

## Structure and Marketing Opportunities on Dairy Farms in Konya Province, Turkey

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### Abstract:

The main problems encountered by Turkish dairy producers are the lower level of productivity and profitability, lack of specialization, cooperation, and have strong links with the characteristics of producers, agricultural systems and hygiene and disease control in dairy herds. The objectives of this study are to identify the dairy cattle production factors, household characteristics, and needs of milk for human life. The survey based on the primary data collected by stratified random sampling method in the dairy farms of Konya in August 2014. 92 dairy farms which are producing and selling milk Konya province was interviewed. The data collected through interviews, focus group and evaluated by using parametric and nonparametric tests. The means age of farmers was 47.4, the average of household members was 5.54, and the average number of members busy with dairy cattle was 2.05. The average number of milk cows per dairy cattle yield was 33.56 kg and daily milk yield per cow was 21.13 kg/day. On a lactation period, milk yield per cow was 5493.8 kg/head and the average lactation period was 260 days, and the results of ANOVA; average forage crop area was 78.92 decares and share of the forage crop area in total farm planting area is around 39%, there are positive and statistically relationship between farm size group and average forage crops.

**Keywords:** Structure, marketing opportunity, Dairy Farms, Konya, Turkey.

### 1. Introduction

Livestock is an important activity in Turkey, in terms of ensuring adequate and balanced nutrition for growing population and use for industry in many areas. One of the most important elements of livestock is to improve income. The improvement dairy production was the main objective of livestock in dairy farms [1]. Dairy cattle play a significant role in rural livelihoods and economies for developing countries. They are the providers of income and employment for farmers and others working in sometimes complex value chains [2]. The dairy cattle sector of Turkey has considerable potential and important part of the agricultural sector and the economy. In Konya, all milk producers are forced to sell their milk through the cooperatives, milk collection centre, directly marketing by itself, sell retailing, factory, dairy association and self-distribution [3]. Through this study in Konya dairy cattle financial situations can be determined the problems, shortcomings, advice and recommendations what they need to be done remedy these shortcomings will be explained and increase the profitability of farms with the development of animal husbandry in addition to Konya and Turkey's economy contribution will be provided [4]. The main problems encountered by Turkish dairy producers are lower level of productivity and profitability, lack of specialization, cooperation, and the high level of endemic diseases and fertility problems. These problems have strong links with the characteristics of producers, agricultural systems and hygiene and disease control in dairy herds' applications of an agricultural area to another [5]. The key problems exist in terms of production, processing and marketing, and the production units are serviced all who have qualities and scale that change from traditional farms to modern companies in the dairy sector in Turkey [6]. Besides many problems belong to production and marketing, continued increases that occurred at a production cost and price, are affected to producers and consumers [7]. The biggest problems of milk production of Konya are unfair competitions stemming

from the shadow sector, raw milk quality, price and hygiene. These problems are followed by the forage prices and cold chain infrastructure issues [8]. The aims of the study are to explain the dairy cattle production, structure and marketing opportunities in the region through careful gathering and documentation of information on the current practices, dairy marketing systems, dairy processing and milk handling, challenges and opportunities the systems of dairy production, processing and marketing systems and to determine the socio- demographic, economic, technical characteristics and information-seeking behavior of dairy farms in the Konya province.

## 2. Material and Methods

The main resources of this study were obtained from questionnaires conducted by face to face interviews with dairy producers. The target of population to which the results of this study generally apply is all dairy farms operating in the Konya province.

This survey was performed to investigate the structural properties of dairy farms marketing. For this purpose, 92 dairy farms which are producing and selling milk in Konya province was interviewed. The sampling data made of 5% errors and confidence intervals have been taken, the data from 92 farmers who are working with dairy cattle activities were collected through focus group discussion, interviews and analyze by using parametric and nonparametric tests. This survey on dairy cattle production, structure and marketing opportunities, household characteristics that pressure the farmers' alternative of milk marketing channel and to have a sustainable efficient farming sector which uses empirical approach with a sustainable use of natural resources. This survey based on the primary data collected through stratified random sampling method in August 2014 in the dairy farms of Konya. The data collection survey was developed which considered explanatory variables used in the study included questions about socio-demographic gender, age, education, employment, and family member, household busy in dairy farms, social health insurance, years engage with livestock, dairy farms and plant crops. The data sampling use stratified randomizing sampling determination formula of Yamane with 0.05 mean error and confidence interval. This number was proportionally divided into three strata and respondents in each stratum were randomly selected. Each respondent had an equal and independent chance of being included in the sample. The sample size was calculated as follows: [9].

Where:

n= Sample size

N = Accessible population

N<sub>h</sub> = Size of each stratum

S<sub>h</sub> = standard deviation within a stratum

D<sup>2</sup> = desired variance

e = accepted error from the mean (5%)

t = t-value from the accepted confidence interval (5%)

$$n = \frac{\sum (N_h S)^2}{N^2 D^2 + \sum N_h S_h} , \quad D = \frac{e^2}{t^2}$$

Descriptive statistics including means, frequency, percentages, and standard deviations independent sample t test, ANOVA (F test) and chi-square test was used as the non-parametric statistical methods through SPSS 21 program. The data were evaluated using mean of Likert-type questions (5 Likert Scale). To construct the dependent variable of the study, 92 dairy farming were determined.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2 + s_2^2}{n_1}}}$$

W

x<sub>1</sub> = Mean of first sample

x<sub>2</sub> = Mean of second sample

n<sub>1</sub> = Sample size (i.e., number of observations) of first sample

n<sub>2</sub> = Sample size (i.e., number of observations) of second sample

s<sub>1</sub> = Standard deviation of first sample

s<sub>2</sub> = Standard deviation of second sample

F= MST

$$X^2 = \sum [ (O_{r,c} - E_{r,c})^2 / E_{r,c} ]$$

Where:

DF = degrees of freedom

r = number of levels of gender

c = number of levels of the voting preference

$n_r$  = number of observations from level r of gender

$n_c$  = number of observations from level c of voting preference

n = number of observations in the sample

$E_{r,c}$  = expected frequency count when gender is level r and voting preference is level c

$O_{r,c}$  = observed frequency count when gender is level r voting preference is level c.

### 3. RESULTS

#### 3.1. Socio-Demographic Characteristics of Households

This section expressed socio-demographic characteristics of farmers such as age, gender, education level, occupation, number of household members, numbers of households busy with dairy cattle, households social health insurance status, experience with livestock activities, experience with dairy cattle activities and experience with plant crops production.

In this survey, the age of dairy farmers are divided 3 groups; the first group farmers are under 35 years old, the second group are between 36-50 years old, and the third group are above 50 years. The percentage of the first group dairy farmers is 23.9%, second age group is 32.6% and third group is 43.6% determined. The average ages of the dairy farmers, who participated in the survey, were 47.4 years. The influence of educational status of respondents, who were participated in the survey, was analyzed with highest level 45 persons and compared with 48,9% was graduate from primary school, the second level 26.1% from secondary school, third level was 16.3% from high school and last level education was 8.7% graduated from university. In terms of employment study of dairy farms, the majority of respondents are farmers (82.6%), and they are busy with dairy cattle. It means the respondents, who are busy with dairy cattle production, get more income than other sectors. Moreover 2.2% of farmers indicated that their work is on private sector, 4.3 % of farmers are retired from other sectors and work now on dairy farms. The number of household member analyzed. The respondents who are involved in first group ( $\leq 3$  members) were 15.2%. The respondents who are involved in second group (4-5 members) were 43.5 % and the respondents who are involved in the third group ( $>5$  members) were 41.3%. Average household size was to be found 5.54 members. The numbers of members are busy with dairy cattle is evaluated and divided into three groups. The first group farmers (1 member) are busy with dairy cattle which are 26.1%, the second group farmers (2 members) are busy with dairy cattle which are 42.4%, and the last group farmers ( $\geq 3$  members) are busy with dairy cattle and which are 31.5%. In the total average number of members busy with dairy cattle were 2.05. In the terms of Health insurance, 94.6 % producers had health insurances, and 5.4 % producers did not have health insurances. Regarding to the years of experience with livestock activities analyzed. it was determined that 29.3 % of farmers have experience in animal husbandry for  $\leq 15$  years, and 35.9% of farmers are between 16-25 years, and 34.8 % of the farmers have experience with for  $\geq 26$  years, livestock activities. Regarding to the years of experience with dairy cattle activities analyzed. It was determined that 23.9% of farmers have experience with dealing with dairy cattle activities for  $\leq 10$  years, and the 38% of farmers between 11-20 years, and 38% of the farmers have experience with dairy cattle activities for  $\geq 20$  years. The producers participated in the survey according to the years of experience with crop activities analyzed. It was determined that 43.5% of farmers have experience between 1-20 years and the 50% of farmers have more than 20 years' experience, and 6.5% the farmers do not have any experience with crop production activities (Table 1).

#### 3.2. Species distribution of animals and cattle according to the race

The species of animal and cattle were evaluated in the farms; the average number of cows per farms is 33.25, number of bullocks are 18.78, number of heifers are 12.79, the number of calves are 8.04, and the number of oxen are 0.53. According to the study the highest species of animals in the dairy farms were cow (Table 2).

Table 2. Average number of animals species owned by enterprises

Animal Species	Average Number of Animals	Std. Deviation
Cow	33.25	55.204
Bullock	18.78	33.986
Heifers	12.79	22.672
Calf	8.04	11.352
Ox	0.53	1.836

### 3.3. Expectations

Producers were asked regarding to the expectations for dairy producers; 61.08% expect milk prices to increase and decreasing the price of feed, 22.38% increase of support, 13.69% provision of technical information support, 8.25% of farmers told marketing problems should be solved, and 9.34% of farmers believe that producers should be organized (Table 3).

### 3.4. Qualitative Comparative Statistical Analysis of Some Variable

In this statistics two or more effective dependent and independent variable affects each other, and verify whether have any relationship between them and the coincidence of any difference between the values obtained from the analyses to understand the structure of them. To compare two groups, t test is performed and to compare of more than two groups F test (ANOVA) is performed. Analysis some number of variables shown in the following.

Table 4 show the independent sample t test, according to analysis results (N=81, M=20.33, SD=4.159), the respondents of mobile milking and (N=11, M=24.45, SD=5.447), the respondents of milking unit. The value of t, which is 2.968, was statistically significant (p=0.004) therefore, the null hypothesis is rejected it means there is a statistically significant between two groups (milking unit and mobile milking). Therefore, we can say that there is a significant difference between the mobile milking and milking unit groups. People who used the milking unit had significantly higher production than those who used the mobile milking.

Table 5 show the independent sample t test, according to analysis results (N=79, M=21.48, SD=3.919), the respondents who have Holstein species and (N=13, M=19.00, SD=3.979), the respondents who have Mix species. The value of t, which is 2.111, was statistically significant (p=0.038) therefore, the null hypothesis is rejected it means there is a statistically significant between two groups (Holstein and mix) species. Therefore, we can say that average milk yield is a significantly different between the Holstein and mix groups. The species of Holstein had significantly higher production than those that the species of mixes.

A chi-square test of independence was performed to examine the relation between Income-expense holding record status with farmer size (number of milked animals). The relation between these variables was statistically significant, ( $X^2 = 7.333$ ,  $P = 0.026 < 0.05$ ). While the number of animals increases also the rate of income-expense is increasing too (Table 6).

Total planting area and forage crops by farmer size group was investigated in table 7. According to results of one way ANOVA, average planting area is found to be statistically different by farmer size. Average forage crop area was 78.92 decares and share of the forage crop area in total farm planting area is around 39%. On the other hand share of the farmers produce forage crops are average 83.30%. There are positive and statistically relationship between farm size group and average forage crops.

### 3.5. Dairy products marketing

Development in breeding, nutrition and animal health will be continued to increase dairy production. It is an important to the hygienic condition in dairy farms, a cow milk production, milk quality, although the ultimate aims to achieve the earnings of enterprises for agricultural economy production to the market. Therefore, the planning of agricultural enterprises production is, one of the most important elements for assessment their marketing channels. Milk processing and evaluation of available dairy factory, the dairy cattle in this area are good. 43.47% of farmers sell their milk products to directly costumers, 41.3% of

farmers sells to retailing, 7.61% of farmers sells to factory, 5.43% of farmers sells to dairy association and 2.19% of farmers self-distributing of their products (Figure 1).

#### 4. Conclusion and recommendation

This study is about the survey results for dairy cattle production, structure and marketing opportunities in the Konya province. The data has been collected through interviews, and focus group discussions, the collecting data has been presented by using descriptive statistics and also applying as parametric and nonparametric tests. The dairy farming has considerable potential and an important part of the agricultural and economy sector. It constitutes about 25% of the value of agricultural production and contributes to the economic development of rural households.

According to results, 48.9% of farmers are illiterate or graduated from primary school, majority of respondents are farmers (82.6%) and they are busy with only dairy cattle, 94.60% of respondents have insurance. The average number of cows per farms is 33.25; number of bullock is 18.78, number of heifers 12.79 and the number of calves of 8.04. In the terms of tools and equipment assets; 59.78% of farmers have automatic irrigation, 53.26% have auto scrapers, 21.73% feed mixing machines, 18.47% milk tanks, 18.47% silage machines, and 16.3% of farmers have baler machines. Climate changed due to changing weather conditions; the types of shelters available for animal welfare (semi-open, open) are not enough and insufficient for animals, for example, last winter was very intensive and indoor shelter was required. This article helps to the policy makers and the dairy farming to contribute to food security and sustainable development, especially for low - income regions. For the reason that dairy farming not only generates income for low-income farms, but also contributes to employment, food security, sustainable development and provides drought power and agricultural inputs. For the long-term sustainability of agriculture in Turkey, the government and the decision maker support farmers to integrate livestock and crops. The Government's overall objectives for the development of the livestock sector must be to reduce rural poverty and increase development and improve sustainability

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## APPENDICES

**Table1. Socio-Demographic Characteristics of HousehoLDS**

Variables	Groups	Frequency	Percent (%)
Age of the farmer (in years)	≤35	22	23.9
	36-50	30	32.6
	≥51	40	43.5
Formal education of farmers	Primary school	45	48.9
	Secondary school	24	26.1
	High school	15	16.3
	University	8	8.7
Employment groups	Farmer	76	82.6
	Private sector permanent worker	2	2.2
	Retired	4	4.3
	Other	10	10.9
Household Size	Group (≤ 3 members)	14	15.2
	Group (4-5 members)	40	43.5
	Group (>5 members)	38	41.3
Number of household members busy in dairy farms	Group (1 members)	24	26.1
	Group (2 members)	39	42.4
	Group (≥3 members)	29	31.5
Health insurance status of farmers	Have health insurances	87	94.6
	Not health insurances	5	5.6
Experiences with livestock activities (Year)	≤15	27	29.3
	16-25	33	35.9
	≥26	32	34.8
Experiences in dairy cattle (Year)	≤10	22	23.9
	11-20	35	38
	>20	35	38
Years of experience with plant crops	0	6	6.5
	1-20	40	43.5
	>20	46	50

**Table 3. Expectations related dairy cattle**

Variables	Expectation	Expectation	Expectation
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	<b>1 (%)</b>	<b>2 (%)</b>	<b>3 (%)</b>
Increasing milk prices, decreasing feed price	61.08	12.60	1.73
Increase of support	16.51	22.38	4.99
Technical information support	3.47	13.69	8.28
Solving marketing problems	2.38	2.82	8.25
Producers organizing	2.38	4.99	9.34
Total	85.82	56.48	32.59

**Table 4. Affecting of milk production for the cow milking status**

<b>Milking shape</b>	<b>Number of Famers</b>	<b>Average milk yield - lit/day</b>	<b>Std. Deviation</b>
Mobile Milking	81	20.33	4.159
Milking Unit	11	24.45	5.447
t-test (p-value)	2.968 .004)		

**Table 5. Affecting Of Cow Milk Production With Animals Species Status**

<b>Animal Species</b>	<b>Number of Farmers</b>	<b>Average milk yield - lit/day</b>	<b>Std. Deviation</b>
Holstein	79	21.48	3.919
Mix	13	19.00	3.979
t-test (p-value)	2.111 (0.038)		

**Table 6. Income-expense holding record status with number of milked animals groups (%)**

<b>Holding record</b>	<b>Farmer size (number of milked animals)</b>			
	<b>&lt;10</b>	<b>10-29</b>	<b>≥30</b>	<b>Total</b>
Income-Expense not holding record	52.30	21.54	26.16	100
Income-Expense holding record	33.33	11.12	55.55	100
Total	46.73	18.48	34.79	100
Chi-Square (p-value)	7.333 (0,026)			

**Table 7. Total planting area, forage crops by farmer size group**

<b>Farmer size (number of milked animals)</b>	<b>Average of total planting area (da)</b>	<b>Average of forage crops area (da)</b>	<b>Share of farmers produce forage crops (%)</b>
<10	75.43	18.83	65.10
10-29	127.97	34.50	76.50
≥30	407.06	183.28	96.90
Average	200.49	78.92	78.30
F-test (P-value)	13.13 (0.000)	19.399 (0.000)	5.991 .000)