USING MULTI-CRITERIA DECISION MAKING FOR SELECTION PROVINCES FOR FATTENING FARM

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ABSTRACT

Turkey has a high potential in the field of agriculture and livestock production. Turkey has a long history in the production of livestock system, which became the "buffer" sector of economy and the "locomotive" sector of Turkey. Although nowadays pastures are decreased, Turkey has quite large pastures. Besides, the domestic demand for meat in Turkey is quite large and tend to a show considerable growth. Animal husbandry is carrying great importance in terms of protein source and fattening cattle in the red meat production. In this sense, the development of meat production in terms of quality and quantity is also very necessary in terms of the nutritional problem that arises parallel to the growing population. In this study, the causes of increase in meat prices in Turkey were investigated, and the findings showed that, the cause of the price increases made as inadequate animal fattening. As a result, it was decided to establish a new place for the production of cattle-raising. Before starting the construction of the fattening livestock farm, firstly the location of the establishment is considered. In the decision-making process, it is quite difficult to make choices because of the different alternatives in terms of various criteria's. For this purpose, the PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) method, which is an easy and straightforward method of multi-criteria decision making techniques which are frequently used in researches in recent years, has been used to select the place of establishment in Turkey. The choice of fattening farm establishment site was evaluated in 81 provinces; cattle feed areas, demand on meat, urban development index value, average minimum temperature, average maximum temperature, precipitation amount and grant support criteria were evaluated with using the PROMETHEE method. The interactions between the criterion and the criteria that influence the process were determined as a result of the survey conducted. As a result of this survey study, criteria weights and criterion values were determined by Analytical Hierarchy Process (AHP) method and solved by PROMETHEE method considering the results. As a conclusion, the most suitable and the less suitable provinces for fattening livestock farm are selected

Keywords: Multiple criteria decision making methods, analytical hierarchy process (AHP) method, PROMETHEE, selection of establishment place for fattening farms in Turkey.

1. INTRODUCTION

In the rapidly developing and changing world, while adequate and balanced nutrition is at the beginning of the problems, it actually contains solutions in itself. Livestock as a branch of agriculture has a strategic importance in terms of revitalizing development in the country's economy. Livestock nowadays has become an industry in developed countries and it become an integral part of the economy. This situation suggests that agriculture and therefore animal husbandry is a sector that needs to be developed at national level.

According to the TUIK (Turkish Statistics Institution) data, the GDP growth rate with fixed prices for the last 11 years increased by 4.9% on average, while the growth rate in the agricultural sector was 2.2%. This difference in rates of change has reduced the share of agriculture in GDP from 12.2% to 9.2%.

In their study, Ocaklı et al. report that in the future, the demand for animal-origin food will not increase significantly but that the demand for meat and dairy products will increase by two times in countries with rapid population growth in the 2020s. In Turkey, the livestock sector has tried to develop according to years but these developments have not been able to

catch up with the growing population and the growing livestock sector in intercountries. The fact that agriculture and animal husbandry are not being carried out in our country in large quantities has dragged us into importing, and causing the animals to be taken from foreign countries.

Turkey thought that red meat prices are very high in 2010. Therefore, Turkey started to import beef, butchery and live cattle and sheep lamb. However, the carcass and meat prices continued to increase in the mentioned period.

Though the exact number is not known, it is estimated that over 30.000 fattening businesses are in our country and more than 90% of these businesses can be considered as small enterprises.

Planning and projecting of animal shelters in our country in order to provide suitable environmental conditions and improvement of existing shelters are obligatory (Ekmekyapar, 1991). In our country where climatic conditions show differences between regions, the preparation of shelter plans suitable for the special conditions of the regions depends on making the right facility place.

Beef farming are made to increase the yield of beef. In order to obtain more meat and better quality meat from younger males and females who do not have breeding features , milk cattle breeders who are left out of the squad, and old cattle, a special nutrition is applied for a certain period of time before slaughter, and this period is called beef farming (Hacıbebekoğlu et al., 2013). Basic methods of fattening are classified as pasture fattening (entansive), before pasture fattening than barn fattening (semi-entansive), and barn fattening (entansive).

Ecological animal husbandry is a production system which number of animal is low, has appropriate feeding and shelter conditions, produce quality product with an appropriate production and marketing methods. In order to design an ecological animal husbandry, firstly selection of facility place should be performed appropriately and correctly. The climate, the location and the environmental factors are very important for the place selection.

People make decisions in many topics during their lives. These decisions have certain criteria. The weights of these criteria vary from person to person. In the selection of the place of beef farming, weights of criteria, the selling, pastures, temperature or IPARD (Rural Development Component) support vary from person to person. A similar situation applies to businesses. For this reason, Multi Criteria Decision Making (MCDM) techniques are used to make scientific selection in evaluating alternatives when people or businesses make decisions.

In this study, it was aimed to determine the most suitable place of beef farming in cities in Turkey by using multi criteria decision making techniques. Firstly, a literature research was carried out. In the first phase of the study, the criteria affecting the place of beef farming were determined. The weights of these criteria were determined by AHP method and the accuracy was checked by consistency analysis. According to these criteria, 81 provinces were evaluated with the help of Visual Promethee package program which is application software of PROMETHEE method. In the last part, the results of the work were evaluated and various suggestions were made.

2. LITERATURE REVIEW

2.1. Studies Related with Animal Husbandry and Beef Farm

With parallel to the importance of the livestock sector in our country, there are a number of studies published in this issue.

Vural and Fidan (2007) reported that the activities types of animal husbandry in Turkey village-type; animal husbandry, agricultural worker activity which feeds one or two cattle's for family consumption, businesses which performs animal husbandry as a subsidiary activity beside herbal production, specialized businesses to produce to market and modern animal.

Çakır and Saner (2005) compared the traditional and ecological animal husbandry systems in Turkey, which have a great potential in terms of animal existence They evaluated necessity and applicability of ecological system in Turkey. Also they evaluated current situation according to different animal production branches.

Kıral (1993) made a general assessment of the technical and economic aspects of beef cattle breeding in Turkey by focusing on the importance and the role of fattening businesses in Turkish livestock farming. In the study, economic analysis of fattening enterprises which have 1-50 heads cattle's , 51-100 heads 1-50 heads cattle's and over 100 heads 1-50 heads cattle's were carried out by emphasizing the socio-economic structure of fattening enterprises (Şerefoğlu, C., 2008).

Ömürbek et al. (2013) have tried to determine the areas where livestock can be done in the province of Isparta by using the AHP method in. In the study, 7 districts in Isparta province were compared according to 5 different criteria (location, environmental factors, labor force, investment costs, laws) and decided to optimum area.

2.1. Multi Criteria Decision Making Methods

Multi-criteria decision-making methods achieve the best compromised solution by evaluating available alternatives based on deterministic criterion values. Genç and Masca (2013) have included in their articles the statements that the decision maker can sort, group or choose among the available alternatives by means of the MCDM methods. When the literature is examined, it is seen that mathematical programming and multi-criteria decision making methods are generally used as numerical methods in the studies about the place of beef farming.

2.1.1. Analytical Hierarchy (AHP) Method

Saaty (1990) describes the Analytical Hierarchy Process (AHP) method, which is widely used in computer aided multi-criteria decision making defined as a method which is based on pair wise comparison of alternatives according to common criterion and provides important support to the decision maker in reaching the conclusion of multi-criteria and multi-choice.

Cengiz and Çelen (2003) used AHP method in rural development, and at the end of the study, they found that AHP is a useful method in rural development studies. Eren (2006) worked on the determination of the best location in the leather industry using the AHP method. Özdağoğlu (2008) used the fuzzy analytical production process to study the facility place, and as a result he determined the appropriate one from the 4 alternative place (Ülke, 2016).

Özel et al. (2014) used the AHP method to select the appropriate area for the new forestation work to be carried out in the Bartın Havza. Bakan (2013) used the AHP method to determine the appropriate districts among 14 district alternatives to establish the university according to the criteria determined.

2.1.2. PROMETHEE

The PROMETHEE method is a multi-criteria prioritization method developed by Jean-Pierre Brans in 1982. The PROMETHEE method has been developed because of the difficulties in implementation of existing prioritization methods in the literature, and used in many studies (Dağdeviren and Eraslan, 2008). Some of the PROMETHEE applications in the literature are summarized below.

Maragou and Tsakiri (2005) proposed that PROMETHEE can be used to simplify the selection process alternative practices of reducing the damage caused by flood problems. Dağdeviren and Eraslan (2008) used PROMETHEE in supplier selection problem of a firm and calculate priority of alternative suppliers.

Athawale and Chakraborty (2010) have solved the problem of more efficient plant place selection using the PROMETHEE II method, and found out how much this selection has an effect in production organizations.

Kutay and Tektüfekçi (2013) used the PROMETHEE-GAIA approach which is one of computer-aided multi-criteria decision-making processes in order to determine the managerial accounting decisions according to the degree of importance. Soba (2012) applied PROMETHEE method, using criteria- prices, fuel, maximum speed, safety, horsepower and performance - for six different panelvans in the same class.

Genç and Masca (2013) used TOPSIS and PROMETHEE methods to obtain ranking of European Union countries and Turkey according to some economic criteria and compared their results. As a result, it is seen that the ranking values obtained as a result of the PROMETHEE and TOPSIS methods are very similar to each other

3. DATA AND METHODOLOGY

Many different methods can be used together to choose the place of beef farming. AHP, ANP, Data Envelopment Method, ELECTRE, TOPSIS, PROMETHEE and integration of these methods are generally used. Selection criteria and method selection are the most important features of facility place selection. When the place of beef farming is selected, AHP and PROMETHEE methods which be able to show the difference in the comparison stage and including mathematical solution will be used. By using these methods, a different point of view has been tried to be achieved.

3.1. Analytic Hierarchy Process (AHP)

The AHP method is based on the naturalness of the human brain in view of events (Kokangül and Susuz, 2009). AHP method is based on pair wise comparison of alternatives according to the criteria. The AHP provides decision support in solving multi-criteria and multi-alternative problems (Çiftçioğlu, 2013). The AHP was firstly introduced by Myers and Alpert in 1968. The AHP method developed by Saaty in 1977 consists of five basic steps (Ömürbek et al., 2014). In the first step, the problem is defined, the main objective is determined in the hierarchical structure. In the second step, hierarchy of criteria and alternatives is created. In the third step; pair wise comparison matrices are created. In the fourth step, weight vector is

found. In the last step, the consistency rate is calculated. In case of inconsistency, pair wise comparisons are controlled, and process is repeated until they are consistent.

3.2. PROMETHEE

The PROMETHEE method, which was introduced in 1982, is a multi-criteria sorting method. PROMETHEE is a method that allows for the sorting of alternatives taking into account conflicting criteria. This method starts with the evaluation table. Alternatives in this table are evaluated according to different criteria. There are two kinds of information needed for the implementation of PROMETHEE. These are function preferences of the decision maker and the relative importance of the considered criteria for comparing the contribution of alternatives in each criterion. The PROMETHEE method consists of 7 steps (Dağdeviren and Erarslan, 2008); In the first step; The data matrix A = (a, b, c, ...) is constructed for the alternatives evaluated by the weight of w = (w1, w2, ..., wk) and the criterion c = (f1, f2, ..., fk). In the second step, the preference function is defined for each criterion. In the third step, the common preference functions for alternative pairs are determined on the basis of preference functions. In the fourth step, the preference index for the alternative is calculated based on the common preference functions. In the fifth step; Positive (Φ +) and negative (Φ-) superiorities are determined for each alternative. In the sixth step; Partial priorities are determined by PROMETHEE I. Partial priorities explain the relationships of alternatives to each other. These relations are stated the preference situations of the alternatives and the determination of alternatives that are indifferent from each other. In the seventh step, full priorities for alternatives are calculated using PROMETHEE II and the calculated values are evaluated in the same plane as all alternatives and the exact order is determined.

3.3. Methodology

In this study, the selection of the facility place of beef farming among the provinces in Turkey was realized by using AHP and PROMETHEE methods. Criteria weights were determined by the AHP method and the ordering of the provinces was performed by PROMETHEE method.

As a result of the study, AHP and PROMETHEE methods were used to determine the ideal provinces and various suggestions were developed. Microsoft Excel and Visual Promethee package programs are used for calculations of AHP and PROMETHEE methods.

In the first phase of the study, the basic criteria required for the establishment of the beef farming were determined with interviews with the staff of the Directorate of Agriculture and in order to obtain expert opinions before the implementation. These criteria are, percentage of feed crop area, percentage of beef demand, urban development index, average minimum temperature, average maximum temperature, annual precipitation amount, grant supports. The criteria are shown in Table 1 below.

Table 1: Affecting criteria of selection of facility place

	Criteria
H1	Percentage of feed crop area
H2	Percentage of beef demand
H3	Urban development index
H4	Average minimum temperature
H5	Average maximum temperature
H6	Annual precipitation amount
H7	IPARD grant supports

In the second stage of study, As a result of the interviews among the employees, the relations between the criteria were determined, and the analytical averages of the values were determined, and the percentages were calculated, and the AHP weight matrix was formed. Weight percentages of the criteria were found as a result of AHP analysis. The accuracy of the weighted matrix was checked by consistency analysis. The results are shown in Table 2.

Table 2: AHP Weighted Matrix

	H1	H2	H3	H4	H5	H6	H7	W
H1	0,26	0,24	0,26	0,29	0,29	0,29	0,23	0.26
H2	0,49	0,46	0,35	0,41	0,41	0,41	0,45	0.42
H3	0,04	0,06	0,04	0,02	0,02	0,02	0,05	0.03
H4	0,05	0,07	0,09	0,06	0,06	0,06	0,05	0.06
H5	0,05	0,07	0,09	0,06	0,06	0,06	0,05	0.06

| H6 | 0,05 | 0,07 | 0,09 | 0,06 | 0,06 | 0,06 | 0,05 | 0.06 |
| H7 | 0,09 | 0,09 | 0,17 | 0,12 | 0,12 | 0,12 | 0,1 | 0.11 |

When ratio is 0,01295 <0,10 result is consistent

In the third stage of the study, the appropriate preference function was chosen to implement the PROMETHEE method, and these values are shown in Table 3. After the preference function is determined, Visual Promethee program is used to implement the method. ("1" is not included in IPARD grant grants, "0" is set.) (1 - number of cattle / population) * 100.

Table 3: PROMETHEE Preference Functions and Data

CRITERIA	H1	H2	H3	H4	H5	H6	H7
Units	%	%	Index	-°C	+°C	mm	IPARD
Preferences							
Min/Max	Max	Max	Max	Max	Min	Max	Max
Weights (W))	0.26	0.42	0.03	0.06	0.06	0.06	0.11
Preference Functions	Type I (Usual)	Type I (Usual)	Type I (Usual)	Type II (U-Shape)	Type I (Usual)	Type I (Usual)	Type III (V-Shape)
Q	n/a	n/a	n/a	-10,00	+30,00	n/a	n/a
P	n/a	n/a	n/a	n/a	n/a	n/a	1,00
Provinces							
ADANA	2,36	90,21	0,47	5,5	34,6	654,4	0
ADIYAMAN	0,63	85,50	0,38	1,3	37,7	695,1	0
AFYONKARAHİSAR	18,85	55,54	0,63	-3,4	29,5	427,3	1
AĞRI	32,70	37,77	0,30	-15,9	30	519,6	1
AMASYA	16,06	46,60	0,59	-0,9	31,3	459,4	1
ANKARA	28,43	93,10	0,62	-3	30,3	366,2	1
ANTALYA	16,05	93,16	0,55	6	34,2	1074,6	0
ARTVİN	53,15	65,88	0,63	-0,2	26,2	701,8	0
AYDIN	2,57	67,40	0,54	4,3	36,1	644	1
BALIKESİR	6,63	58,76	0,63	1,3	31,3	576,8	1
BİLECİK	19,06	83,37	0,63	-0,3	28,6	454,5	0
BİNGÖL	27,10	54,17	0,44	-6,1	34,5	944,1	0
BİTLİS	10,23	83,13	0,40	-6,4	30,7	1221,2	0
BOLU	17,87	52,75	0,66	-3,2	28	553,9	0
BURDUR	7,86	21,62	0,55	-0,8	32,2	426,9	1
BURSA	15,58	93,44	0,60	1,7	31	695,1	1
ÇANAKKALE	9,70	60,70	0,59	3,2	30,7	628,8	1
ÇANKIRI	35,96	30,00	0,60	-4	31,1	410,6	1
ÇORUM	34,85	59,11	0,50	-4,2	29,4	431,5	1
DENİZLİ	5,92	75,41	0,59	2,3	34,4	566,1	1
DİYARBAKIR	2,94	79,02	0,35	-2,3	38,5	490,1	1
EDİRNE	0,22	62,15	0,57	-0,6	31,7	602,4	0
ELAZIĞ	19,52	73,41	0,48	-4	34,2	410,2	1
ERZİNCAN	23,13	59,56	0,57	-7	31,9	376,8	1
ERZURUM	30,47	14,38	0,53	-14,3	27,3	406	1
ESKİŞEHİR	37,57	83,65	0,62	-3,5	29,3	370	0
GAZİANTEP	1,77	92,05	0,47	-0,8	35,3	552,7	0
GİRESUN	37,96	80,20	0,58	4,4	26,5	1266	1
GÜMÜŞHANE	32,24	52,17	0,53	-5,7	28,7	461,3	0
HAKKARİ	5,40	86,50	0,33	-8,1	30,9	781,3	0
HATAY	0,77	92,30	0,44	4,7	32	1128,9	1
ISPARTA	16,12	65,50	0,67	-1,8	30,5	545,4	1
MERSİN	11,22	94,16	0,48	6,3	31,5	588,4	1
İSTANBUL	0,25	99,49	0,65	3,1	26,8	813,2	0
İZMİR	2,41	85,74	0,60	5,9	33,2	690,3	0
KARS	0,92	-71,02	0,38	-16	26,2	499,3	1
KASTAMONU	20,62	40,77	0,57	-4,3	28	485,2	1

KAYSERİ	37,21	78,23	0,55	-6,8	30,8	388,6	0
KIRKLARELİ	0,83	58,82	0,58	0	30,5	570,2	0
KIRŞEHİR	40,54	31,74	0,59	-4,1	29,7	379,9	0
KOCAELİ	15,50	93,72	0,59	3,3	29,6	809,3	0
KONYA	30,09	64,10	0,62	-3,9	30,2	318,7	1
KÜTAHYA	14,19	68,37	0,65	-3,2	28,5	560,3	1
MALATYA	44,26	76,35	0,52	-3	34	382,6	1
MANİSA	4,50	83,97	0,58	3,1	34,9	730,1	1
KAHRAMANMARAŞ	12,52	84,38	0,53	1,3	35,9	732,1	1
MARDİN	2,38	89,16	0,29	0,5	34,9	666,4	1
MUĞLA	17,33	77,34	0,54	1,6	33,6	1169,4	0
MUŞ	15,88	23,20	0,28	-11,1	33	762,7	1
NEVŞEHİR	24,41	73,47	0,56	-3,8	28,4	415,2	1
NİĞDE	32,65	58,95	0,53	-4,5	29,4	336,4	0
ORDU	38,88	83,05	0,51	3,8	27,3	1035,1	1
RİZE	0,00	93,18	0,63	3,5	26,6	2245,3	0
SAKARYA	0,16	83,58	0,67	2,9	29,4	834,6	0
SAMSUN	8,14	76,93	0,57	3,9	27	706,3	1
SİİRT	15,13	93,70	0,42	-0,6	37,1	716,3	0
SİNOP	39,49	52,79	0,63	4,2	26,2	676	0
SİVAS	38,46	55,73	0,56	-7	28,5	432,3	1
TEKİRDAĞ	0,02	85,29	0,58	2,1	28,1	589,1	0
TOKAT	13,10	59,30	0,56	-1,7	29,6	432,4	1
TRABZON	0,00	83,62	0,60	4,4	26,8	810,2	1
TUNCELİ	51,16	64,35	0,45	-5,7	35,2	792,7	0
ŞANLIURFA	14,92	87,04	0,35	2,2	38,7	458,4	1
UŞAK	0,71	59,30	0,65	-1,2	30,6	544,5	1
VAN	32,96	85,17	0,37	-7,7	28,2	387,4	1
YOZGAT	27,11	44,98	0,49	-5,2	26,5	578,7	1
ZONGULDAK	3,08	88,36	0,55	3,4	25,3	1216,8	0
AKSARAY	34,99	49,29	0,51	-3,6	30,5	345,7	1
BAYBURT	21,89	-7,92	0,54	-10,8	27,4	438,3	0
KARAMAN	8,10	73,68	0,59	-3,8	31,1	329,4	1
KIRIKKALE	41,38	77,35	0,63	-2,9	31	382,6	0
BATMAN	0,94	90,82	0,32	-1,5	39,4	488,8	0
ŞIRNAK	4,89	92,90	0,32	-1,1	33,3	683,7	0
BARTIN	0,00	73,83	0,56	0,3	28,2	1040,5	0
ARDAHAN	28,45	-208,96	0,35	-17	24,4	554,1	1
IĞDIR	6,37	45,53	0,36	-8,1	33,2	256	0
YALOVA	37,88	95,33	0,62	3,3	28,7	748,7	0
KARABÜK	43,05	81,73	0,63	-0,5	32,5	489,8	0
KİLİS	9,50	94,28	0,40	2,2	36,2	494,6	0
OSMANİYE	0,85	87,34	0,41	3,4	34,2	834,8	0
DÜZCE	0,00	85,41	0,53	0,4	29	822,1	0

In the fourth stage of study, when selection problem of facility place for beef farming is solved with the help of Visual Promethee package program, it was seen that Yalova is the first, Kars was the last. The results are shown in Table 4.

Table 4: Sequencing Results Calculated by PROMETHEE

Provinces	Phi	Phi+	Phi-
YALOVA	0,6341	0,7604	0,1263
BURSA	0,4783	0,6800	0,2018
MERSİN	0,4560	0,6696	0,2136
ANKARA	0,4420	0,6623	0,2203
GİRESUN	0,4355	0,6590	0,2235

ORDU	0,4350	0,6591	0,2241
KOCAELİ	0,4069	0,6464	0,2395
ANTALYA	0,4061	0,6464	0,2403
SİİRT	0,3168	0,6023	0,2855
KİLİS	0,2764	0,5819	0,3055
KARABÜK	0,2701	0,5776	0,3075
VAN	0,2636	0,5736	0,3100
HATAY	0,2528	0,5680	0,3153
ŞANLIURFA	0,2499	0,5664	0,3165
İSTANBUL	0,2483	0,5676	0,3194
MALATYA	0,2324	0,5576	0,3253
KAHRAMANMARAŞ	0,2199	0,5510	0,3311
ESKİŞEHİR	0,2151	0,5509	0,3358
ARTVİN	0,1756	0,5304	0,3548
KIRIKKALE	0,1744	0,5294	0,3550
MARDİN	0,1689	0,5263	0,3574
ZONGULDAK	0,1656	0,5261	0,3605
RİZE	0,1649	0,5201	0,3553
MANİSA	0,1530	0,5178	0,3648
ŞIRNAK	0,1359	0,5116	0,3758
ADANA	0,1136	0,5005	0,3869
BİLECİK	0,1121	0,4986	0,3865
İZMİR	0,1011	0,4939	0,3928
KAYSERİ	0,0796	0,4831	0,4035
SAMSUN	0,0760	0,4793	0,4033
MUĞLA	0,0750	0,4810	0,4060
TUNCELİ	0,0720	0,4799	0,4079
OSMANİYE	0,0685	0,4781	0,4096
GAZİANTEP	0,0546	0,4710	0,4164
NEVŞEHİR	0,0445	0,4635	0,4190
TRABZON	0,0347	0,4538	0,4190
HAKKARİ	0,0160	0,4519	0,4359
BATMAN	0,0069	0,4471	0,4403
ISPARTA	0,0063	0,4448	0,4385
SİNOP	-0,0014	0,4419	0,4433
KONYA	-0,0025	0,4400	0,4425
DENİZLİ	-0,0128	0,4345	0,4473
BİTLİS	-0,0136	0,4369	0,4505
ELAZIĞ	-0,0145	0,4344	0,4489
KÜTAHYA	-0,0199	0,4315	0,4514
SİVAS	-0,0335	0,4245	0,4580
ÇORUM	-0,0366	0,4235	0,4601
ADIYAMAN	-0,0479	0,4194	0,4673
SAKARYA	-0,0651	0,4111	0,4763
DÜZCE	-0,0688	0,4039	0,4726
TEKİRDAĞ	-0,0724	0,4071	0,4795
DİYARBAKIR	-0,0726	0,4051	0,4778
ÇANAKKALE	-0,0768	0,4025	0,4793

AYDIN	-0,0986	0,3921	0,4908
KARAMAN	-0,1173	0,3823	0,4995
ERZİNCAN	-0,1210	0,3808	0,5018
AKSARAY	-0,1520	0,3656	0,5176
AFYONKARAHİSAR	-0,1535	0,3638	0,5173
TOKAT	-0,1573	0,3600	0,5173
ÇANKIRI	-0,1785	0,3520	0,5305
BALIKESİR	-0,1970	0,3420	0,5390
NİĞDE	-0,1990	0,3436	0,5426
YOZGAT	-0,2009	0,3414	0,5423
BİNGÖL	-0,2126	0,3374	0,5500
AMASYA	-0,2253	0,3283	0,5535
AĞRI	-0,2289	0,3274	0,5563
KIRŞEHİR	-0,2431	0,3214	0,5645
KASTAMONU	-0,2480	0,3173	0,5653
GÜMÜŞHANE	-0,2610	0,3126	0,5736
BARTIN	-0,2641	0,3064	0,5705
BOLU	-0,2673	0,3103	0,5775
UŞAK	-0,2851	0,2963	0,5814
ERZURUM	-0,3076	0,2873	0,5949
ARDAHAN	-0,3371	0,2729	0,6100
MUŞ	-0,3519	0,2659	0,6178
EDİRNE	-0,3864	0,2501	0,6365
KIRKLARELİ	-0,4244	0,2311	0,6555
BURDUR	-0,4365	0,2230	0,6595
BAYBURT	-0,4620	0,2125	0,6745
IĞDIR	-0,5860	0,1509	0,7369
KARS	-0,6233	0,1300	0,7533

4. CONCLUSION

Manufacturers in the livestock sector live problems such as inefficiency, inadequate use of technology, unconsciousness in union or cooperative style organization, and disconnection from the market as it is in many other sectors.

The productivity and profit increase which are main objectives of the animal husbandry will increase depending on the correct selection of the facility place of the enterprises. According to traditional methods, there are many problems in control and reduction of costs due to high investment, operating costs and labor demands in agricultural holdings in cattle feeding which are carried out in closed system stalls (Toker et al., 2010).

In this study, AHP and Promethee methods of multi criteria decision making methods were used for choosing beef farming place. For selection; seven criteria were defined as feed plant area percentages, percentage of demand of meat, city development index, average minimum temperature, average maximum temperature, annual rainfall quantity, grant supports. It is aimed that to select the correct criteria for the beef farming place, to find the weights of these selected criteria, and to determine the preference functions of the found weights were performed with Visual Promethee program.

As a result of the evaluations, it was determined that preference of Yalova province is suitable for the selection of the place. The province of Kars should be the last one to be preferred.

When the top ten provinces in the list are evaluated, it is seen that they are the ones in Marmara, Mediterranean, Black Sea, Central Anatolia and Southeastern Anatolia regions in Turkey. These five regions are emerging as priority regions for the establishment of a new district.

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