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ANALYSIS AND CLASSIFICATION OF NUTRITIONAL, HUSBANDRY AND HEALTH RELATED PARAMETERS TO DEFINE SPECIALIST DAIRY FARMING

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ABSTRACT

The level of specialist dairy farming in Burdur region of Turkey was determined by the analysis of nutritional, husbandry, breeding, health and product safety and quality parameters. A face-to-face questionnaire was conducted. The data obtained were classified and transformed to numerical values before statistical analysis. A multiple-response analysis was performed to define the classification of dairy farms into qualified, averaged and unqualified, which were established by algorithmic rules within each set of parameters. The results revealed that the level of specialist (qualified) dairy farms was only 47%, whereas 33% unqualified and 20% averaged. The nutritional expertise levels of farmers were not at a satisfactory level: 50% of farmers were qualified, 23% averaged and 27% were unqualified. The expertise level of farmers in feeds and feedings was dramatic: only 38% were qualified, 20% averaged and 42% unqualified. On the other hand, for animal husbandry, animal health and product safety criteria the farmers were not highly-skilled experts: 51% were qualified, 19% averaged and 30% unqualified. In conclusion the specialist dairy farming system in Burdur accounts only 47% of the total. This figure is lower than an overall European figure of 83%. It showed that Turkish dairy farming is not convincing even some serious reforms were made. This suggests the need for intervention programmes to be undertaken in the region by the concerned public and private bodies.

Key words: Nutrition; Husbandry; Specialist Dairy Farming; Decision-making indicators;

INTRODUCTION

Turkish Agricultural Policy has been changing with alignment of European Agricultural Regulations. Dairy policy makers and/or service providers need to generate sustainable policies which are based on pin-pointed data extracted from a sound assessment of agricultural farms including those in animal production. For assessment of agricultural farms a wide range of management indicators can be used to simplify a complex reality on farms. The farm typologies are therefore commonly recognised indicators to demonstrate farm management practises as well as environmental performance in a given agricultural policy context (Andersen *et al.,* 2007). The indicators are suggested to be classified into an integrated form rather than in a single form. Such approach provides useful tools for assessing and designing different farming policies taking into account of a wide range of differences between various types of farms (Andersen *et al.,* 2004). This reflects that the farm typology is decided upon in a period when the main goals of the agricultural policies are related to production and economy (Anonymous, 2003).

Towards integration of Turkey's Dairy farming the sustainability level, in other word the level of specialist dairy farming is to be known and determined. Sustainability must be understood to be more than an economical analysis. As recommended in the Dutch model the aspect of sustainability is to be extensively studied for various dimensions; ecological, economical, environmental, safety, welfare and health, and moreover a criteria based approach is suggested to be followed (Van Calker, 2005).

In the first part of this research study an example of such farm typology (only farm size, housing, milking mechanisation) was published to demonstrate the statues of typical Turkish dairy farms**.** New indicators based on nutrition, husbandry and health are now investigated in order to further specify Turkish dairy farm typologies.

The province of Burdur is known one of the major dairy milk producers and is an excellent representation of Turkey (Anonymous., 2009). In order to maintain a profitable and sustainable dairy business in the region the statues of dairy farming must be determined. This study was therefore designed to collect, analyse and interpret the nutritional, husbandry and health related indicators for the purpose of providing good quality of services by the local and national authorities.

MATERIALS AND METHODS

Approximately 400 dairy farmers were initially intended to be randomly visited. After the completion of 10 surveys it was foreseen that the size of subjects (400) as well as the number of questions (more than 100) were large to complete the study. Therefore, the survey was

reduced to contain only 90 questions with 172 subjects. These 172 subjects (farmers) were randomly visited at 18 different locations throughout the region. The locations were randomly chosen. The average representative farmers per each location was 9.52 ± 2 which was seen to be insignificantly different between the locations (χ^2 = 20.77; df = 17; P = 0.24). The first parts of questionnaire regarding farm size, animal housing and milking mechanisation was already published.

The data obtained from the remaining survey was entered manually to a spreadsheet using Microsoft Office Excel Application. Data to be selected for statistical treatment was transformed to numerical values. Multiple-Response Test was applied to the data by using a window-based statistical package program, SPSS version 15 (SPSS, 2006). The survey questions were classified into the categories of animal nutrition, feeds and feeding, reproduction husbandry, health and product safety and quality. The questions asked were highly related to important management measures, which allow determining the level of farmer's qualification for on-going farm activities. Thus these measures were considered as zootechnical performance characteristics upon which a set of algorithmic rules (Orhan and Yasar ,2010) were setup. The rule is that each of 172 farms was classified as qualified, averaged or unqualified on the basis of their answer to each of the questions, and they were coded as 1, 2 or 3, respectively. The responses of farmers to all multiple questions in the form of 1 (qualified), 2 (averaged) or 3 (unqualified) were then subjected to a multiple-response analysis in order to establish the overall frequencies within each of categories. The applicability (Orhan, 2007) and validity (Orhan and Yasar 2010) of multiple-response test was successfully tested to evaluate the results obtained from such multiple-questionnaires.

RESULTS AND DISCUSSION

1-PRACTICAL KNOWLEDGE OF ANIMAL NUTRITION (AFTER CALVING, LACTATION AND DRY PERIOD)

This section related to determination of specialist dairy farmers on nutritional management of animals kept per farm. The questions asked were very simple and decisive to understand whether the farmers are technically capable of performing these daily activities. This section is divided into three parts:

After calving: In animal nutrition, the new born calves must be fed with sufficient amount of milk during at least 24 h after calving since the milk produced during these hours (colostrums) are nutritionally valuable for calves. 41% of farmers fed their calves with a daily amount of 3-4 L milk per calf, 33% with 5-6 L and 6% with 7-8 L, whereas 20% did not measure or know daily amount of colostrums provided per calf (Table 1). The amount of milk was declared by the farmers, and may not reflect to the precise amounts needed to be given to the new-borns: For instance, 7-8 L of milk per calf is not correct when assumed the required amount milk is to be 10% of body weight.

Where the price of milk is relatively high a specifically formulated feed in place of milk (milk replacement feed) are often used to provide the new-born animals with a formula similar to fresh milk to meet daily nutritional requirements. As a result 95% of farmers did not replace the milk with any kind of milk replacement feed. However, after weaning when the calves begin to consume solid feed materials, 80% of farmers provided the weaned young animals with a starter feed.

During lactation: The nutritional needs of dairy cows throughout the lactation cycle are variable and must be met with an appropriate feeding regime. In this study it was shown that 67.4% of farms applied almost a feeding strategy which is basically based on an understanding of the farmer from the nutrition of dairy cows (Table 2). Wrong feeding strategies may diminish significantly the milk potency of dairy cows. For instance, underfeeding has a significant impact during early lactation than late lactation. Maximum profit, the objective in feeding dairy cows, generally correlates well both with highest milk yield per cow and with providing required nutrients at least cost. In region almost 72% of farmers are able to calculate their net profit, only based on the cost of feed/milk ratio, irrespective to various phases of lactation. Technically speaking the majority of farmers was not highly skilled-dairy man. Moreover, 44% of farmers were shown to calculate the total feed on monthly milk production per cow, 20% on daily milk yield per cow and 13% on average milk yield per lactation, whereas 23% of farmers did not know how to calculate total feed required for their animals kept in. Besides an economical analysis a feeding strategy based on using cheap sources of replacement feed materials such as urea for plant proteins can be best fit obtain a maximum net profit concept. This indicates the level of highly skilled practising dairyman. Many examples may have a small effect on net profits, with a substantial number; the total effect may be appreciable. Almost all the farmers were shown to never practise any kind of such feeding strategies.

Feed may represent 70% or more of the total costs of producing milk. Least-cost formulation is therefore, necessary for every dairy farm, based on the use of an appropriate mixture of sufficient quality of forages/roughages with formulated concentrate feeds at individually or group fed levels. Least-cost feeding was seen to be not applied at the studied farms. Regional farmers were asked to provide monthly amount of

concentrate feed and forages (not subjected to analysis). The daily consumptions levels of feeds per dairy cows were too low in the present case, and that the farmers tended to use low quality of forages (3% silage versus 60% hay) and nearly 60% farms used improper amount of concentrate feed.

On the other hand, almost all the farmers were aware of providing sufficient clean water to dairy cows (92.5%). Disease preventive practises during lactation periods are shown in the Table 2, indicating that a good degree of preventive action is performed.

The percentage of farmers reporting any of the following disorders: milk fever, displaced abomasums, ketosis, acidosis and other disorders were 41%. The percentages of farmers reporting two and three or more of these disorders associated together were 24 and 10%, respectively, and 25% of farmers reported none occurrences of these disorders.

The farmers were asked how often to buy the concentrate feed into the farm. The majority of farmers (93%) buy concentrate feed on a regular monthly base. Occurrence of feed moulding is reported by 19% of farms.

During dry period: The nutritional practice during dry period during the last two months of pregnancy is vital for the preparation of pregnant cows for the next, lactation cycle and for having a healthy calf. The majority (96%) was aware that an adaptation period is needed when a dairy cow goes to a dry period (Table 3). However, there is variability amongst farmers for the duration of dry period: sixty percent of farmers kept the dairy cows for a dry period of more than 60 days, 6% of the farmers kept less than 60 days and 33% kept exactly on 60 days. Moreover, 25% of farmers used an antibiotic treatment during the dry period. Mineral and vitamin supplementation just before the calving is practised by almost 50% of farmers. Again the half of farmers applies a feeding regime which requires at least a week of period for changing from one feed to another, whereas 34% of farmers suddenly change from one to another feed. As overall 65% of farmers claimed that they are aware of how the dairy cows are fed during the dry period. Technically speaking the percentages showing a good degree of animal nutrition were not convincing for a competitive and profitable dairy farming.

Determination of specialist dairy farming from the above mentioned nutritional indicators: In the tables 1, 2 and 4 the nutritional factors influencing dairy management are presented. 172 farms were coded by 1, 2 or 3, as qualified, averaged and unqualified farms, respectively for each of the answers given to the questions which were presented. A multiple-response test are used to analyse and classify the number and frequency of the coded farms as qualified, averaged and unqualified farmers from algorithmic rules established from these nutritional indicators. The results of multiple-response analysis were presented in Table 4. The indicators have shown that the majority of farmers (68%) have an appropriate knowledge in the nutrition of lactating dairy cows, whereas they were not good at caring and nutrition of dairy calves (50%), and nearly 40% of farmers showed a good practice of non-lactating, pregnant, dairy cows. After pooling (all individual data were combined and re-analysed by multiple-response test) these figures regarding various phases of lactation cycle, dairy farmers can be classified as 50% qualified, 23% averaged and 27% unqualified farmers within the frame of nutritional indicators (Table 4). Therefore, there is high potential (73% including those qualified and averaged farms) for the policy-maker and service providers to take actions for the nutritional improvements.

2-EXPERTISE LEVEL ON FEED AND FEEDING STRATEGIES (FORAGES, SILAGE AND CONCENTRATE FEEDING)

Forages and silages: The percentage of farms using silage as a source of forage was only 26% (Table 5). These farms use one or more of silage compounds such as salt, molasses, cereals and some others to obtain a better quality of silage, whereas they do not know about the availability of silage additives (i.e., organic acids and micro-organisms). There is a variability seen in the fermentation time of silage amongst the farms, the majority of farms (71.5%) did not know how long silage should be fermented for. Only 13% of these farms exactly know how much of silage should be given per dairy cow and 70% with no knowledge at all.

The use of sugar beet pulp (SBP) as silage is preferred by only 1.7% of farmers. Mostly SBP is either stored on ground (48%) or in a confined store (13%) for daily use. Mixing SBP with other feeding materials is preferred by 33% of farmers and 8% had noticed some digestive problems in dairy cows. The farmers mixing feedingstuffs with molasses were only 14%. The percentage of farmers using alfalfa as a source of good quality forage was 23%, whereas 49.5% of farmers preferred to use hay or dried oats plants as a source of bad quality forage.

Concentrate feed: Fifty-seven percent of farmers did not know any information over the composition of feed ingredients used in concentrated feeds used in their farms (Table 6). Majority of farmers (69%) fed their dairy cows according to measured milk yield. Fifty-two percent of farmers believe that a chemical analysis of feed would tell a better idea about quality of concentrate feed used. Seventy-five percent of farmers did not use additional supplements or premixtures to be added to concentrate feed for a better nutritional performance at a least-cost level, and 70% of farmers preferred to use a coarse

ground concentrate feed for dairy cows. How the farmers evaluate the quality of daily used concentrate feed? The answer was by physical examination of feed by the farmer (6.6%), by chemical analysis (2.3%) or by measured milk yield (85.5%).

Determination of specialist dairy farming from the indicators of feed and feeding strategies: Table 4 summarised the results of specialist dairy farming estimated according to the indicators of feeds and feeding. Important results were obtained: Forty-five percent of farmers were unqualified in the use of forages to dairy cows. For the concentrate feed and feedings, nearly 59% of farmers were evaluated to be qualified farmers. As overall the farmers were defined as 42% unqualified, 38% qualified and 20% averaged.

3-FARM STATUES IN REPRODUCTION AND BREEDING

Majority of farmers (92%) reported a normal estrous cycle of 21 days (Table 7). Frequency of aborted fetus during the pregnancy was seen to be 32%. The percentage of farms reported normal birth to a calf is about 49% and those reported difficult births were nearly 49%. Human intervention during the labour (birth) is reported to be practised by 45% of farmers. Sixty-one percent of farmers have reported to have one calf per year, 33% reported to have a calf every 1.5 year and 4% reported to have 2 or more year. After the birth, the first estrous cycle observed in the dairy cows is reported to be at 80 days by 43% of farmers, whereas 36% reported after 60 days and 12% after 45 days. The percentage of farms reported reproductive problems of having no estrous at all is about 11%, having no successful fertilisation is about 22% and having no estrous and no fertilisation is about 31%.

4-AWARENESS IN ANIMAL HEALTH AND PRODUCT SAFETY AND QUALITY

The farmers were some basic questions over health and food safety aspects (Table 8). How you clean up the navel cord: Twenty-nine percent used a medicinal antiseptic while forty-nine percent used non-medical antiseptic (cologne). In the study 31% of farmers reported nutritional disorders (mainly diarrhea) of new born animals while 68% not. The results regarding to what happens to any aborted fetus were: twenty-six percent of farmers placed to waste bin, 3% sent it a laboratory for investigation and 28% properly disposed it into the ground. Sixty-five percent of farms vaccinated the calves. Sixty percent of farmers collect the milk into an aluminium barrel, 28% to a stainless steel barrels and 10% to a plastic barrel. The production of cheese was made of raw milk (22%) or heated milk (64%). The use of yeast in cheese production is about 59% and the use of calcium chloride is about 39%. Forty percent of farmers did know well what the source of anthrax is at a dairy farm, and only 64% of farmers did know that brucellosis is all about. Seventy-eight percent of farmers knew well that during the antibiotic treatment, the residues of antibiotics in milk may have any potential effects on human health. Fifty-one percent of farmers did know that the presence of micro-organisms in milk above threshold may exert deleterious effect on human health and quality of product badly affected, and 60% did know the source of micro-organisms transmitted to the milk. Fifty-one percent of farmers believed that total bacteria count in the collected milk is an important indicator and establishment of cooling systems at milk collection centres are useful to keep the quality of fresh milk at a desired level.

5. DETERMINATION OF SPECIALIST DAIRY FARMING FROM THE INDICATORS OF REPRODUCTION-BREEDING AND HEALTH-PRODUCT SAFETY

As overall the studied indicators showed that the dairy farmers were classified as 51% qualified farmers for the on-going farm activities relating to reproduction, breeding, and health and product safety in dairy farming (Table 4).

6-OVERALL RESULTS AND REGIONAL STATUE ON THE LEVEL OF SPECIALITY OF DAIRY FARMING IN BURDUR

The results regarding the level of specialist dairy farming under each of the sections were pooled and analysed, and the results were presented at the end of Table 4. It can be concluded that 47% of farmers were qualified farmers, whereas 20% were unqualified and 33% averaged farmers, estimated by the studied scientific and technical indicators in the present case.

Impact of European Union's Common Agricultural Policy (CAP) during the enlargement process of Turkey has been extensively studied in the light of econometric aspects by Koc *et al.,* (2001) and recently summarised by Bayaner (2007). These results indicated that implementation of such policy would have a different impact on crop and livestock sectors; crop production is expected to be competitive while livestock production is not. This conclusion was strongly supported by the present findings related to the status of dairy farming in Burdur Region: the rate of acceptable competitive dairy farmers was not over 47% of the entire farmer population (Table 4). This figure was quiet similar to that reported by Orhan and Yasar (2010).

Only large scaled enterprises with high profitability rate in dairy business have been shown to be remained as competitive as possible after Turkey's unification with Europe (Cicek *et al.,* 2009). It was extensively discussed by Orhan and Yasar (2010) that the percentage of these farmers was not at reasonable levels in the region and all over the country. Both Bayaner

(2007) and Orhan and Yasar (2010) mentioned about a reformist programme in order to change current unsustainable dairy policies. However, the results of such programme has not yet been realised or revealed although it is expected not to be promising. The reason is that the current policy does not cover the involvement of all parties: for instance, the role of animal extension experts from public and private sectors in such reform is not yet defined and activated. Thus, any reformist policies can inevitably fail without transferring scientific and technical "Know-How" to the bottom line.

Former studies undertaken in the region were mostly econometric studies, investigating simply profitability or single factor influence: Cicek *et al.,* (2008) found that the profitability in dairy farming in the province of Afyon (nearby Burdur) is worse affected by the lack of having farmer's own initiative on the determination of feed and milk prices, similar to the results of Orhan and Yasar (2010). Moreover, one unit increase in the cost of feed and management inputs had negative impact on profitability. Therefore, the price of milk is tended to remain relatively unchanged for many decades compared to the high feed cost. Furthermore, the amount of concentrate feed in dairy cattle farms has been reported to have a significant impact on the success of dairy business (Kulekci and Aksoy, 2008; Aksoy *et al.,* 2009).

A good dairy-man should give a consideration on how dairy cows use nutrients, the needed nutrients, feeds as sources of nutrients, and the evaluation of feeds. This knowledge is important and useful in planning practical feeding programs for different types of dairy cows and varying farm conditions. A typical dairy cow of 630 kg will eat about 20 kg of air-dried feed each day. For a 10-cow milking herd this is 200 kg daily or 73 tons per year. The most of best practical feeding programs for milking herds are based on the use of high proportion of high quality forages. As milk production increases the cows usually can not consume sufficient forage to fully meet their energy requirement, thus supplemental concentrates are needed since forages are often deficient in one or more other needed nutrients. The concentrated feed must therefore, HE formulated to make up any deficiencies. According to Fuller *et al.,* (1999) dairy producers must consider good quality concentrated feeds to be an integral part of their feeding regime, whereas concentrate feed is being replaced with grains, oilseed meals or by-products when the price of concentrate increases. Therefore, the demand for lower quality feeds tends to be more elastic than for concentrate feed. Economical parameters indicated that increasing quality of feed ingredients significantly improves feed efficiency and productivity. Our finding revealed that the dairy farmers did not follow a proper feeding strategy, where the qualitative and quantitative aspects of feeding dairy cows are fully respected.

Azabagaoglu (2004) found that the average fodder consumption per dairy cow is 14.6 ton/year, silage consumption to be 47.1 tons/year and compound mixed feed 8.18 ton/year. The dairy farmers' response indicates that low price of milk and fluctuations in market and higher feed prices are the major problem in Turkey. This was the reason why the daily consumptions levels of feeds per dairy cows were too low in the present case, and that the farmers tended to use low quality of forages (3% silage versus 60% hay) and nearly 60% farms used improper amount of concentrate feed per dairy farm. One of the other important factors is that Burdur Region has comparatively low grazing area (Boyar and Yumak, 2000). Moreover, no farmers stated that they kept grazing dairy cows on the pasture and grassland in the present study. The forages and roughages were preserved for indoor feeding, where the usage of these feed materials as silage was not more than 26% of the total (Table 5). Bad quality of forages, mostly hays of cereal plants were prominent in the region.

Nutrient management studies are of significant importance for sustainable dairy farming. No studies have been undertaken for Turkish dairy farming to reveal the status. For instance, ration balancing for dairy farms was

Table 1. The frequencies and classification of nutritional indicators (postpartum period)

Indicators	Multiple-levels	Frequency (%)	Codification*
Amount of colostrums per calf	3-4 L	41	2
	5-6 L	33	2
	7-8 L	6.0	1
	Do not know	20	3
Use of milk replacement feed?	Yes	3	1
	No	95	3
	Do not know	2	2
Use of calf starter feed?	Yes	80	1
	No	19	3
	Do not know	1	2

* Within each of the multiple-levels every farm (total 172) was codified as 1, 2 and 3 to define the algorithmic rules: qualified farmers indicated by "1"; averaged farmers by "2"; and unqualified farmers by "3", respectively

Table 2. The frequencies and classification of nutritional indicators (Lactation period)

Indicators	Multiple-levels	Frequency (%)	Codification*
Cost analysis?	Yes	72	1
	No	23	3
	Do not know	5	2
Apply a feeding regime?	Yes	67	1
	No	25	3
	Do not know	8	2
Total feed calculated on?	Daily milk yield	20	2
	Monthly milk yield	44	1
	Lactation milk yield	13	1
	None	23	3
Availability of sufficient water?	Yes	92.5	1
	No	7.5	3
Disease preventive measures (vaccination, disinfectant, hygiene)?	One of measures	45	2
	Three of measures	29.1	1
	Two of measures	25	1
	None	1.2	3
Nutritional disorders (displaced abomasums, milk fever, acidosis, ketosis, other)?	Any of above	41	1
	Two of above	24	2
	3 or more of above	10	3
	Do not know	25	3
Feed is bought in	Monthly	93	1
	Quarterly	2	2
	Other	5	3
Moulding in feed?	Yes	19	3
	No	75	1
	Do not know	6	2

* Within each of the multiple-levels every farm (total 172) was codified as 1, 2 and 3 to define the algorithmic rules: qualified farmers indicated by "1"; averaged farmers by "2"; and unqualified farmers by "3", respectively.

Table 3. The frequencies and classification of nutritional indicators (Dry Period)

Indicators	Multiple-levels	Frequency (%)	Codification*
An adaptation period is applied?	Yes	96	1
	No	3	3
	Do not know	1	2
Duration of dry period	60 days	33	1
	< 60 days	6	3
	> 60 days	60	2
	Do not know	1	2
Antibiotics are applied?	Yes	25	3
	No	66	1
	Do not know	9	2
Mineral and vitamin support?	Yes	49	1
	No	48	3
	Do not know	3	2
Change from one to another feed.	Suddenly	34	3
	1 day	3	2
	7 days	51	1
	Do not know	12	2
A special feeding regime applied?	Yes	65.7	1
	No	32	3
	Do not know	2.3	2

* Within each of the multiple-levels every farm (total 172) was codified as 1, 2 and 3 to define the algorithmic rules: qualified farmers indicated by "1"; averaged farmers by "2"; and unqualified farmers by "3", respectively.

Table 4. The results of multiple response analysis. Frequency of qualified, averaged and unqualified farmers determined from algorithmic rules based on nutritional, husbandry and health and product safety parameters

Indicators	Qualified farms (%)	Averaged farms (%)	Unqualified farms (%)
Nutritional			
Dry Period	40	37	23
Calving	30	20	50
Lactation	68	15	17
Pooled	50	23	27
Feeds and feeding			
Forages and silage	25	30	45
Concentrate feeding	59	5	36
Pooled	38	20	42
Breeding-Health			
Reproduction-breeding	51	24	25
Health-product safety	51	17	32
Pooled	51	19	30
Overall results	**47**	**20**	**33**

Table 5. The frequencies and classification of the indicators related to feeds and feeding strategies (Forages and silage)

Indicators	Multiple-levels	Frequency (%)	Codification*
Production of silage?	Yes	25.6	1
	No	64.5	3
	I do not know	9.9	2
Use of silage additive?	Yes	26.7	1
	No	73.3	3
How long silage left for fermentation?	30 days	1.2	3
	45 days	17.4	2
	60 days	9.3	1
	Variable	0.6	3
	I do not know	71.5	3
Do you measure the quantity of silage per cow per day?	Yes	12.8	1
	No	18.0	2
	I do not know	69.2	3
How you feed animals with Sugar Beet Pulp (SBP)?	As silage	1.7	1
	stored on ground and directly fed to animals	48.3	2
	Stored on closed place and directly fed	13.4	1
	I don not know	36.6	3
Digestive problems with SBP?	Yes	8.1	3
	No	41.9	1
	I do not know	50.0	2
Mixing SBP with other feed materials?	Yes	32.6	1
	No	14.5	3
	I do not know.	52.9	2
Mixing feed with molasses?	Yes	14.0	1
	No	73.3	3
	I do not know.	12.8	2
Sources of forages?	Alfalfa	23.4	1
	Silage	9.6	1
	Hay	26.3	3
	Dried oats plants	23.2	2
	Other forages	17.5	2

* Within each of the multiple-levels every farm (total 172) was codified as 1, 2 and 3 to define the algorithmic rules: qualified farmers indicated by "1"; averaged farmers by "2"; and unqualified farmers by "3", respectively.

Table 6. The frequencies and classification of the indicators related to feeds and feeding strategies (Concentrated feed)

Indicators	Multiple-levels	Frequency (%)	Codification*
Having knowledge over ingredient composition in concentrate feed?	Yes	38	1
	No	57	3
	I do not know	5	2
Feeding animals according to milk yield?	Yes	69	1
	No	29	3
	I do not know	2	2
Do you believe a chemical analysis of feed important?	Yes	52	1
	No	47	3
	I do not know	1	2
Use of feed supplements/premixture in addition to concentrate feed?	Yes	24	1
	No	75	3
	I do not know	1	2
Texture of feed you prefer?	Fine	20	2
	Coarse	70	1
	I do not know	10	3
Calculate daily concentrate feed per dairy cows/	Yes	74	1
	No	24	3
	I do not know	2	2
Important criteria to determine quality of concentrate feed?	Physical examination	6.6	3
	Chemical analysis	2.3	2
	Observing increase in milk yield	85.5	1
	I do not know	5.6	3

* Within each of the multiple-levels every farm (total 172) was codified as 1, 2 and 3 to define the algorithmic rules: qualified farmers indicated by "1"; averaged farmers by "2"; and unqualified farmers by "3", respectively.

Table 7. The frequencies and classification of the indicators of husbandry and breeding practises

Indicators	Multiple-levels	Frequency (%)	Codification*
Oestrous cyle	21 day	92	1
	30 day	5	3
	I do not know	3	2
Labour (Birth)?	Normal	49	1
	Difficult	49	3
	Caesarean	0.5	2
	I do not know	1.5	2
Human intervention during labour?	Yes	45	1
	No	53	3
	I do not know	2	2
Aborted fetus?	Yes	32	3
	No	66	1
	I do not know	2	2
Period of having a healthy calf.	1 year	61	1
	1.5 year	33	2
	2 year	4	3
	I do not know	2	3
First oestrous after birth	45 day	12	1
	60 day	36	2
	80 day	43	2
	5 months	6	3
	I do not know	3	3
Reproductive problems?	No oestrous	11	2
	Infertility	22	2
	No Oestrous and infertility	31	3
	No problem	35	1
	I do not know	1	1

* Within each of the multiple-levels every farm (total 172) was codified as 1, 2 and 3 to define the algorithmic rules: qualified farmers indicated by "1"; averaged farmers by "2"; and unqualified farmers by "3", respectively.

Table 8. The frequencies and classification of the indicators of animal health and product safety

Indicators	Multiple-levels	Frequency (%)	Codification*
How you clean up the navel cord?	Medicinal antiseptic	29	1
	Non-medic antiseptic	49	2
	Both	8.7	1
	None	5.8	3
	No answer	7.6	2
What happened to aborted fetus?	Waste bin	26	3
	Sent to laboratory	3	1
	Disposed	28	2
	No answer	43	3
Diarrhoea?	Yes	31	3
	No	68	1
	No answer	1	2
Calves are vaccinated?	Yes	65	1
	No	34	3
	No answer	1	2
Milking bucket	Plastic	10	3
	Stainless steel	28	2
	Aluminium	60	1
	Other	2	3
How milk is treated for the production of cheese?	Raw milk	22	3
	Heated milk	64	1
	No answer	14	2
Do you know the source of Anthrax?	Yes	24	1
	No	40	3
	No answer	36	2
What is it used to produce cheese?	Yeast	59	1
	Calcium chloride	39	3
	No answer	2	2
Brucellosis is a transmissible disease?	Yes	64	1
	No	13	3
	No answer	23	2
Use of antibiotics for treatment may cause reduced milk quality/health related problem?	Yes	78	1
	No	5	3
	No answer	17	2
The presence of micro-organisms in milk may exert health/product quality related problem?	Yes	51	1
	No	46	3
	No answer	7	2
Do you know source of micro-organism coming to milk?	Yes	60	1
	No	36	3
	No answer	4	2
Can cooling milk is beneficial for a better milk quality?	Yes	51	1
	No	46	3
	No answer	2	2
Do you know the total bacteria count in milk?	Yes	16	1
	No	80	3
	No answer	4	2

* Within each of the multiple-levels every farm (total 172) was codified as 1, 2 and 3 to define the algorithmic rules: qualified farmers indicated by "1"; averaged farmers by "2"; and unqualified farmers by "3", respectively.

shown to be realised by the services of feed and mineral sale representatives (85% of farms) and manure management by fertiliser dealers (40%), as stated by Dou *et al*., (2001). None of these extension activities were observed to be carried out at Burdur Region. The present study were foreseen a few preliminary intervention studies. The results indicated that balancing daily rations of a few local farmers had resulted in great improvements

of production and profitability. In addition, the willingness to receive such management services by technical and scientific expert by the farmers was too low due to their cost effects (too expensive to buy). Therefore, the introduction of such management services at low prices or free of charge could be an alternative solution provided by the state or local authorities.

The success of dairy industry has been built on animal health and the consumers' confidence in the quality of dairy products. Dairy operations must be able to meet the task every day of producing a high quality product. Emphasis on monitoring animal health and facility hygiene can help ensure that the milk produced continues to meet consumer demands.

Yalcin *et al.,* (2008) conducted a prospective longitudinal observation study, where dairy farms at various locations including Burdur were visited to determine incidence rates of several diseases. Fertility disorders (30.2%) and udder diseases (28.3%) were most commonly seen, and this is followed by puerperal disorders (18.3%) and locomotors system disorders (10.0%). Exactly same percentage of fertility disorders (31%) was observed at Burdur's dairy farms. Good reproductive practices in dairy cows were important for having healthy and productive animals at next generations. However, these aspects were seen to be not adequately handled.

Awareness for a better quality of milk is a key factor in the light of consumer health and economy. However, safety and quality of fresh milk before and during collection at the regional collection centres were not fully respected. Quality control analysis of raw milk at the milk collection centres were not carried out in the region of Izmir due to the lack of qualified expert and inadequate equipment (Demirbas *et al.,* 2008). Some primary properties of raw milk were analysed at these collection centres. The quality of raw milk (i.e., fat content, bacteria count) appeared to affect the price paid for the collected milk at these centres, and the proportionally high number of small sized dairy farms which account over 50% in total directly has 50.3% determination coefficient on the farm gate milk prices (Uzmay, 2009). These results strongly supported our findings obtained in the region of Burdur. The safety and quality of milk begins during milking and ends up with bottling or packaging. Therefore, awareness in the product safety and quality should be increased.

Conclusions: In short, the specialist dairy farming system in Burdur accounts only 47% of total. This figure is too low as compared to the overall European figure of 83%, reported by Van Arendonk and Liinamo (2003). This clearly indicated that Turkish dairy farming is not convincing. Therefore, a short- and long-term action plan from the side of policy-maker is needed.

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