THE PROBLEMS OF RAW MATERIAL SUPPLY OF THE TURKISH DAIRY INDUSTRY AND SUGGESTIONS : CASE OF İZMİR

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Abstract

In this study, problems that have been faced by dairy plants related to obtaining raw materials were investigated. For the development of dairy industry, an adequate supply of good-quality, raw milk for dairy plants is very important. A trouble-free supply of raw material, which is proper in quantity and quality, primarily depends on the improvements in dairy farming and the integration of dairy plants and dairy farms. In this study, problems regarding raw material supply of dairy industry were determined by applying questionnaires to managers of dairy firms. Suggestions for solving these problems were also shaped out of the information gathered from the managers of these companies through questionnaires.

Key words: Turkey, Dairy Industry, Dairy Farming, Integration, Raw Material.

INTRODUCTION

Although natural resources and ecological characteristics in Turkey are quite convenient for dairy farming, structural problems in agricultural sector and lack of efficient policies for dairy farming suppress the increase in milk production yields. Failure in performing the desired improvement in dairy farming also effects the development of dairy industry negatively that has organic ties with dairy farming. In addition, the weakness of the integration of dairy industry and dairy farming is another factor that limits the development of dairy industry. In this study, questionnaires were applied to the managers of dairy firms in İzmir to detect the problems in raw material supply of dairy plants and to gather suggestions to solve the problems. These suggestions were also shaped by the information gathered from the same managers.

MATERIAL AND METHOD

Material
In this study two groups of material were used. The first group consists of data obtained directly from dairy firms by means of questionnaires. The second is the national and the international literature on the subject

Method
Method Followed In Data Collection
In İzmir province, where the research was made, the number of dairy plants make 10.4% of the total dairy plants in Turkey according to 2000 data (MARA, 2002). The material concerning field study of the research consists of the data obtained from face to face questionnaires filled with dairy plant managers in İzmir province. The managers who filled in the questionnaires were plant owners in small or middle-scaled plants, and

professional managers in relatively large plants. The lists of plants that process milk and dairy products in İzmir were obtained from İzmir Provincial Directorate of Agriculture, Ege Region Chamber of Industry, İzmir Chamber of Commerce. In this way, the plants under the registration of different Associations and Institutions were all obtained. The number of plants that were interviewed was calculated using the proportional sample size formula (Newbold, 1995).

$$n= [N.p.(1-p)]/[(N-1) \sigma p_x^2 + p (1-p)]$$

In the formula, n = the number of plants to be interviewed (sample size),
N= the number of plants that process milk and dairy products in İzmir,
σp_x^2 = variance
p= proportion of dairy plants that don't have any problems in obtaining raw material.
As the proportion of dairy plants that don't have any problems in obtaining raw material within the population is not known, the proportion of dairy plants (p), was taken 0.50 in order to calculate the maximum sample size. With this approach, using the proportional sampling, the sample size was calculated as 86 plants with 5% type I error and at 90% level of confidence interval. The dispersion of sample volume among the districts was made according to the proportion of dairy plant numbers in each district to the total number of dairy plants in İzmir province. The trial questionnaires were filled in during the period of August-September 2003, and the questionnaire interviews were held during the period of October 2003-February 2004.

Method Followed In Data Analysis
At the beginning of the analysis, dividing the dairy plants into homogenous groups according to cluster analysis was tried. Both in local and in Turkey, the

skewed pattern of the sizes of dairy plants that constitute the sample volume (Demirbas et al., 2002), made the results of cluster analysis done with the variables obtained from questionnaires meaningless. In order to group dairy plants, basic statistical calculations such as frequency distribution, standard error of mean, variance, skewness and kurtosis for parameters of size such as number of employees, technical capacity and production capacity were made. According to the results, it was decided to determine the groups by the number of employees. Therefore plants were divided in to four groups.

In analysing the data, Jarque-Bera test was initially carried out for constant variants. Variance analysis (one way anova) for the variants that have the normal distribution was applied. For the variants that have not the normal distribution, Kruskall Wallis test was applied – a non parametric one-way variance analysis and is used to determine whether the data from different samples show the main trend of a single group.

To measure the existing situation regarding the raw material problems of the plants to which questionnaires were applied, the five-Likert Scale (from 1 the lowest to 5 the highest) was used (Malhotra, 1996). Also factor analysis were done depending on figures obtained from the Likert Scale. Factor analysis aims separating the closely related data bodies in order to form new data bodies that are less related and less in number; and also to form new bodies benefiting from the relations among variables (Malhotra, 1996; Hair et al., 1998). In this study, responds gathered by questionnaires regarding the raw material problems were grouped into bodies more unified but less in number by factor analysis. In addition, suggestions on raw material problems gathered through Likert Scale that had been applied to the responds to the questionnaires are presented.

Analysis Results
General Characteristics of Dairy Plants and Their Managers
In dairy plants that were examined, general characteristics of the managers such as, age, occupational experience, experience in the plant and duration of education were taken. As for the plants, technical and production capacity were determined as general characteristics. Age and job experience that suits normal distribution were assessed by variance analysis others that don't suit normal distribution were analysed by Kruskall Wallis Test.

The average age of plant managers was 40.83 and the average duration of education was 10.17 years. There is a difference among the averages of the groups statistically. The occupational experience average in dairy plants was 18.57 years and the experience in the plant was 14.42 years. The average technical capacity of the plants was 29.52 ton/day. But their production capacity average was 14.25 ton/day. There are statistical differences in plants' average capacities.

In Turkey most dairy plants are owned by private sector. Approximately 6% of the 1300 dairy plants that use more than 1000 tons of milk are co-operatives (Demirbaş & Kaya, 2003). 41.9% of dairy plants are standard and individually owned companies; 7% are corporations companies; 5.8% are cooperatives; 2.3% are collective and 1.2% are owned by the state.

Only four of the studied plants are not registered at an Institution or Organisation. The majority of the registered plants are members of İzmir Chamber of Commerce (44.37%), Ege Region Chamber of Industry (23.24%), Chamber of Guilds and Craftsmen (8.46%) and the Union of Chamber of Commerce Industry Maritime Commerce of Turkey (10.57%). The other Institutions and Organisations that have members are the Association of Milk and Meat Producers, the Chamber of Yoghurtmakers and Milkmen, İzmir Commerce Stockmarket, the Association of Agricultural Village Development Co-operatives, the Chamber of Candymakers and Pastrymakers.

The analysed plants display a heterogeneous structure in terms of production technology. In some plants, there is only a pasteurisator, in some others there is a double-wall open vat, in others there is both a vat and a pasteurisator, and in some there is only a simple heating vat. About 98% of the plants have got a double wall open vat. In 26 of them (30.23 %), there is a pasteurisator. In Turkey, 14.62% of the 1300 dairy plants with the production capacity of 1000 ton/year have got a pasteurisator (SPO, 2001). In Turkish dairy industry, İzmir province is one of the regions that have a priority in terms of the number and size of plants; therefore, the proportion of owning a pasteurisator is above the country average.

When the plants are analysed in terms of product range, it is observed that in 40.81 % there are sorts of cheese, in 16.23 % there is yoghurt and its sorts, in 16.34 % there is whey cheese, in 7.29 % there is butter, in 5.54 % there is cream, in relatively less amounts there is UHT and pasteurised milk, skim-milk cheese, milky dessert, ice-cream and milk powder production.

The Problems Faced in Obtaining Raw Material in The Analysed Plants
Factor analysis was applied to the gathered responds given by the managers of the firms related to the problems in obtaining raw material. As a result of analysis the Kaiser-Meyer-Olkin value was measured 0.735. This value showed that the data was suitable for analysis. At principle component calculations, the eigen value (base value), that was used in determining the number of factors, variance and added variance were calculated. Five factors that had eigen values over 1 have explained 66.722 % of the variance.

Factors were named according to Varimax Rotation Calculation. In the first factor group were; being unable to obtain the same amount of milk at all times of the year; in adequacy of raw material; small number of dairy farms and local consumption of milk. First factor

explains 27.085% of the variance and was named as "amount of raw material". The second group was constituted by lack of efforts by farmers', the government and the dairy firms on rising awareness on health concerns and raw milk quality, lack of government control on raw milk that is marketed. Second factor explains 14.577% of the variance and was named as "measures taken by the government".

The third factor defined as instability of raw material prices; low-quality of raw material and high raw milk prices explains 9.773% of the variance.

Low productivity rates of dairy farms and inadequacy of fundamental infrastructure and the cold chain at production and collection process constitute the fourth factor group and is named as "productivity + infrastructure". The fourth factor explains 7.831 % of the variance.

Inadequacy of consumer efforts on raising awareness on health concerns and quality of raw milk and inadequacy of marketing organisations of raw milk are included in fifth factor group named "consumer + marketing". The fifth factor explains 7.455 % of the variance.

Opinions of Managers On Solution of Raw Material Problems

Agreement intensity of the plant managers with the suggestions about the solution of the problems listed above was measured by the Likert Scale. According to the results, managers want firstly (4.41) the government to pursue a continuous (stable) policy on improving dairy farming in order to solve problems related to raw material. The main suggestions were; Increasing the number of exotic breeds (4.21); Payments of subsidies to the farmers on time by the government (4.15). Inspection and certification of dairy farms by the government (4.12); Sorting out the problems in all related organisations in the sector (4.07); Adjustment of milk production subsidies according to the quality of milk by the government (4.01) and establishing the stability of prices (4.00). Some other suggestions were; adopting a stable policy of private sector for the improvement of dairy farming (3.98); encouragement of contract farming (3.70); enforcement of the legislation (3.54); increase in the amount of milk subsidies (3.31) and encouragement of the organisation of farmers (3.08).

Compliance with the legislation in order to solve raw material problems is considered a secondary problem within the list of suggestions. Mostly, suggestions regarding structural problems and subsidies were put forward. Neither for the whole agro-sector nor for dairy farming, organisation as a solution to problems, has been suggested primarily.

RESULTS AND DISCUSSION

One of the most important problems of milk and dairy industry has been the raw material. Because of the policies that have been followed so far, most of the dairy farms have remained as small, family size farms in the village. Since hygiene of such farms is not easy to establish, milk is usually contaminated at milking time. And this situation results in low quality milk. In addition lack of cold chain from the farm to the plant also affects the milk quality adversely and the raw milk decays until it gets to the plant and becomes unsuitable for any process. Therefore it results in considerable economic losses (SPO, 2001). Another problem for the industry is the doorstep sales of now milk that effect the amount of milk the industry receives.

There are 3840 dairy plants that process milk and dairy products in Turkey. Among them there are both highly advanced factories and the ones which are primitively operated ones, small family plants or seasonal plants. On the other hand it has been observed for the past 15 years that the structures and the characteristics of the industry have started to change in a way that the plants have been growing in capacity and been modernised. Also in recent years, foreign investors have started making investments on dairy sector in Turkey. Tikveşli-Danone and Mis Süt–Nestle are some of the noticeable partnerships that the EU companies have formed in Turkey. But only 15% of the total amount of the milk produced in Turkey is processed in modern factories. And this, therefore, forms a considerable obstacle before the development (Demirbaş et al, 2004).

The low ratio of integration between dairy plants and dairy farms has been a problem in obtaining raw material. Recently, contract farming has been applied to relatively large-scale farms by big companies. A great number of small dairy plants buy milk either directly from farmers or collectors without any contract. Cooperatives of dairy farmers' are not sufficient in number. The very small percentage of cooperatives and the unions is the dire strait of the integration of the industry and farmers. Because of this, dairy farmers depend on the local milk collectors and so, there are also important problems in collection, cooling and transporting it to the plants. Lack of cooperatives together with the small sizes of family farms suppresses the application of the payment system which takes the ratio of fat, protein and microbiologic quality of milk as parameters for different raw milk prices. This situation, therefore, suppresses the improvement in raw milk quality. In Turkey only some major companies are able to implement the premiums to their contractors (Demirbaş et al., 2002).

As it was stated in the questionnaires by the managers of the dairy plants, eradication of raw material problems in milk and dairy industry depends on the solution of structural problems. Expectations of companies that were introduced concentrates on the measures such as premiums for dairy farmers. Plant managers do not consider farmer cooperatives among the choices for solution to the problems. It is not because they don't believe in organisation but because the common disbelief in development of cooperatives both in the whole agriculture and dairy cattle breeding. In fact,

while cooperatives in dairy cattle breeding concentrates in some regions it is not at desired level in other regions. Overcoming the problems of quantity and quality of raw material in dairy industry primarily depends on increasing the number and quality of dairy farms and establishing the integration of dairy farms and dairy plants by cooperative efforts and contract farming implications.

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