Sustainability of dairy production in Turkey: A case study

Udržitelnost produkce mléka v Turecku: případová studie

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Abstract: The aim of this paper is to show some empirical evidence of the sustainability and decision making in dairy production in Turkey. The main material of the study was obtained from the data collected by the survey conducted in the villages in Merkez, Manavgat and Serik districts of the Antalya province. Within the context of the research, 75 farmers were interviewed in the 2007 production season. The research results indicate that the households are the most important decision maker in terms of farming decisions. 56.3% of the farmers in the small farms, 61.5% of the farmers in the medium-size farms and 41.2% of the farmers in the large farm noted that they could quit dairy production activity if they received a fixed salary.

Key words: dairy production, agriculture, sustainability, decision making, finance, Turkey

Abstrakt: Cílem příspěvku je poskytnout empirickou evidenci týkající se udržitelnosti produkce mléka a rozhodovacího procesu na úrovni farem této produkce v Turecku. Základní empirický materiál pro studii byl získán v rámci výzkumu prováděného ve vesnicích regionů Merkez, Manavgat a Serik v provincii Antalya. V rámci výzkumu byly uskutečněny v produkčním období roku 2007 řízené rozhovory se 75 farmáři. Výsledky výzkumu ukazují, že při rozhodování o produkci má hlavní úlohu domácnost jako celek. 56,3 % farmářů z malých farem, 61,5 % farmářů ze středně velkých farem a 41,2 % majitelů velkých farem by bylo ochotno opustit produkci mléka, pokud by měli zajištěn stabilní příjem.

Klíčová slova: produkce mléka, zemědělství, udržitelnost, rozhodovací proces, finance, Turecko

Sustainability in agriculture is an issue that has been popular since the report of the Brundtland Commission (1987). Even though many definitions can be found for sustainable agriculture, it remains difficult to link the concept to practical actions and decisions (Hansen, Jones 1996). The development of sustainability indicators can be an effective tool to make agricultural sustainability operational (Rigby et al. 2001) and to implement sustainability into the practical policy decisions (Rennings, Wiggering 1997; Van Calker et al. 2003).

The interest in the concept of "sustainable" farming systems has grown as a result of the continuous pressure of farm incomes, the occurrence of animal diseases with a major impact on the image of dairy farming, the concerns about animal welfare, and environmental problems caused by agriculture (Van Calker et al. 2005a). Therefore, it is important to determine the extent to which certain farming practices and farming systems can be considered sustainable or not (Van Calker et al. 2005b). In general, sustainability of agricultural practices and agricultural systems concerns the general economic, social and ecological sustainability (Hansen 1996; Heinen 1994; Shearman 1990). According to Van Calker et al. (2005b), sustainable dairy farming involves protecting and improving of the natural environment, animal welfare, and conditions of the local communities, while at the same time being productive and efficient.

The aim of this paper is to show some empirical evidence of the sustainability and decision making in dairy production in Turkey.

MATERIAL AND METHOD

The sustainability of dairy farming survey was conducted in the Antalya Province of Turkey. A face to face questionnaire was conducted on sustainability, using the Likert type scales ranging from 1 (much more) to 5 (much less). For sampling, the stratified random sampling method was used. The sample size was calculated using the Neyman method (Yamane 1967). The permissible error in the sample size was defined to be 5% for 95% reliability. Farmers were categorized as small (less than 5 heads of dairy cows), medium (6 to less than 10 heads of dairy cows) and large (11 and more than 11 heads of dairy cows). The questionnaire was implemented in October 2007 with 75 randomly selected dairy producers in the Merkez, Manavgat and Serik districts of the Antalya province. The major share of the Antalya region's dairy cow population is concentrated in this area. Farmers' perceptions were studied using the descriptive statistical analysis. Mean values were obtained in dairy farming. All computations were made using the SPSS for Windows.

RESULTS AND DISCUSSION

The study includes the issues such as socio economic features, decision making regarding financial characteristics of dairy farm, the reasons of taking part in agricultural activities in farms, the views of the farmers about factors to be helpful today and in the future in continuing agricultural activity, the desire of the farmers to continue agricultural activity etc.

In the study, it was found that the average age of the farmers was 47.2 years and the average size of farm family in the investigated dairy farm households was composed of 4.6 individuals. 77.3% of the farmers who took part in the questionnaire were primary school graduates. In the analyzed dairy farms, the average number of parcels was 7.4 and the average farm holdings size was found as 8.5 ha (Table 1).

Farmers still rely mostly on their own experience to make decisions about their herd rather than using information systems in Turkey. Regarding agricultural production in our country, in the decision-making process of the farms, the risk element is generally ignored. Since no records are kept in farms, reliable

Table 1. Socio-economic features in the investigated farm holdings

	Number of dairy cows			Means
	1–5	6–10	11+	
Farmer's age	47.9	44.5	50.3	47.2
Farmers' education level (%)				
– Illiterate	–	–	5.9	1.3
– Primary school	81.3	77.0	70.6	77.3
– Secondary school	3.1	7.7	–	4.0
– High school	15.6	11.5	17.6	14.7
– University	–	3.8	5.9	2.7
– Total	100.0	100.0	100.0	100.0
Household size (person)	4.7	4.6	4.3	4.6
Farm holdings size (ha)	5.7	10.9	10.2	8.5
Number of parcel	5.5	8.9	8.6	7.4
Agricultural production by types (%)				
– Mainly crop production	22.5	7.3	13.8	15.3
– Mainly livestock production	77.5	92.7	86.2	84.7
Number of average dairy cows	5.0	7.5	16.9	8.5
Agricultural income ($/year)	15 064.0	21 011.9	19 720.0	18 181.4
Off-farm income ($/year)	4 216.4	5 939.3	6 734.1	5 384.3

*1 USA $ = 1.20YTL in October 2007

data cannot be obtained and effective persons rather than effective methods become important in decision-making about agricultural activities. In the study, the decisions about dairy production were analyzed in terms of investment, saving, financing, future, farm enlargement, marketing, determining production pattern and off farm work decisions. It was found that the households had a significant role in all of the decisions other than decisions about finance, marketing, off-farm work. The spouses and children of the farmers do not participate in decision-making effectively (Table 2).

In 68% of the farms in our study, the farmers never kept records while 1.3% of them occasionally kept records. The share of the farmers who keep regular records about farm activities is 30.7%. The rate of keeping record regularly in the large dairy farms (64.7%) was higher than the rate of other dairy farm

Table 2. Decisions-making on farm holdings (%)

	Number of dairy cows			Means
	1–5	6–10	11+	
Investment decisions				
– farmer	46.9	38.5	35.3	41.3
– farmer's wife	3.1	–	–	1.3
– household	50.0	61.5	64.7	57.4
Saving decisions				
– farmer	43.8	38.5	47.1	42.7
– farmer's wife	–	3.8	–	1.3
– farmer's children	–	–	5.9	1.3
– household	56.2	57.7	47.0	54.7
Finance decisions				
– farmer	53.1	50.0	41.2	49.3
– farmer's children	3.1	–	5.9	2.7
– household	43.8	50.0	52.9	48.0
Future decisions				
– farmer	40.6	38.5	29.4	37.3
– farmer's wife	–	3.8	–	1.3
– household	59.4	57.7	70.6	61.4
Farm enlargement decisions				
– farmer	43.8	38.5	35.3	40.0
– farmer's wife	3.1	–	–	1.3
– farmer's children	3.1	3.8	5.9	4.0
– household	50.0	57.7	58.8	54.7
Marketing decisions				
– farmer	53.1	42.3	41.2	46.7
– farmer's wife	–	3.8	–	1.3
– farmer's children	3.1	–	11.8	4.0
– household	43.8	53.9	47.0	48.0
Production pattern decisions				
– farmer	53.1	50.0	41.2	49.3
– farmer's children	3.1	–	11.8	4.0
– household	43.8	50.0	47.0	46.7
Off-farm work decisions				
– farmer	50.0	50.0	47.1	49.3
– farmer's wife	3.1	–	–	1.3
– farmer's children	3.1	–	5.9	2.7
– household	43.8	50.0	47.0	46.7

groups. Within the scope of financing characteristics, the use of credit, outstanding debt, savings, land sale and investment issues were analyzed in the investigated dairy farms (Table 3). In 52.0% of the analyzed farms, agricultural credit is not used. 89.3% of the farms have no debts to private institutions. 85.3% of the farmers noted that they could not manage any savings. In 78.7% of the analyzed farms, no land sale was made in the recent five years. In 48% of the farms, no investment was made into agricultural activities. In 50.7% of the farms, it was noted that an off -farm investment was made in the last five years.

Among the analyzed dairy farms, the most significant reason of carrying out dairy production was the fact that they made profit (1.32). Considering the small and medium farms, the most important reason was making profit, while the most important reason was being the boss of own business in the large dairy farm (Table 4).

In the investigated dairy farms, among the factors that help the farmers in pursuing dairy production activity, in the small and medium farm, low debts were found to be more significant and the farmers' family working in the farm was found to be more important in the large farm when compared to other factors (Table 5).

In the study, the factors that farmers found to be helpful in their future activities were also analyzed (Table 6). While the guaranteed crop prices were indicated as the most important factor (1.49), providing support in the case of natural disasters (1.53), increasing educational opportunities (1.55) and increasing

Table 3. Financial characteristics of investigated farms (%)

	Number of dairy cows			Means
	1–5	6–10	11+	
Keeping record				
– keeping record regularly	12.5	30.8	64.7	30.7
– not keeping record regularly	84.4	69.2	35.3	68.0
– keeping record occasionally	3.1	–	–	1.3
Agricultural credit usage				
– use credit	46.9	38.5	64.7	48.0
– do not use credit	53.1	61.5	35.3	52.0
State institutions				
– debiting to state institutions	12.5	7.7	–	8.0
– no debiting to state institutions	87.5	92.3	100.0	92.0
Private institutions				
– debiting to private institutions	12.5	11.5	5.9	10.7
– no debiting to state institutions	87.5	88.5	94.1	89.3
Savings				
– make savings	12.5	23.1	5.9	14.7
– no savings	87.5	76.9	94.1	85.3
Land sale in the last 5 years				
– sold	31.3	11.5	17.6	21.3
– did not sell	68.7	88.5	82.4	78.7
Agricultural investment in the last 5 years				
– making investment	46.9	38.5	82.4	52.0
– no investment	53.1	61.5	17.6	48.0
Off-farm investment in the last 5 years				
– making investment	46.9	53.8	52.9	50.7
– no investment	53.1	46.2	47.1	49.3
Failure in farming				
– very important	59.4	42.3	41.2	49.4
– partially important	3.1	–	–	1.3
– unimportant	37.5	57.7	58.8	49.3

Table 4. The reasons of farmers for farming

Reasons	Number of dairy cows			Means
	1–5	6–10	11+	
Having land for farming	1.97	1.85	1.88	1.91
Enjoying farming	2.81	2.46	1.76	2.45
My family shares the work with me	1.56	1.81	1.77	1.69
Making profit	1.28	1.31	1.41	1.32
Lack of off–farm opportunities	2.25	2.69	3.00	2.57
Difficulties to find a different work for me	2.97	3.19	3.47	3.16
Difficulties to change the job	2.72	2.46	3.06	2.71
Being boss of own business	1.53	1.54	1.35	1.49

Likert Scale: from 1 (very important) to 5 (unimportant)

Table 5. Factors helping farmers to sustain farming

Factors	Number of dairy cows			Means
	1–5	6–10	11+	
Extension programs	1.81	2.42	2.00	2.07
My debts are not excessive	1.56	1.69	1.77	1.65
I can get a loan when I need one	2.00	1.85	2.06	1.96
Off–farm income keeps the farm going	1.59	2.00	2.12	1.85
Government supports	1.69	1.81	2.00	1.80
My participation in a farmers' cooperative	2.53	2.89	3.06	2.77
Agricultural engineers of input suppliers	2.13	2.27	2.35	2.23
Agricultural engineers in the public sector	2.03	2.65	2.59	2.37
Farmers' family shares the work with the farmer	2.31	2.15	1.71	2.12

Likert Scale: from 1 (very important) to 5 (unimportant)

Table 6. Factors helping farmers in the future

Factors	Number of dairy cows			Means
	1–5	6–10	11+	
Agricultural education programs for young people	1.97	1.85	1.59	1.84
Availability of home-economics services	2.70	2.54	3.06	2.63
Increasing educational opportunities	1.50	1.62	1.53	1.55
Improved infrastructure (roads, telecommunication etc.)	1.63	1.77	1.65	1.68
Increased the availability of off-farm employment	1.75	2.00	1.71	1.83
Provided support in case of natural disasters (flood, hail, frost, etc.)	1.53	1.65	1.35	1.53
Existence of additional employment opportunities for family members	2.03	2.54	2.29	2.27
Providing guarantees for crop prices	1.53	1.46	1.47	1.49
Increased credit availability	2.06	2.00	1.47	1.91
Increased of income support by government	1.75	1.54	1.65	1.65
Increased number of agricultural cooperatives	2.75	2.54	3.00	2.73

Likert Scale: from 1 (very important) to 5 (unimportant)

income support by the government (1.65) were also listed as important factors respectively.

75.0% of the farmers in the small dairy farm, 61.0% of the farmers in the medium dairy farm and 35.3% of the farmers in the large dairy farms who took part in the questionnaire noted that young people in the family did not want to take part in the dairy production activities and they would not do this job in the future (Table 7).

The most significant factor influencing young farmers to give up farming is that farming does not provide an adequate income (1.41). The same factor was the most important factor in all three dairy farm groups (Table 8).

In the research, the views of the farmers on whether they would quit agricultural activity for a fixed salary was also analyzed (Table 9). 56.3% of the farmers in the small farm, 61.5% of the farmers in the medium farm and 41.2% of the farmers in the large farm noted that they could quit dairy production if they received a fixed salary.

The goals were not the same for all producers. Because of this reason goals of farmers were analyzed according to the individual dairy farm groups in Table 10. The results of the analysis show that the primary goals for dairy farmers in every group were (in the order of importance) income maximization. We found that there were some differences between the three groups. In the small dairy farm, farmers want to reach income maximization (1.44), saving for their children's education (1.44) and protecting environment in farming activities (1.47). Farmers in the medium farms want to improve the family and personal quality of life by maximizing income. This group of farmers also aims at producing a high quality product. In the large farms group, farmers want to reach income maximization (1.18), producing a quality product (1.35) and a comfortable living (1.53) respectively.

Table 7. Views of young farmers' on farming

Number of dairy cows	Going on with farming	%	Giving up farming	%	Total	%
1–5	8	25.0	24	75.0	32	100.0
6–10	10	38.5	16	61.5	26	100.0
11+	11	64.7	6	35.3	17	100.0
Total	29	38.7	46	61.3	75	100.0

Table 8. Factors affecting the decision to give up farming by young farmers

Factors	Number of dairy cows			Means
	1–5	6–10	11+	
Lack of institutional support to farming	1.58	1.94	1.67	1.72
Farming does not provide adequate income	1.29	1.63	1.33	1.41
Difficulties in obtaining credit	2.46	3.00	2.33	2.63
Farming is too risky	1.71	2.00	1.50	1.78
Farming is not attractive	2.13	3.06	1.50	2.37
Better educational opportunities in other sectors	1.79	1.81	1.83	1.80
Better standard of living in other industries	1.50	1.63	2.00	1.61

Likert Scale: from 1 (very important) to 5 (unimportant)

Table 9. Farmers views on giving up farming if they received certain income

Number of dairy cows	I would quit farming	%	I would not quit up farming	%	Total	%
1–5	18	56.2	14	43.8	32	100.0
6–10	16	61.5	10	38.5	26	100.0
11+	7	41.2	10	58.8	17	100.0
Total	41	54.7	34	45.3	75	100.0

Table 10. Goals for future in dairy farms

	Number of dairy cows			Means
	1–5	6–10	11+	
Maximizing income	1.44	1.31	1.18	1.33
Providing sufficient income	1.69	1.62	1.65	1.65
Making investment for the farm	1.91	1.69	1.77	1.80
Farm enlargement	2.56	2.38	1.82	2.33
Saving money for retirement	2.03	2.08	2.12	2.07
Producing quality product	1.63	1.39	1.35	1.48
Saving for children's education	1.44	1.65	1.71	1.57
Lower stress	1.56	1.73	1.77	1.67
Reducing risks	1.75	1.58	1.82	1.71
To be known among other farmers	2.59	2.23	1.71	2.27
To have access to agricultural innovations	1.75	1.65	1.59	1.68
Making off-farm activities/hobbies	2.38	2.35	2.12	2.31
To protect environment by farming activities	1.47	1.58	1.77	1.57
To ensure that future generations will continue farming	3.69	4.19	3.00	3.71
Make a comfortable living	1.66	1.50	1.53	1.57
Improving family and personal quality of life	1.63	1.35	1.59	1.52

Likert Scale: from 1 (very important) to 5 (unimportant)

CONCLUSION

There are various problems in stock breeding, specifically the milk-cow breeding sector in Turkey, such as price instability, organisation structure, problems related with animal diseases, hygiene and quality, low productivity, high unit production costs, enterprises being of less than adequate size, inadequacy of knowledge dissemination between the researcher, the extension worker and the producer, marketing problems, off-record stock breeding, insufficiency of state supports, low education level.

These problems that are widespread in the whole country also influenced the enterprises in the region. Therefore, the research findings revealed results supporting this argument. It is seen in the study that 61.3% of young farmers surveyed in the milk cow breeding enterprises indicated that they will not continue in this economic activity anymore and 54.7% of the existing enterprise owners declared that they could leave farming in exchange of a constant payment. Seeking of the solutions for the problems occurring in the researcher-extension worker-farmer triangle and the provision of state supports in this field are inevitable for the economic and social sustainability of milk cow breeding activities in Turkey.

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