

Economic Structure and Services Efficiency of Turkish Beekeepers' Association

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Abstract

The study aimed to explore the current economic situation and services efficiency level of problems of beekeepers' union and honey producers' union in Turkey. Research data were collected from 73 beekeepers' union and 58 honey producers' union by using well-structured questionnaire. In the research, classical economic analysis approach was used to reveal socio-economic structure of unions. When measuring the efficiency, we followed two stage procedure. In first stage, data envelopment analysis was used, while Tobit model was used to explore the inefficiency determinants in second stage. Research results showed that typical Turkish beekeeper's union obtained the ₺1,59 from each expenditure by ₺1. Economic condition of beekeeping unions was healthier than that of honey producers' union. 11% of the Turkish beekeepers and honey producers' unions were efficient, while the rest were inefficient. The most critical variables affected the efficiency level of unions were manager's profile and the number of union member. Service efficiency level would increase, if the number of union member increased and profile of managers were improved. The research suggested that the typical Turkish beekeepers' union would have 927 members to be efficient if they had no income sources without member fee. Keeping the basic record in the beekeepers' association and developing information management system would accelerate the efficiency improving in Turkey.

Keywords: beekeeping, beekeepers' union, honey producers' union, economic analysis, service efficiency

1. Introduction

Human beings have maintained the honey bee colonies and produced honey together with hive products such as beeswax, pollen and royal jelly worldwide for 4500 years. Beekeeping is not only basic income sources but also such kinds of hobby or part time job for rural people all over the world due to less initial and working capital demand and having quick capital recovery. Beekeeping has also the contributions to the not only environmental sustainability and agricultural production via pollination, but also human health. Turkey is one of the main actors in world beekeeping industry due to having good ecological conditions that ensures the availability of flowers from lots of wild species and cultivated plants throughout the year, even if winter time in Turkey. Turkey ranks second of largest honey producing countries in the world and constituted the 8% of the total world colony and 6% of the world honey production. The contribution of beekeeping industry is approximately \$330 million to the Turkish economy. On the other hand, beekeeping has provided employment about 35 thousands of people in rural area (FAO, 2014). In last decades, pressure of increasing domestic and foreign demand to honey and other hive products has made Turkish beekeeping industry transform from small scale production unit to the modern and more commercial economic enterprise. Since the information related economic parameters of beekeeping sector in Turkey is

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very scarce and fragmented, the economic dimension of the beekeeping enterprises and their association has come into the agenda for many traders and policy makers to develop economy without changing environmental balance. Therefore, exploring the economic structure of beekeepers' association and its efficiency level has become important issue in Turkey, like other main partners acting world beekeeping product market.

Up to now, several researches have conducted on beekeeping all over the world. Some of the previous researchers have focused on technical side of beekeeping, while the rest were interested in economic dimension of beekeeping. Researches related to the technical side of beekeeping have continued 6 different zones such as bee stocks, queen growth and colony life, bee product analysis, feeding, bee disease and pollination. However, the researches focused on the economic dimension of the beekeeping were relatively lesser than that of technical side. Most economic studies related to economic dimension of the beekeeping and beekeepers' association have been based on the macro level secondary data and outlined the general situation of beekeeping sector (Kızılaslan & Kızılaslan, 2007, Pocol & Ilea, 2008; Mogni, Senessi, Palau & Vilella, 2010; Agera, 2011; Çakal, 2013). However, the studies based on beekeepers' level has been rare all over the world, as well as Turkey due to difficulties to reach healthy and detail data from beekeepers. Since reaching the beekeepers level data was difficult and required more time, most previous researchers have only concentrated on colony and production parameters by using the data specially belong the social variables of beekeepers ignoring the detail management data such as cost structure, marketing characteristics etc. (Yahaya & Usman, 2008; Seven & Yeninar, 2010; Pocol, 2011; Uzundumlu, Aksoy & Işık, 2011; Popa & Pocal, 2011; Masuku, 2013).

Unfortunately, there have been rare studies focusing on detailed economic analysis of beekeepers in the world (Singh & Saxena, 2009; Barlovic, Kezic, Benedic, & Grgic, 2009; Aiyeloja, Popoola, & Ogunjinmi, 2010; Čejvanović, Grgić, Maksimović, & Bićani, 2011; Popescu, 2013; Laate, 2013). Similarly, Turkish researchers have conducted some research by using detail beekeepers level management data (Saner, Yücel, Yercan, Karaturhan, Engindeniz, Çukur, & Kösoğlu, 2011, Kekeçoğlu & Rasgele, 2013, Kutlu, 2014).

The backgrounding of the literature showed that it was not clear that the economic performance and efficiency of beekeepers' association all over the world, as well as Turkey. Hence the research intended to test the differentiation of economic performance of beekeepers' association considering the *ceteris paribus* conditions. To reduce this information gap, the purposes of the study were (i) explore the economic structure of Turkish beekeepers' association, (ii) to calculate the services efficiency score of Turkish beekeepers' association and (iii) develop strategies and policy to increase efficiency of beekeepers' association.

2. Materials and Methods

2.1 Research data

Research data were collected from 131 beekeepers' association beekeepers, which was all the beekeepers' association in Turkey by using questionnaire. 56% of the

total Turkish beekeepers' association were beekeeping unions (BU), while the rest were honey producers' union (HPU). Questionnaires were administered to the beekeepers' association to collect management data by considering the 2015 production year.

2.2 Estimation of services efficiency

Two-stage efficiency analysis procedure was followed when analyzing the services efficiency of beekeeper's associations. In first stage, services efficiency scores for Turkish beekeepers' association were estimated by using data envelopment analysis (DEA). The Farrell input-orientated measure of services efficiency was used; as Turkish beekeepers' association tend to have greater control over their inputs than they have over their outputs. The Farrell measure equals 1 for efficient Turkish beekeepers' association, and then decreases with inefficiency (Farrell, 1957). Based on the suggestion by Charnes, Cooper, & Rhodes, (1978), we constructed DEA models for Turkish beekeepers' association assuming that each decision making unit (DMU), which is Turkish beekeepers' association in Turkey, marketing services and other services (Y_i) using multiple inputs such as personal cost (Turkish Liras, ₺), asset (Turkish Liras, ₺), marketing cost (Turkish Liras, ₺) and education-extension cost (Turkish Liras, ₺) (x_i) and that beekeepers' association (i) was allowed to set its own set of weights for both inputs and output. Services were included the model as an index, which was constituted by aggregating the variables of number of education programs, number of consultation, number of beekeeper's level control and amount of inputs supplied to beekeepers. The data for all beekeepers' association were denoted by the $K \times N$ input matrix (X) and $M \times N$ output matrix (Y). Using piecewise technology, an input-oriented measure of efficiency can be calculated for the i -th beekeepers' association the solution to linear programming (LP):

$$\begin{aligned} & \text{Minimize } \theta, \lambda \quad \theta \\ & \text{Subject to} \\ & -y_i + Y\lambda \geq 0 \\ & \theta x_i - X\lambda \geq 0 \\ & \lambda \geq 0 \end{aligned}$$

where θ is the TE score having a value $0 \leq \theta \leq 1$. If the value equals 1, the beekeepers' association is on the frontier; the vector λ is an $N \times 1$ vector of weights which defines the linear combination of the peers of the i -th beekeepers' association.

Coelli, Rao, O'Donnell, & Battese, (2005) pointed out that the CRS model is only appropriate when the DMU is operating at an optimal scale. Factors such as imperfect competition and financial constraints may prevent a DMU from operating at optimal scale. Since beekeepers' association, as an DMU, in the research area conducted their activities under imperfect competition due to imperfect information about market such as input and output prices, and because the size of many beekeepers' association, made them ineligible for institutional loans, we transformed equation (1) to the variable returns-to scale (VRS) technology model by adding the convexity constraint: $N1\lambda = 1$, where $N1$ is an $N \times 1$ vector of ones and λ is an $N \times 1$ vector of constant to the equation (1) based on suggestion by Banker, Charnes, & Cooper, (1984). Efficiency measures under VRS was calculated by using DEAP 2.1 developed by Coelli (1996).

2.3 Exploring efficiency determinants

Since many previous studies were used Tobit model in the second stage of efficiency analysis (Bjurek, Kjulín, & Gustafsson, 1992; Ruggiero & Vitaliano, 1999; Cinemre, Ceyhan, Bozoglu, Demiryurek, & Kilic, 2006; Bravo-Ureta, Solís, López, Maripani, Thiam, Rivas, 2007; Gündüz, Ceyhan, & Esengün, 2011; Luik, Viira, & Värnik, 2014), Tobit model was used to explore the effects of socio-economic variables affected the services efficiency of beekeepers’ associations in the second stage of efficiency analysis.

A Tobit regression of inefficiencies on potential determinants was used because the inefficiency scores are truncated at 0 and 1. The Tobit model is specified as follows:

$$u_i > -\beta_0 - \sum_{i=1}^N \beta_i X_i \quad \text{ise} \quad Y_{ij} = \beta_0 + \sum_{i=1}^N \beta_i X_i + u_i$$

$$u_i \leq -\beta_0 - \sum_{i=1}^N \beta_i X_i \quad \text{ise} \quad Y_{ij} = 0$$

Where Y_{ij} was the measure of services efficiency for beekeepers’ association i , X_i were explanatory variables that influence the services efficiencies of the beekeepers’ associations, N was the number of variables, β were the parameters of the model and u was the random error term.

The explanatory variables of services efficiency for beekeepers’ association were the number of member, profile of managers, presence of marketing facilities for bee products, asset and personal cost in the model.

3. Results and Discussions

3.1 General characteristics of beekeepers’ association

Research results showed that 92% of the Turkish beekeepers were recorded in beekeeping unions, while the rest were recorded in honey producers’ union. 89% of the member beekeepers were active in beekeepers’ association. Average Turkish beekeepers’ associations had 491 members and operated in for 8 years. In Turkey, the number of beekeepers that were member of beekeeping unions was 808, on average, while that of honey producers’ union was 87. 78% of the beekeepers who were member of the Turkish beekeepers’ association was itinerant beekeepers. The percentage of localized permanent member was 22%. Beekeeping unions gained 54 new members per year, while that of honey producers’ union was 13 (Table 1).

Table 1. The general profile of Turkish beekeepers’ associations

	BU			HPU			Turkey		
	mean	min	max	mean	min	max	mean	min	max
Experience (years)	10	3	12	5	1	17	8	1	17
Number of members (person)	808	80	4321	87	20	225	491	20	4321
Localized permanent member (person)	155	0	640	33	0	211	102	0	640
Itinerant member (person)	653	0	4321	54	0	220	364	0	3681

BU: Beekeeping unions, HPU: Honey producers’ union

When glancing at the physical asset of the Turkish beekeepers' associations, it was clear that the beekeeping unions was better comparing to honey producers' union. 5% of the total number of Turkish beekeeping unions conducted their activities in their own building, while the percentage of rented building and temporarily building were 88% and 7%, respectively. The percentage of own, rented and temporarily building for honey producers' union were 5%, 71% and 24%, respectively. Regarding the machinery park, 15% of the Turkish beekeepers' associations had honey filling machine. 14% of the Turkish beekeepers' associations had the honey filling and packing plants. Table 2 presented the physical asset of the Turkish beekeepers' associations associated with the association type.

Table 2. Physical asset of the Turkish beekeepers' associations by association type

	BU		HPU		Turkey	
	Frequency	%	Frequency	%	Frequency	%
Research and Development Center	1	1,4	0	0,0	1	0,8
Laboratory for bee health	1	1,4	0	0,0	1	0,8
Laboratory for honey analysis	1	1,4	0	0,0	1	0,8
Honey filling machine	16	22,2	4	6,9	20	15,4
Honey filling and packing plants	15	20,8	3	5,2	18	13,8
Burning machine	2	2,8	0	0,0	3	2,3
Dough machine	1	1,4	0	0,0	1	0,8
Heating boiler	0	0,0	1	1,7	1	0,8
Cake machine	10	13,9	4	6,9	14	10,8
Cake packing machine	3	4,2	0	0,0	3	2,3
Carpenter	1	1,4	0	0,0	1	0,8
Honeycomb machine	3	4,2	0	0,0	3	2,3
Pollen drying machine	1	1,4	1	1,7	2	1,5
Pollen packing machine	1	1,4	0	0,0	1	0,8
Powder sugar mill	1	1,4	0	0,0	1	0,8
Honey filtration machine	1	1,4	0	0,0	1	0,8

BU: Beekeeping unions, HPU: Honey producers' union

Based on the results of socio-economic analysis, education level of 76% of the managers of Turkish beekeepers' associations were college degree or more. The percentage of managers who has primary school graduation were 19% for beekeeping unions and 31% for honey producers' union (Table 3). 31% of the managers had the ability of using foreign language. Common foreign languages were English (60%), German (10%) and Arabic (15%). When focusing on the personal composition and characteristics, 21% of the Turkish beekeepers' associations employed secretary, while the percentage of employing retainer and office person were 12% and 3%, respectively. The percentage of technical supervisor, director, agricultural engineer, veterinary and food engineer were 22%, 8%, 6%, 2% and 2%, respectively. In addition, 4% of the Turkish beekeepers' associations benefited from the hired labor when the workload was heavy. The annual personal cost was ₺25300 and it was ₺34000 in BU and ₺14000 in HPU.

Table 3. Education level of managers of the Turkish beekeepers' associations

Education level	BU		HBU		Turkey	
	Frequency	%	Frequency	%	Frequency	%
Primary school	14	19,2	18	31,1	31	24,4
College	17	23,3	16	27,6	33	25,2
Vocational school	18	24,7	9	15,5	27	20,6
Bachelor's degree	21	28,8	13	22,4	34	26,0
Master of science	3	4,1	2	3,4	5	3,8
Total	73	100,0	58	100,0	131	100,0

3.2 Activities of the Turkish beekeepers' associations and relationship between associations and members

Based on the research results, the services of Turkish beekeepers' associations were formed into four different group such as marketing services, education services, input supply services and R&D activities. 15% of the Turkish beekeepers' associations had the honey products marketing facility.

Table 4. Education programs and its participants associated with union type

	BU		HBU		Turkey	
<i>Technical beekeeping</i>						
Number of union	30	41,1	25	43,1	55	42,0
Number of participant	10726	18,2	1954	38,9	12630	19,8
<i>Queen bee rearing</i>						
Number of union	15	20,5	5	8,6	20	15,3
Number of participant	2223	3,8	380	7,6	2603	4,1
<i>Organic beekeeping</i>						
Number of union	6	8,2	7	12,1	13	9,9
Number of participant	1666	2,8	695	13,8	2361	3,7
<i>Bee products</i>						
Number of union	12	16,4	5	8,6	17	13,0
Number of participant	4504	7,6	553	11,0	5057	7,9
<i>Bee health</i>						
Number of union	19	26,0	8	12,8	27	20,6
Number of participant	7326	12,4	515	10,2	7841	12,3
<i>Record keeping</i>						
Number of union	5	6,8	1	1,7	6	4,6
Number of participant	1575	2,7	100	2,0	1675	2,6
<i>Cooperation</i>						
Number of union	4	5,5	2	3,4	6	4,6
Number of participant	735	1,2	270	5,4	1005	1,6
<i>Marketing</i>						
Number of union	5	6,8	2	3,4	7	5,3
Number of participant	1210	2,1	130	2,6	1340	2,1
<i>Control and certification</i>						
Number of union	7	9,6	2	3,4	9	6,9
Number of participant	1218	2,1	190	3,8	1408	2,2
<i>Quality</i>						
Number of union	1	1,4	2	3,4	3	2,3
Number of participant	120	0,2	160	3,2	280	0,4

The percentage of association where they were marketing the honey was more in beekeeping unions (22%) than that of honey producers' union (7%). 66% of the Turkish beekeepers' associations conducted education activities to increase their members' technical capacity. It varied associated with the type of associations and it was 74% in beekeeping unions, while that of honey producers' union was 57%. In general, education programs for beekeepers oriented to technical dimension of beekeeping such as organic beekeeping, bee products, bee health, honey quality etc. in Turkey. However, the programs related to economic dimension of beekeeping such as record keeping, marketing, certification etc. was not common. Education programs held for beekeepers were depicted in Table 4. Regarding the R&D activities, it was clear that the Turkish beekeepers' associations was weak on R&D activities. The only 7% of the Turkish beekeepers' associations had the improvement studies. Similarly, the experience of project of the Turkish beekeepers' associations was unsatisfactory level. 29% of the Turkish beekeepers' associations had the national level project experience, while that of international ones was only 5%. Input supply was the another services of beekeeping association in Turkey. Beekeeping associations supplied the queen bee, bee hive, cake and honeycomb to their members. The input supply services of beekeeping unions were more satisfactory comparing to honey producers' union due to their strong infrastructure ($p < 0,01$). 47% of the beekeeping unions presented their services to non-member beekeepers, while the percentage was 36% for honey producers' union. Based on the research results, 70% of the Turkish beekeepers were satisfied from the services of Turkish beekeeping association. The satisfaction level of beekeepers varied associated with the scale of the beekeeping association. The satisfaction level of medium and large size beekeeping association were more than that of small ones.

3.3 Economic structure of the Turkish beekeepers' associations

The main income source of Turkish Beekeepers' association was annual membership fee by 57%. Product sales (19%) and plate and barcode sales (11%) followed it. The percentage of product sales in total income of association was 20% in beekeepers' union, while that of honey producers' union was 11%. Regarding the cost structure, the most magnificent cost item was labor cost by 20%. It was followed by product purchasing cost by 15% and manager's payment by 13%. On average, Turkish beekeepers' association gained 1,32 Turkish liras from one Turkish lira purchasing. It was 1,36 Turkish Liras for beekeepers' union and 1,02 Turkish Liras for honey producers' union. It was clear based on the results of the economic analysis that economic situation of beekeepers' union was better than that of honey producers' union (Table 4).

Table 4. Revenue and cost of Turkish beekeepers' association associated with union type (₺)

	BU		HBU		Turkey	
<i>Revenue</i>	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Product sales **	22079,88	8941,42	1479,74	714,71	13801,96	5666,70
New member entrance allowance***	8667,95	1153,59	1103,79	141,36	5649,77	949,68
Annual member allowance **	61861,58	20017,16	8925,86	1913,37	40785,52	12514,25

Plate and barcode sales ***	12175,64	3315,73	1980,82	328,95	8126,63	1776,62
Other revenues (Grants, honey filling and packing, input sales) **	5170,10	1890,36	376,55	172,08	3245,10	1090,52
Total revenue ***	109955,17	15885,76	13866,76	2701,57	71608,98	17588,88
Expenditure						
Raw material ***	12569,23	5718,41	1163,28	660,40	7999,01	3271,03
Allowance ***	3628,39	586,08	284,60	19,78	2286,43	205,55
Managers' salary ***	10076,00	4300,00	2229,31	577,19	6986,47	1089,07
Plate and barcode purchasing ***	6345,12	1124,00	1363,53	187,42	4381,71	586,58
Labor cost ***	17004,15	1764,25	2006,66	1056,75	11013,05	1395,32
Cost of rent, energy, communication and cleaning **	10285,13	2006,80	3078,79	716,42	7487,09	188,88
Laboratory charge and R&D payment	1415,00	523,36	88,45	19,65	881,68	450,97
Transportation cost **	6118,59	1410,67	1495,34	611,72	4305,19	1036,66
Marketing cost **	4652,56	904,55	405,17	108,42	2949,62	550,33
Hospitality cost **	2551,16	370,93	531,98	88,07	1754,55	145,78
Other expenditures depreciation, tax, insurance etc.) **	6272,76	1491,20	823,83	327,17	4099,67	2079,09
Total expenditure ***	80918,09	16218,54	13470,94	4378,90	54144,47	9750,68
Total revenue – total expenditure	29037,08	14476,47	395,82	401,06	17464,51	8259,07
Total revenue / Total expenditure *	1,36	0,26	1,03	0,18	1,32	0,30

*, ** and *** reflects that the difference between the means of beekeepers' union and honey producers' union for the related variable are statistically significant at the probability level of 10%, 5% and 1%, respectively.

(1) One Turkish (₺) lira equaled to 2,67 US dollar and 3 euro.

3.4 Services efficiency of Turkish beekeepers' association

Efficiency analysis results showed that services efficiency score of Turkish beekeepers' association was 0,62, on average in Turkey. Services efficiency score of beekeepers' union was better than that of honey producers' union ($p < 0.05$) (Table 5). 11% of the Turkish beekeepers' association were efficient, while the rest were inefficient. The percentage of efficient association for beekeepers' union and honey producers' union were 15% and 6%, respectively (Table 6).

Table 5. Efficiency scores of Turkish beekeepers' association and some basic characteristics

	Services efficiency score *	Services score *	Number of members (person) **	Optimum number of member (person) **
Beekeepers' union	0,63 ± 0,01	16,14 ± 0,12	808 ± 92	1274 ± 280
Honey producers' union	0,60 ± 0,02	0,27 ± 0,12	87 ± 7	484 ± 264

* and ** reflects that the difference between the means of beekeepers' union and honey producers' union for the related variable are statistically significant at the probability level of 10% and 5%, respectively.

Table 6. The distribution of the efficient and inefficient Turkish beekeepers' association

	Efficiency group		Total
	Inefficient	Efficient	
Beekeepers' union	63	11	74
Honey producers' union	55	3	58
Total	118	14	132

* The difference between the beekeepers' union and honey producers' union was statistically significant at the probability level of 10% ($X^2=3,222$).

Based on the results of the second stage of the efficiency analysis, the most important variables affected the services efficiency were managers' profile and the number of member. When the number of member and the qualification of the managers were increasing, services efficiency of Turkish beekeepers' association was increasing ($p<0.01$). The other variables that positively affected the efficiency were presence of building and having marketing facility ($p<0.05$). Having unsuitable labor composition and uncontrollable expenditure were the other variables that negatively affected the service efficiency (Table 7). Comparable analysis revealed that the efficiency score was 0,98 for efficient association, while that of inefficient ones was 0,57. The number of member and the level of organization culture in efficient association were more satisfactory level than that of inefficient association. Efficient associations were managed by more skillful managers and they had enough personal and good infrastructure. The profitability level of efficient association that served the more facilities to their members and focused on economic issues in education programs was more than inefficient ones. In addition, services portfolio of efficient association was wider than comparing to inefficient one (Table 8).

Table 7. The determinants of service efficiency for Turkish beekeepers' association

Variables	Coefficient	Standard error
Constant	0,4574 ***	0,0195
The number of member (person)	0,0029 ***	0,0001
Non-current asset (Turkish Lira)	0,0014 **	0,0007
The profile of managers	0,0706 ***	0,0226
Number of personal (person)	-0,0131 *	0,0079
Number of member who supplied raw material	0,0019 *	0,0001
Error	0,118 ***	0,008
R ²	0,535	
LR test statistics	76,05**	

* statistically significant at the probability level of 10%, ** statistically significant at the probability level of 5%, *** statistically significant at the probability level of 1%.

Table 8. Some socio-economic characteristics of efficient and inefficient beekeepers' association

	Inefficient association		Efficient association	
	Mean	Standard error	Mean	Standard error
Number of association (unit)	118	-	14	-
Service efficiency score ***	0,57	0,01	0,98	0,01
Number of member (person) *	469	64	792	159

Revenue/Expenditure ***	2,20	0,27	6,77	3,48
White collar personal (person)	0,70	0,12	1,07	0,37
Blue collar personal (person)	0,91	0,09	1,07	0,34
Experience (year) **	7,84	0,33	9,93	0,82
Number of educated member (person)	1995	718	1769	407
Number of member buying beehive (person)	251	85	325	75
Number of member buying cake (person)	222	67	550	450
Number of member used credit (person)	82	24	171	164
Number of member buying honeycomb (person)	337	121	589	462
Revenue from product sales (Turkish lira) *	9125,00	2601,08	20075,00	7026,90

*, ** and *** reflects that the difference between the means of beekeepers' union and honey producers' union for the related variable are statistically significant at the probability level of 10%, 5% and 1%, respectively.

4. Conclusions

Under the light of the results of the study, economic performance and the service efficiency of Turkish beekeepers' association was unsatisfactory level. Turkish beekeepers' association should be managed by more professional managers in order to solve the structural and economic problems of associations. Participatory approach will make members more active than the past and this approach will increase the service efficiency of beekeepers' association. Keeping the basic record in the beekeepers' association and developing information management system would accelerate the efficiency improving in Turkey. Giving up the conventional function that is helping the implementation of government policy and focusing on basic functions may increase the service efficiency of Turkish beekeepers' association. Turkish beekeepers' association should be more active in marketing of honey products by using marketing strategies such as making brand etc. and benefit the national or international financial funds via research projects to transform the structure of the beekeepers' associations in Turkey. Supporting the infrastructure of the Turkish beekeepers' association and optimizing the number of member may accelerate the improvement of service efficiency. Of course, the role of government should be redesigned to transform the beekeeping industry. Developing the control standards in input and output markets and increasing the quality of relationship among the beekeepers' association and all actors in beekeeping industry may contribute the solving the problems of sector.

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