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The Analysis of Socio-Economic Factors in the Dairy Farming of Antalya Province of Turkey

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Abstract: In this study, important socio-economic factors in the dairy farming of Antalya province have been analyzed. Possible relationships between milk productivity of farms, being the Union membership of the farmer and number of cows with selected characteristics are investigated in the enterprises. The research results indicate that there are relationships between family size, experience in dairy farming and raising high yielding cows with the daily milk yield. A relationship between the farm size, age of the farmer and experience in dairy farming with the number of dairy cows was also found. According to the research results investigated factors did not any effect on the being a member of the union. A relationships have been observed with the variables in the scope of economic factors (technical and economic problem fields), total agricultural area, the share of the irrigated area, farm size, number of lactation days, total number of cows, quantity of daily sold milk, between level of daily milk yield; with total agricultural area, share of the irrigated area in the total area, share of fodder plants, farm size, quantity of daily sold milk, daily milk yield, problem fields, participation to decision-making, collaboration and assistance between the number of cows; with total agriculture area, share of irrigated area in the total area, farm size, number of cattle, keeping pedigree records, daily milk productivity, type of milk selling between being a member to the union.

Key words: Dairy farming, milk productivity, farmers union, socio-economics analysis, Antalya, Turkey

INTRODUCTION

In nearly 67.4% of all the 3,1 million farms, vegetable and animal production activities are carried out together. Farm rate doing only animal production activity is 2.4%. According to the 2007 data, total cow number is 11,037, 29.6% being domestic, 29.9% culture and 40.5% crossbred. About 91.7% of total milk production is supplied from dairy farming (Anonymous, 2007). Milk productivity in domestic races cannot be raised to the intended level because of inadequacy of genetic capacity. Therefore, it is important to raise the domestic and crossbred race among total cow quantity. However, it is not known that in which level crossbreds carry the blood of culture race. After all it is accepted that the share of crossbreds and also, share of high-blood leveled of these crossbreds are increasing (Ozkutuk and Goncu, 2000).

The share of animal production value in total agricultural production is 25.3% (Anonymous, 1997). However, this rate is about 60% in countries where agriculture is developed (Anonymous, 1996a). Considering the rational difference between vegetable and animal production value, it is seen that farming has not improved expectantly in Turkey. One of the most important reasons for this occasion to arise is the uncertainty and inefficiency in agricultural policy pursued. Related to this, there are many problems pending to be solved such as not being able to convert domestic cows into culture and crossbreds and providing suitable habitat, inadequacy of farm size and of extension service, not protecting grasslands, not expanding fodder plants, not providing farmer organization, turning the rise of product-input prices against product prices, not adopting the pedigree system and economic principles in farms.

As shown in the area of animal production in Turkey, raising the productivity per animal comes as one of the most important subjects to be highlighted. In order to attain this goal, apart from having domestic and crossbred races, providing suitable habitat and the quality of human-resource in sector that are farmers and attributors to production activities have great importance. In the studies, important problems based on the inadequacy of farmer quality are detected. As long as farmers are not provided with enough information and ability about animal care and breeding, housing and general health subjects are not suggested to unite

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according to their common benefit, having high yielding races and giving enough roughage will prevent reaching intended production increase (Anonymous, 1996b).

Applications on dairy farming in Turkey: It is seen that legal precautions about improvement of animal quality have begun to be taken in Turkey since 1926. In later periods, husbandry improvement projects began to be applied (Pekel, 1999). Today Ministry of Agriculture and Rural Affairs supported dairy and cattle farming in order to improve cow farming and increase the share of productive culture among existing cows and raise the meat and milk yield per animal. For this aim, a number of domestic and foreign projects are designed (Anonymous, 2001). However, with the effect of reasons afore-mentioned, in spite of the projects, which aim the improvement of husbandry, especially cow farming; enough progress is not recorded (Demirtas, 1999). Experience gained in these projects put forward the need that breeding cow farmers should found their own breeding organizations. Upon this, projects of building breeding dairy cattle farms have come to the fore (Pekel, 1999).

In this scope, Italian Government aided TURK-ANAFI Dairy Cattle Breeding Development Project that started in 1989 and German Government aided Cattle Breeding Information System Project that started in 1990 brought into force the building of breeding animal associations with the hand of farmers, keeping pedigree records by these associations, passing the services about animal breeding farmers that has been carried by Ministry of Agriculture till today over these associations, Ministry of Agriculture's providing necessary supports and supervising. With the first project, 3250 breeding pregnant heifer imported from Italy were distributed to breeding dairy cow farms in Izmir, Manisa, Balikesir, Usak, Aydin, Denizli, Mugla, Isparta and Burdur provinces, central offices of pedigree, extension and information services were built in Izmir, being the project centre, parallel to this breeder extension and information services were built in each province. In this project that ends in 1994, pedigree applications, productivity controls, artificial insemination, extension and health services were provided by the government (Pekel, 1999). The main aim of German Government aided Cattle Breeding Information System Project (GTZ) that came into force one year after the previous project is to build and information system suitable for Turkish standards and form a special breeding association in order to carry out this system for the genetic protection and improvement of culture cows that were brought to Turkey. Although, the project was intended to last till the end of 1996 normally, due to the negotiations it was extended to 31 Dec, 1999 (Anonymous, 1996b). With this project special organization began to be built up in Turkey for the first time (Pekel, 1999).

In 17 provinces, 1137 farms, the average milk yield of 4111 Holstein Friesian cow is 5.434 kg according to 1996 data. The value is 4.492 kg for Antalya Province. The highest value is in Balikesir with 6.538 kg and the lowest is in Samsun with the value 4.005 kg.

In the light of these events, Ministry of Agriculture authorities and foreign responsibles of these two projects decided to begin a new project called Turk Holstein Friesian (HF) project in 20, 01, 1995. This projet includes Antalya together with Ankara, Aydin, Balikesir, Burdur, Bursa, Canakkale, Denizli, Edirne, Eskisehir, Isparta, Izmir, Kirklareli, Konya, Manisa, Mugla, Sakarya, Samsun, Tekirdag ve Usak provinces. From these enterprises; Cattle Breeders' Associations, which was founded in 1995 also founded their Main Office in 1998 (Kumlu and Ozcan, 1998). The association, which was found in Antalya in 1995, under the name of Black-Mottled Cattle Breeders' Association changed its name as Antalya Province Holstein Cattle Breeders' Association in 1997.

In this study, farms that do dairy farming in Antalya province, which has the 1.4% of cows in Turkey and produces 1.6% of animal products and 2.4% of cow milk are taken into consideration. In the study, important socio-economic factors in the dairy farming of Antalya province have been analysed. In this scope, possible relationships between milk productivity of farms, being the union membership of the farmer and number of cows with selected characteristics are investigated. According to this, the aim of the study is to analyze the important socio-economic factors in the dairy farming of central district of Antalya Province.

Previous studies: A number of studies that were carried out on dairy farming is presented.

Erkus *et al.* (1987), in the study titled as the productivity of dairy farming in Burdur and Eskisehir and the detection of optimum production and investment volume, detecting the rivalry power in dairy and cattle breeding production activity according to labor, feed and cowshed area evaluation and optimal production level in farm production pattern is aimed (Erkus *et al.*, 1987).

Ucak (1992), farms that have import cows in Samsun are observed, existing condition and problems encountered are detected.

Cicek and Ozbas (1993), in the study titled as a research on existing conditions of breeder farms projected in Tokat Province-central district it is detected that the capacity usage and milk yield is very low in farms.

Karkacier (1995), made the economic analysis of urban dairy farming production activity of Tokat Province sample.

Sahin and Yurdakul (1995), highlighted source usage and productivity in dairy farming in Adana Province, Seyhan and Yuregir districts.

Yayar and Karkacier (1996), in the study titled as a research on economic and technical characteristics of dairy farms in Tokat Province Pazar district animal races, average animal number produced, milk yield and costs are calculated.

Olug (1996), problems encountered in dairy farming in Burdur Province is observed and suggestions are put forward.

Karli (1998), in the study titled as the structural characteristics of animal farms in Turkey and improvements in animal production, levels of meat, milk and egg production and consumption and projections are done.

Kutlar and Ozcatalbas (2008), in the study titled as social gender analysis and information sources in farms that are and are not members of dairy farming breeders' association in central district of Antalya Province, the roles of family members on animal production activities and information sources of producer is presented.

MATERIALS AND METHODS

The main material of the research composes of primary data gathered from survey in central district of Antalya Province dairy farming. Besides, in the scope of secondary data, previous studies about the subject and statistical sources are used.

First applications for dissemination of productive culture race in dairy farming in Antalya Province was carried out in central district of Antalya Province, first culture dairy farming began in central district. Therefore, central district of Antalya Province is appointed to be the investigation area.

Farms that do dairy farming and have at least one culture dairy cow are detected and 8 farms are found to be suitable to be studied considering average cow number per farm according to villages. The number of farms in stated characteristics is 161 in these 8 villages and this number constitutes the frame. Based on the number of cows in farms, sample size is calculated with stratified random sampling using Neyman Equation (Yamane, 2001) and suitable sample size is found as 54. According to this sampling ratio is 8.8%. Evaluations about daily milk yield and dairy cow number took place over 54 surveys.

$$n = \frac{\Sigma(N_h \times S_h)^2}{N^2 + D^2 + \Sigma(N_h \times S_h^2)}$$

Moreover, since possible effect of organization (farmers' union) of dairy farming in productivity will also be studied, the members of Holstein Dairy Cow Breeders' Union in Antalya Province are detected. Accordingly, there are 26 farms that are member to dairy cow breeders' union in central district and this value is 59.1% of the whole. As it is seen, an important part of member farms are located in central district. Since, of all the 54 farmers that are included in sampling 3 of them are members; survey is done for the rest 23 farmers. By this way, the survey is applied on all the members of the union using complete inventory method. Observing the condition of being member or non-member of the union, 26 member and 51 non-member farms are taken into consideration.

Possible relationships between characteristics of farmers and milk yield, dairy cow number in farm and being member of the union is searched with χ^2-test (Yogurtcugil, 1978) and calculations are analyzed in SPSS 9.0 for Windows statistics package program.

RESULTS AND DISCUSSION

Characteristics of farmers: General aspects of farmers are detected by data gathered from 54 farmers in the scope of research (Table 1). According to this; average family size is 5.09 people. Considering the education level, females are between literate and primary school graduate; males are between primary and secondary school graduate. Information sources on dairy cow breeding are local (self-experience, neighbor, relatives, friends etc.) and experts (crews of provincial and district directorate of agriculture, union officers, veterinarians etc.). Females are found to get more use of expert information sources than males. Males are double experienced than females in the scope of experience duration.

Characteristics of farms: Average farm size that farmers have is 71.87 decare, 63.7% being irrigated. Number of piece is 8.4 averagely. Fodder plants (corn, oat, tare, clover, vetch oat) agriculture is done in 28.1% of average farm size (Table 2).

Average number of cattle in farms is 15. Nearly, all of them (99.6%) composes of culture animals, only 0.4% being culture crossbred. There is no farm that has domestic races (Table 3).

Some other characteristics seen important for farms and by farmers are observed as average values (Table 4).

According to this, farmers have been doing culture race dairy cow breeding for 12 years, began culture race dairy cow breeding for the first time 25 years ago. Nearly, all of the farmers keep pedigree records. The aim of occupation is not self-consumption but commercial. Nearly, all of farmers think of proceeding in husbandry.

Table 1: Some chosen characteristics of farmers

Characteristics	Average	Min.	Max.
Family size (number of people)	5.09	3	7
Average age of female (year)	41.89	24	59
Average age of male (year)	46.33	29	63
Education of female (*)	2.44	1	5
Education of male (*)	3.24	2	6
Experience in dairy cow breeding (year)	22.19	3	41
Experience in culture dairy cow breeding (year)	12.37	3	25
Characteristics of info source of female (**)	1.54	1	2
Characteristics of info source of male (**)	1.35	1	2
Total number of subjects (N)	54.00	-	-

*1): Not literate, 2): Literate, 3): Primary school, 4): Secondary school, 5): High-school and 6): College, **1): Expert info sources and 2): Local info sources

Table 2: Vegetable production activity and area of fodder plants in farms

Production activity	Cultivation area (da)	Share in total (%)
Fodder plants	20.18	28.1
Corn	11.33	55.1
Oat	6.81	33.7
Vetch oat	1.11	5.5
Clover	0.74	3.7
Tare	0.19	0.9
Other arable crops	49.09	68.3
Wheat	31.33	63.8
Barley	13.15	26.8
Cotton	2.83	5.8
Sesame	1.78	3.6
Citrus and olive	1.04	1.4
Vegetable (open)	1.56	2.2
Total	71.87	100.0

Table 3: Number of cattle in farms

	Culture (pure) race		Culture crossbred (*)	
Cattle	Number (head)	Share in total (%)	Number (head)	Share in total (%)
Milch cow	7.35	49.2	0.02	33.4
Heifer	1.74	11.6	0.02	33.3
Bull	0.04	0.3	-	-
Female steer	1.70	11.4	-	-
Male steer	0.89	6.0	-	-
Female calves	2.09	13.9	0.02	33.3
Male claves	1.13	7.6	-	-
Total	14.94	100.0	0.06	100.0
No. of cattle	15.00	-	-	-

(*): There are 3 culture crossbred race only in one farm

The role of wives, children and family elders about participation and assistance in animal production activity is important. Collaboration and assistance with neighbors and relatives about animal production is very low. Problems encountered are generally economic.

There are 15 cattles per farm. Nearly half of them (7.37) are dairy cows. Yearly milk yield per dairy cow is between 1.680 and 7.000 kg average annual milk yield is 4813, 62 kg number of lactation days/year is averagely 268. Daily milk yield changes between 10-30 kg and averagely 18 kg. Daily milk production is averagely 132 kg 96.8 and is sold, 2.3% is processed in farm, 0.8% is consumed in farm and 0.1% is sold to employers in farms. Milk is rather sold wholesale.

Moreover, there are averagely 2, 24 ovine in farms and agricultural area of fodder plants is approximately, 72 decare.

Analysis of socio-economic factors: It is aimed to detect the possible relationships between 3 chosen variables such as milk yield, number of dairy cows and being a member of Antalya Province Holstein Cattle Breeders' Association with socio-economic characteristics of framer and these relationships are studied with χ^2-test (Yamane, 2001). Group class limits according to variables studied are as such: Daily milk yield (1. group 8-15 kg/head/day; 2. group 16-30 kg/head/day), number of dairy cow (1. group 1-5 head/farm; group 6-26 head/farm), being a union member (1. Member; 2. Non-member). As it's described in Methods, the number of subjects for the first two variables is 54 and 77 for the third.

Variables and analysis results taken in the scope of social factors are given in Table 5. According to this, there is a relationship between family size, experience in dairy farming, raising high yielding cows with the daily milk yield statistically. There is also relationship between the farm size, age of the farmer and experience in dairy farming with the number of dairy cows statistically. There is no relationship between variables in Table 5 and being a member of the union. These results show that social factors do not have any effect on being a member of union. In other words, being a member of union does not differentiate the farmers, both members and non-members show similar characteristics. However; that factors, which have relation among themselves have effect on daily milk yield or number of dairy cow is put forward statistically by χ^2-test.

Variables and analysis results considered in the scope of economic factors about production activity are given in Table 6. According to these results there is a relationship between total agricultural area, the share of irrigated area, farm size (between 1-50, 51-100, 101-260), the number of lactation days, total number of cows, quantity of daily sold milk, problem fields (technical-economic) and level of daily milk yield. There is also relationship between total agricultural area, share of irrigated area, characteristics of problems (technical and economic), participation in decision-taking, collaboration and assistance with number of cows and daily milk yield. Moreover, apart from social factors there is relation between total agricultural area, share of irrigated area, farm size, number of cattle, keeping pedigree records, daily milk productivity, type of milk selling and being a member to the union. Regarding these results, it can be said that in the frame of related subjects; the economic factors have mutual effect with daily milk yield, number of dairy cows or being a member of union.

Table 4: Other characteristics about farm and animal production activity

Characteristics	Average	Min.	Max.
Time elapsed after the first bought culture dairy cow (year)	12.37	3	25
Cowshed area per cattle (m^2)	4.88	2.65	16.44
Keeping pedigree record (1. Keeping, 2. Not keeping)	1.96	1	2
Aim of occupation in husbandry (1. Commercial, 2. Self-consumption)	1.19	1	2
Thought of proceeding in farming (1. Yes, 2. No)	1.17	1	2
Being a member of union (1. Member, 2. Non-member)	1.94	1	2
Decision taking (1. Self, 2. Contribution of family)	1.65	1	2
Collaboration and assistance (1. No, 2. Yes)	1.94	1	2
Characteristics of problems (1. Economic, 2. Technical)	1.37	1	2
Number of total cattle	15.00	3	73
Average number of dairy cow (culture + crossbred)	7.37	0	26
Average number of culture dairy cow	7.35	1	26
Average number of culture crossbred dairy cow	0.02	0	1
Number of lactation days (day $year^{-1}$)	267.78	210	300
Quantity of milk production in last year (kg/head)	4813.62	1680	7000
Daily milk production per dairy cow (kg)	17.97	10	30
Quantity of milk production in farm (kg/farm/day)	132.48	10	350
Daily sold milk in farm (kg)	128.19	8	343
Daily processed milk in farm (kg)	3.12	0	12.50
Daily consumed milk in farm (kg)	1.06	0	3
Daily milk given to employers in farm (kg)	0.11	0	4
Type of milk selling (1. Wholesale, 2. Retail sale)	1.35	1	2
Number of ovine (head/farm)	2.24	0	61
Total agricultural farm size (da)	71.87	11	260
Irrigated farm size (da)	45.79	0	160
Total number of subjects (N)	54.00	-	-

Table 5: Analysis of social factors about farmers' characteristics

Characteristics	Level of daily milk yield	No. of dairy cows	Being a member	SD
Family size	8.421**	7.372**	0.049	1
Age of female	0.080	3.641	0.783	2
Age of female	0.306	6.916**	0.473	2
Education of female	0.017	3.260	0.003	1
Education of male	0.784	0.110	0.002	1
Experience in dairy cow breeding	9.362**	6.070**	3.654	2
Experience in culture dairy cow breeding	8.235**	1.002	3.687	2
Characteristics of info females made use of	0.887	1.717	0.099	1
Characteristics of info males made use of	0.163	0.011	0.640	1
Total number of subjects (N)	54.000	54.000	77.000	-

$X^2_{0.95} = 3.841_{(SD=1)}$, $X^2_{0.95} = 5.991_{(SD=2)}$, **Related

Table 6: Analysis of economic factors about production activity

Characteristics	Level of daily milk yield	No. of dairy cows	Being a member	SD
Total agricultural area	6.312**	19.636**	5.111**	1
Irrigated agricultural area	5.707**	6.462**	9.171**	1
Share of fodder plants	0.424	14.079**	3.077	2
Farm size	6.986**	22.937**	12.466**	2
Cowshed size	0.017	0.007	2.220	1
Aim of occupation	0.698	1.886	1.902	1
Number of lactation days	8.466**	1.978	2.279	1
Number of cattle	6.068**	-	6.764**	2
Keeping pedigree records	0.108	1.428	49.071**	1
Daily sold milk	9.567**	46.034**	0.000	1
Daily milk yield	-	6.375**	5.045**	1
Type of milk selling	0.659	0.533	5.580**	1
Thought of proceeding in farming	0.140	0.245	0.233	1
Participation in decision-taking	1.950	15.283**	0.396	2
Collaboration and assistance	0.041	4.620**	0.145	1
Being a member of union	1.032	2.184	-	1
Characteristics of problems	4.769**	21.838**	0.097	1
Total number of subjects (N)	54.000	54.000	77.000	-

$X^2_{0.95} = 3.841_{(SD=1)}$, $X^2_{0.95} = 5.991_{(SD=2)}$, **Related

It must especially, elaborate on number of dairy cows and being a member of union, which are detected to have effect on daily milk yield. In this sense, it is resulted for the farmers that having at least 6 or more dairy cows is important for increasing daily milk yield. This finding is compatible with the condition of having at least 5 culture dairy cows in order to be a member. The statistical relationship between milk yield and being a member can be explained with the condition of having at least 5 culture dairy cows in order to be a member.

CONCLUSION

In the farms observed, average cattle number is 15, being nearly all of them (99.6%) culture animals. There is no farm that has domestic races.

There is a relationship between family size, experience in dairy farming, raising high yielding dairy cows with the daily milk yield among variables considered in the scope of social factors. There is also, relationship between family size, age of male, experience in dairy farming with the number of cattle in farm. There is no relationship between being a member of the union and all other factors. These results show that subjects that are regarded as social factors did not have any effect on being a member of the union. However, factors that are related have effect on daily milk yield or dairy cow number.

Within the variables in the scope of economic factors there is a relationship between total agricultural area, the share of the irrigated area, farm size, number of lactation days, total number of cows, quantity of daily sold milk, problem fields and level of daily milk yield. There is also, relationship between total agricultural area, share of the irrigated area in the total area, share of fodder plants, farm size, quantity of daily sold milk, daily milk yield, problem fields (technical and economic), participation to decision-making, collaboration and assistance and the number of cows.

Moreover, there is a relationship between total agriculture area, farm size, number of cattle, keeping pedigree records, daily milk productivity and type of milk selling and being a member to the union.

It is put forward that having at least 6 or more dairy cows is important for improving daily milk yield for dairy cow breeder farms.

Considering the problems detected, it will be possible to make use of dairy cow breeding at the peak level according to existing condition.

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