk production and the rest is used for the calves and for the home consumption, while the farms bred NRF only 82-87%, because the medium sized farms are using more milk for raising calves. The small sized farms have higher the price of meat sold because they are slaughtering and selling the meat by themselves while the medium farms are selling live calves in the market. Another difference between the small and medium farms is that the medium ones are using milking machine 65-77,5%) to milk the cows and this is a reason that they have better milk price as the milk quality is higher.

Regarding the trainings the owners of small farms breeding Holstein did not participate in any training while for the medium farms 30% of them participated. 30% of the owners of small and medium farms breeding NRF participated in trainings. In addition all the farmers interviewed are asking for trainings and the main subjects are related with cows feeding and feed ration, animal feed preparation, animal health, and livestock best practices.

From this study we found that farms bred NRF had better results than those bred Holstein breed. In addition, the medium farms (of both breeds) had higher production, better Net Farm Income and lower cost of production compare with small farms.

CONCLUSIONS

Both breeds are performing well in conditions of Albania and specially NRF that is introduced in the last 15 years. However the milk yield of both breeds is low compare with the production in countries of origin (ERDBA, 2010). The state extension service should train the owners of medium sized farms for best management practices, as they lack knowledge of feeding the cows during milk period and dry one. In addition the farmers could get better results

from the calves as the daily gain must be increased with proper feeding.

The 'IpF' increases with an increase in the number of cows kept on the farm. So, the medium sized farms have better financial indicators than the small ones and the Ministry of Agriculture should support the medium farms in the future through IPARD Like program and through the programs financed by Albanian Government.

Farmers in Elbasan region likes NRF breed, as calves has better daily gain and the price of calves is better than Holstein. In addition the milk fat content is higher for NRF breed and as result the milk price is better than Holstein.

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