

EDUCATION LEVEL OF DAIRY FARMERS IN KOSOVO**M. Zeqiri, E. Shahu, Y. Biçoku, E. Pire****Summary**

A study was conducted to assess the impact of farmers' education on dairy farming knowledge, national food safety standards, animal diseases, and farm production practices. Farmers' lack of awareness is likely a contributing factor to food standards not being met in most cases. The data are collected from 150 respondents randomly selected from farmers' municipality database, in two regions of Kosovo (Gjilan and Ferizaj). The data were collected through face to face interviews and personal visits based on a structured questionnaire. Significant differences were found among farmers (higher level of education compare with primary education) in regard with food safety standards, animal diseases, milk yield, use of milking machine, milk cooling tanks, animal identification, farm register, feeding the animals according to the production level, etc. Awareness, teaching and training programs for dairy farmers can improve: animals feeding, cows' milk yield, diseases control in animals and reduce the public health risk of milk-borne zoonosis. Also public and donor support schemes for farmers should be strongly linked to food safety standard implementation.

Key words: dairy farming, education, dairy farming knowledge, Kosovo

Introduction

The agricultural sector, in Kosovo, accounts for 12.0 percent of GDP and is estimated to employ around the agriculture sector nearly 25 percent of the total employment, mainly in the informal sector, while according to the official results from the Population, Households and Housing Census in Kosovo (2011) shows the employment rate in agriculture by 4.4 percent (MAFRD, 2014; Presidenti, 2013)

Most of the agricultural work, in agricultural households, is done by family members. Managers (who are mostly the head of the families) make almost half of the agricultural work (44.6%), while other family members perform 49.6 percent (ASK, 2015).

Agriculture Census (2014) showed that in Kosovo, there are 130,775 agricultural farms, which are breeding 261,689 cattle (51 percent of which milking cows), 183,584 sheep and 28,430 goats. On average, the farm size is 3.2 ha agricultural land (including common land/pasture) and about 3.9 cattle (about 2 milking cows) (ASK, 2015).

It is estimated that today there are about 91,200 livestock farms in Kosovo (ASK, 2015). According to Food and Veterinary Agency of Kosovo (FVA) the number of cattle farms is 70,215 farms and about 26,100 of them are delivering milk to the dairy processors (ASK, 2013).

Cattle milk dominates raw milk production while small ruminant milk production is insignificant in Kosovo. Milk production is considered as an activity with considerable nutritional, social, and economic importance (Zeqiri et al., 2015).

M. Zeqiri, MSc, Extensionist in Gjilan Municipality, Kosovo and PhD candidate at Agricultural University of Tirana, Tirana-Albania

E. Shahu, PhD, Lecturer, Agricultural University of Tirana, Tirana-Albania

Y. Biçoku, PhD, Full professor (ybicoku@ubt.edu.al) , Agricultural University of Tirana, Tirana-Albania

E. Pire, MSc, Researcher at Development Solutions Associates(DSA), Tirana-Albania

During 2014, were operating 5,472 commercial farms (7.8 percent of the dairy farms) that have more than 5 milking cows which are the main suppliers to the dairy processing industry with a total of about 62 million liters of milk per year, or about 18 percent of the milk produced in the country (AAD, 2015; MAFRD, 2015; and authors calculations).

The rest is used for feeding calves, for own consumption, sold as raw milk or white cheese on the various local unregulated (green) markets. Commercial and semi-commercial farms sell milk to one of the 19 dairy processors (Nushi, 2010). Traditional dairy products are yogurt, butter, curd and different kinds of cheese.

The average age of the holders of agricultural farms is 52 years. As far as education/training in agriculture, more than 95% of managers have only practical experience in agriculture (ASK, 2015).

In Kosovo, like in other developing countries, dairy development has played a major role in increasing milk production, improving income level, and generating employment opportunities, especially for small and marginal farmers. The dairy farming is characterized by low productivity as the result of poor farming technologies and lack of capital by smallholder farmers. Also, research and training programs need to be planned, which would be beneficial to the farming environment. Due to the increase in purchasing power, demands for local dairy products are expected to mark an increase (MAFRD, 2014).

The question addressed in this paper is: What impact does farmers' education have on farm business practice?

According to Hicks (1987) education and training are widely acknowledged as contributors to national economic wellbeing and growth. In addition a major factor in explaining differences in productivity and income between countries is the level of education and human capital, which includes both formal education and informal on-the-job training. Also, as mentioned by Hanushek E A and Wößmann L (2010) education can facilitate the diffusion and transmission of knowledge needed to understand and process new information and to successfully implement new technologies, which again promotes economic growth.

Mellor (1976) emphasized that the investment in education in rural areas needs to be part of a strategy to improve agricultural productivity through its complementary with agricultural inputs, and effective research and extension service.

Lockheed et al. (1980) have synthesized the conclusions of a number of studies of the positive effect of a farmer's educational level and exposure to extension services on the farm productivity.

According to Kilpatrick (1996) the farm businesses which have agricultural qualifications have an average gross operating surplus compared to other farm businesses.

In the present research, we investigated the relation between the educational levels of dairy farmers with practices implemented on the farm, such as: farm size, farmers age, farmers experience in livestock, milk production, number of animals raised, farmers' awareness about food

safety standards and animal diseases, etc. According to Hadrić (2011), farmers have different educational backgrounds: (i) primary education, (ii) middle school; (iii) agronomy background, (iv) university education. In addition the human capital is not defined by one specific variable, but rather is a combination of various factors, such as age, experience, and management capabilities of the principal operator.

Material and Methods

Study area. The present study was conducted in the regions of Gjilan and Ferizaj, Kosovo. The data were collected during the period of May-July 2014.

Data collection. A structured questionnaire was used for collection of all information related to dairy farming. The questionnaire was examined by a panel of specialist to verify its content and validity. To avoid confounding questions and for clarity, the questionnaire was pre-tested on a pilot group of 10 farmers. In the case of inconsistent questions, it was modified accordingly. Face-to-face interviews were conducted. The questionnaire contained both open-ended and closed questions. Interviewers read aloud the closed questions and possible (coded) answers from the questionnaire to the respondents. In the case of the open end questions, the interviewers only read the question. Observation is the most direct way of collecting data. According to Gillham (2003) a risk of choosing observation is that people observed may play some kind of a role when observed. For this reason both observation and interviews were used and also the animals and their environment were observed carefully.

The sample consisted of 150 dairy farmers that were randomly selected (from the farmers' list prepared by the municipalities) which included 40 percent of the population of livestock farms with more than 4 dairy cows, in the targeted regions. Interviewers did not encounter any major problems in terms of the willingness of the population to participate, especially after the participants had been briefed about the purpose of the interview and the survey. The answer rate reached 100 %, when in such surveys a 50% response rate can be accepted as satisfactory. This achieved rate is more than adequate for drawing inferences from the data and the results are very indicative for the entire farmers in the regions.

The questionnaire was designed to capture information related to general characteristics of the farm, situation of milk production and marketing, milk yield in different farm sizes, age and education level of household head, family size, experience in dairy production, numbers of dairy cow, farmer training, farmers' awareness on animal health and food safety issues.

Data analysis. The obtained data was stored in Excel-2000 and imported to software SPSS 22.0 for analysis. Stored data were tabulated and arranged as a percent value. Descriptive statistics (i.e. means, frequencies, etc.) was done to estimate the different variables. Statgraphics Centurion 17.1 was used for simple correlation.

Results and discussions

This section analyzes the current situation and the sector's developments with focus the relationship between level of formal education and farmers practices, in two regions of Kosovo. For this purpose education is included by using six point Likert scale: 1-no education, 2- primary education (up to 4 years of school), 3-obligatory education (up to 9 years of school), 4- agricultural middle school (12 years of school), 5- other middle school (12 years of school), and 6-university degree.

The results of group 1-3 (primary education) are compared with those of better educated farmers' group 4-6 (secondary + education).

Sample socio-demographic and farm indicators

Table 1: Main sample socio-demographic and farm indicators.

Education level	Sample farm household indicators							
	Age (years)		Working experience (years)		Farm size (persons)		No. of cows	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Primary education	48,98	12,432	23,29	15,731	6,29	6,433	9,0	4,708
Secondary+ education	44,02	8,357	17,5	10,823	9,02	9,699	12,07	7,835

Since the typical sampler farm had more than 4 cows and the average farm size was 9.0 to 12.07 cows, it may be concluded that they were market oriented (Table 1). We targeted market oriented farms, as usually they are more aware of the standards; invest more in the future, toward improving standards; and compare with small subsistence farms (1-2 cows) are more likely to "survive" the growing competition in the future.

The majority of respondents belongs to 30-49 years of age (50.8%) and farming experience of the 68.2 percent of respondents was less than 20 years for the primary education group; while in the secondary+ education group, 66.6 percent of the farmers belong to the age group of 30-49 years, and 73.5 percent of farmers have less than 20 years experience. In the group of better educated farmers 31 percent are with less than 10 years experience.

Effect of education on milk yield. The difference in milk production performance between primary education group of farmers and secondary+ group (Table 2) is an established fact: hence the effect of education level on milk yield was assessed in both group of farmers. Milk yield, increased with the level of farmer's education.

Table 2: Effect of education on milk yield

Education level	Milk/cow/day (kg)	
	Mean	Std. Dev.
Primary education	9,97	4,490
Secondary+ education	14,06	4,921

Effect of education on milk sold to processors. From table 3, we figure out that 73 percent of the primary education farmers are not selling milk to the processors. This group mainly is selling the milk to the consumer houses, in the green market (open market), and only 27 percent is sold to the processors. While for the secondary+ group of farmers the figures are 46 and 54 percent, respectively.

Table 3: Answer the question “What part of your milk production is sold to the processors”?

Percentage of the production	Selling milk to the processors			
	Primary education		Secondary+ education	
	Frequency	Percent	Frequency	Percent
0	46	73.0	40	46.0
1-50	2	3.2	8	9.2
51-100	15	23.8	39	44.8
Total	63	100	87	100

Food Safety Institution. Kosovo’s Food Law¹ provides information that the official control of food shall be carried out from the inspectorate under the Food and Veterinary Agency. One of the questions for farmers was to choose the institution in charge of food safety in Kosovo, providing them several options from which to choose. From table 4, we figure out that 64.4 percent of the secondary+ education group stated they know that FVA is in charge with food safety compared with 27 percent of the primary education group. 69.8 percent of farmers of the primary education group stated that they do not know—indicating the law awareness level among farmers about food safety.

Table 4: Answer to the questions: “Which is the institution in charge of food safety? and Which is the institution that issues animal health certificate?”

Education level	Institution in charge of food safety				Institution that issues animal health certificate			
	Primary education		Secondary+ education		Primary education		Secondary+ Education	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
FVA	17	27.0	56	64.4	21	33.3	63	72.4
MAFRD	1	1.6	4	4.6	1	1.6	2	2.3
Municipality	0	0.0	2	2.3	1	1.6	1	1.1
I don't know	44	69.8	23	26.4	39	61.9	20	23.0
No answer	1	1.6	2	2.3	1	1.6	1	1.1
Total	63	100	87	100	63	100	87	100

Animal Health Certificate. The Law on “Veterinary”² (article 6, 14, 16, 19) emphasis that veterinary service is responsible for issuing a veterinary certificate for: (i) the movement of the animal or the products, (ii) trade of animals, (iii) slaughtering of animals. Farmers were asked to choose the institution in charge of issuing animal health certificate providing several options from which to choose. 72.4 percent of the farmers from the secondary+ education group provided the right answer while almost 62 percent of the farmers from the primary education group stated that they do not know (Table 4), indicating the lack of information about this important aspect.

¹ Republic of Kosovo (RoK): Law on Food No. 03/L-016. Assembly of Kosovo, 12 February 2009. Official Gazette of the Republic of Kosovo No. 49, 25 March 2009

² Republic of Kosovo (RoK): **Law on Veterinary No 2004/2.** Assembly of Kosovo, 16 June 2004, Official Gazette of the Provisional Institutions of Self-Government in Kosovo No. 18, 01 November 2007

Farm Register. According to the article 27 of the law on “Veterinary” the farmer must keep the animal register. Keeping a farm register is very important, not only for farmers but also for animal and public health experts, because through records could be identified the movement of animals from one farm to another, from one farm to the market or to a processing facility. The record keeping of animals’ movement helps to find the sick ones, and also to find the farm and the area where another animal may have come into contact with and potentially exposed to a disease. Using the farm records, the experts can determine if those animals need to be tested, treated, or even quarantined to prevent further spread of disease. These are very important step in securing the safety of our food supply.

According to our field survey, most of the farmers stated that they do not have a farm livestock book/register. Only 14.3 percent of the farmers of the primary education group and 35.6 percent of the farmers of the secondary +education group stated that they have farm register book (Table 5). It is observed that there is a relationship between level of education and the fact that a farmer keeps notes on books about animals (Pearson Chi-Square = 8.514330 sig = .004). The responses were coded as follows; yes = 1 and not = 2 to have books, primary education = 1, secondary + education = 2 for education. Spearman's coefficient was calculated to measure the level of correlation , which resulted as follows: -.238 (sig = .003), -a statistically significant correlation. The relation between these variables resulted negative, so the higher the educational level, the fewer farmers do not keep books about animals.

Certificate for the transport of animals. The majority of the farmers is not issued with veterinary certificate before transporting their animals. However, from the secondary+ education group, 44.8 percent are issued with veterinary certificate compared with 23.8 percent from the primary education group (table 5). Educational level also influences on having transportation certificate, where the results of statistics are as follows: Pearson Chi-Square=7.006 sig=0.008124, Spearman Correlation=-0.216118, sig=0.007902.

Table 5: Answer to the questions: “Do you have a farm book/register on livestock”? “Do you obtain a certificate for the transport of animals?”

Description	Answer	Education level			
		Primary education		Secondary+ education	
		Freq.	Percent	Freq.	Percent
Farm register	Yes	9	14.3	31	35.6
	No	54	85.7	56	64.4
	Total	63	100	87	100
Certificate for the transport of animals	Yes	15	23.8	39	44.8
	No	48	76.2	48	55.2
	Total	63	100	87	100

Animal Identification. According to the law on “Veterinary” the owner is responsible for the animal’s identification and for keeping the identification register. The penalty of 500- 30,000 Euro

is applied to the farmer who doesn't use the ear tag for his animals. The majority of the farmers of both groups (74.6% of the primary group and 94.3% of the secondary+ group) state that they always use ear tags for the identification of their animals. However, from the primary education group, 11.1 percent of the respondents stated that they never or rarely use the ear tags (table 6). The dependence between ear tags identification scale and education level resulted statistically significant and negative. As of the farmers declarations the results were as follows: the higher the educational level the fewer farmers rarely or never used ear tags identification. The responses were coded as follows; Always=1, often=2, rarely=3, never=4.

Slaughter of Animals. The majority of the farmers of both groups (76.2% of the primary group and 47.1% of the secondary+ group) stated that they never notify the veterinarian before slaughtering the animals (table 6). (Pearson Chi-Square =14.089378 sig=0.003, Spearman Correlation=-0.306, sig=0.0001)

Table 6: Do you use ear tags for livestock identification? Do you notify the veterinary service before slaughter your animals?

Education level	Use ear tags for livestock identification				Slaughter your animals			
	Primary education		Secondary+ education		Primary education		Secondary+ Education	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Always	47	74.6	82	94.3	4	6.3	21	24.1
Often	9	14.3	4	4.6	2	3.2	5	5.7
Rarely	4	6.3	1	1.1	9	14.3	20	23.0
Never	3	4.8	0	0.0	48	76.2	41	47.1
Total	63	100	87	100	63	100	87	100

Animal diseases. Poor knowledge of zoonosis might significantly impede people who are infected with brucellosis from seeking medical services. Most of the farmers of the primary education group stated that they don't know the symptoms of Brucellosis and TBC, 87.3 percent and 85.7 percent, respectively. (Table 7). While the answer from the secondary+ education group is much better: 40.2 percent of them knew the symptoms of Brucellosis and 43.7 percent knew the symptoms of TBC. The statistics resulted as follows: Pearson Chi-Square = 13.544336 sig=0.000, Spearman Correlation=-0.300, sig=0.0002 for Brucellosis and Pearson Chi-Square =14.672 sig=0.0001, Spearman Correlation=-0.312, sig=0.00009 for TBC.

Table 7: "Do you know the symptoms of the following diseases?"

Education level	Brucellosis				TBC			
	Primary education		Secondary+ education		Primary education		Secondary+ Education	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Yes	8	12.7	35	40.2	9	14.3	38	43.7
No	55	87.3	52	59.8	54	85.7	49	56.3
Total	63	100	87	100	63	100	87	100

Feed ration. Most of the farmers of the both groups are not consulting the feed expert and they continue to feed the animals without making a distinction of the ration according to the milk production. This is one of the reasons why the milk yield in Kosovo is below potential breed averages. However exist a considerable difference between the two groups, where 1/3 of the

secondary+education farmers are feeding the cows according to the milk production. Pearson Chi-Square =7.606 sig=0.006, Spearman Correlation=-0.225, sig=0.006.

Table 8: "Do you use the feed ration of cows according to the milk production?"

Education level	Feed ration			
	Primary education		Secondary+education	
	Frequency	Percent	Frequency	Percent
Yes	8	12.7	28	32.2
No	55	87.3	59	67.8
Total	63	100	87	100

Milking and cooling tank. Almost 70 percent of the farmers of the secondary + education level group are using milking machine, in addition, 57.5 percent of the farmers, of this group, are using milk cooling tank which shows us for better milk quality and less risk for diseases (Table 9).

Table 9: Do you use hand or machine milking? and "Do you have milk cooling tank"?

Education level	Machine milking				Milk cooling tank			
	Primary education		Secondary+ education		Primary education		Secondary+ education	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Yes	22	34.9	60	69.0	9	14.3	37	42.5
No	41	65.1	27	31.0	54	85.7	50	57.5
Total	63	100	87	100	63	100	87	100

Conclusions

This is an exploratory study, aiming at assessing the impact of farmers' education on dairy farming knowledge, national food safety standards, animal diseases, and farm production. This sample covers only 2 out of 7 regions of Kosovo, due to financial constraints, which might represent a limitation – however, the findings could be considered indicative for the Kosovo as a whole, since the legal and institutional framework is the same for the whole country. According to the survey findings, the milk yield of the cows managed by the farmers of the secondary+ education group is 41% higher than those of the primary education group. 54% of the farmers of the secondary+ education group sell milk to the processors compares with 27% of the primary education group. In addition, 64.4% of the farmers of the secondary+ education group knew who is the institution in charge with food safety, 72.4% knew about the institution in charge of issuing the animal health certificate, 40.2% knew the symptoms of Brucellosis, 43.7% knew the symptoms of TBC compare with 27%, 33.3%, 12.7% and 14.3%, respectively for the primary education group.

In addition, significant differences between two groups of farmers (in favor of the secondary +education group), are also for the use of milking machine, milk cooling tanks, animal identification, farm register, feeding the animals according to the production level, etc. Pearson Chi-Square and Spearman's coefficient was calculated to measure the level of correlation, which resulted with a statistically significant correlation. The relation between these variables in some cases resulted negative, so the higher the educational level, the better the performance it is.

These findings indicate the low awareness level among farmers about farm management, animal diseases and food safety. The extension service and information dissemination in regard to the application of best farmers' practices need to be strengthened and to provide farmers with the agricultural knowledge and information regarding food safety and animal health.

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