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An Analysis of the Effects of Livestock Support Policies on Breeders: An Example of TR83 Region in Turkey

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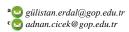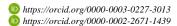*Corresponding author

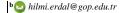| ARTICLE INFO	ABSTRACT
	This paper studied the effect of livestock support policies applied in Turkey by a empirical study. The study was carried out based on the analysis of the data collected through surveys with a total of 478 livestock enterprises in the TR83 region (including Amasya, Çorum, Samsun and Tokat provinces). The enterprises included in the survey study were grouped into three categories by the number of their animals. Binary Logistic Regression Model was applied in order to define the policy-based support payment utilization probabilities of the enterprises and the factors affecting them. It was determined that approximately 45% of the enterprises cannot utilize livestock supports. The most utilized support items by the enterprises were determined as calf support, support per animal, forage plant support and raw milk support. A total of 65% of the enterprise owners think that the support amount per animal is insufficient, but regard the mentioned support item as the most important factor for improving animal presence. The utilization rates vary in terms of enterprise scales on the other hand. The support utilization likelihood of medium-scale enterprises is 3.1 times higher than small-scale enterprises, and this likelihood is 1.7 times higher for big-scale enterprises when compared with medium-scale enterprises. The study recommends that some regulations are needed in support of policies to enable a better improvement in animal presence and a homogenous distribution of support payments.

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Introduction

More than half, 60% of the livestock enterprises in Turkey hold 1 to 4 cattle; and the percentage of enterprises which perform only animal production accounts for 0.5% of the total agricultural enterprises is 0.5% (TURKSTAT, 2016). In the circumstances, it is accurate to disclose that an important amount of livestock enterprises in Turkey are small family enterprises, far from being a business firm. It can be said that the main reason for the deficiency of enterprises which perform only animal production and for enterprises being small in terms of animal presence may be the lack of extensive and consistent support policies before 2000. The share of livestock support payments in total agricultural support payments was 1.5% in 2002, which was the last year before the increase; and this percentage was recorded even less in the years before 2000. The mentioned percentage, which is inevitably seen as insufficient for development and sustainability in livestock breeding, changed in the forthcoming years, reaching 20%

in 2010 and 30% in 2015 (Ministry of Finance, 2016), and more systematic and increasing rates were seen in the support payments. An increase in animal presence has also been seen in accordance with the increases in livestock support payments. An increase of 35.4% in large ruminant (cattle and buffalo) and 11.5% in small ruminant (sheep and goat) presence was recorded between 2000 and 2015, whereas there had been a decrease in cattle presence by 10.4% and by 32.5% in small ruminant presence between 1991 and 2000 (TURKSTAT, 2015). The animal presence has evolved into fertile races by the requirement for the support payment per animal, which has been paid since 2009 to be applied for exotic breed and crossbred animals. It is undeniable that the present livestock support policies have recorded an increase in total animal presence in Turkey. However, the only purpose of these policies is not only to increase animal presence; but also, the policies are important for the purposes of specializing enterprises,

increasing fertility, animal health and welfare, increasing forage manufacturing, modernizing enterprises and providing hygiene. On the other hand, existing enterprises have to satisfy numerous requirements to utilize the support payments completely, creating a correlative causality. In other words, support payments are made to enterprises satisfying requirements and appropriate enterprises can get the support payments. However, in terms of animal races and enterprise development, there is a homogenous dispersion among regions in Turkey which is a factor causing the effectiveness of the support payments to be arguable. TR83 Region (Samsun, Tokat, Çorum, Amasya provinces) ranked third in terms of crossbred cattle presence, and fourth in terms of native race cattle presence whereas it is tenth in terms of exotic breed cattle presence among Level 2 regions. The highest increase in animal presence in the region is seen in goat presence between 2005 and 2015 (TURKSTAT, 2015).

Erdal et al. (2016) estimates that the highest increase in animal presence is expected to be in water buffalo by 128.43% by the year from 2015 to 2022. On the other hand, exotic breed cattle presence of the area has increased from 2005 as 1.8 times, and it is expected to increase by 0.9 times from 2015 to 2022. However, the alternation in the native cattle presence in the region from 43.9% decrease between 2005-2015 to the expectation of a 35.91% increase, which is contrary to the countrywide situation, can be interpreted as that the region conserves or it will conserve its traditional structure in native livestock breeding. This can be interpreted as the region conserves or it will conserve its traditional structure in native livestock breeding. This outcome points to the required discussion of the regional efficiency of policies.

In this sense, it is highly important in terms of creating more appropriate and efficient policies to determine the efficiency and contribution of the livestock breeding supports to the sector and the perception of the requirements for the support applications by the enterprises and the problems and hinders on the field.

Literature Review

Literatures show that the number of the studies concerning the impacts of agricultural support policies have increased in recently.

These studies are mainly field studies which have been carried out focusing on a selected agricultural support instrument and production, income, and farmer behaviors (Wise, 2004; Bournaris and Manos, 2012; Riasat et al., 2014; Saghir et al., 2016; Czyżewski and Poczta-Wajda, 2017; Guth et al.,2020).

A number of studies highlighted that the changes of supports decreased production due to the reduction of cattle number (Benin et al., 2003; Shrestha et al., 2007; Acs et al., 2010; Morgan-Davies et al., 2012). Breen et al. (2005) stated that some of the producers terminated production activity. Among these studies, Benin et al. (2003) stated that as the result of the study carried out in 98 villages in Ethiopia, it is determined that livestock breeding has gradually decreased although the adaptation of animal feeding developments and animal health care services has been increased.

Some research results indicated that the agricultural supports had an increasing impact on production and income of the farms (Sckokai and Moro 2006; Majewski et al., 2011; Viaggi 2011; El Benni et al., 2012; Bartolini and Viaggi 2013; Severini and Tantari 2013).

Daugbjerget et al (2005) investigated the perception of a total of 4500 enterprise owners in England, Germany and Portugal, concerning the supports given by the Common Agricultural Policy and the effects of them. It was concluded in the study that the enterprise owners perceived the supports without having complete knowledge about them.

Some literatures highlighted that agricultural supports had neither an increasing nor decreasing impact on production and income (Douarin et al., 2007; Genius et al., 2008; Lobley and Butler 2010; Weber and Key 2012; Giannoccaro and Berbel 2013; Latruffe et al., 2013). Thus, 66% of the producers in the study of Latruffe et al (2013) and 62% of the producers in the study of Lobley and Butler (2010) did not change the amount of production in case of no support scenario.

There are studies concerning the impact of supports on the livestock sector in Turkey. Of all, the impacts of supports were examined at the levels of provincial, regional or countrywide using secondary data or primary survey data.

In the paper that studied the effects of livestock supports on forage plant growing, Demir and Yavuz (2007) suggested the increase of the supports in eastern regions and the continuation of the policies supported by educative practices. In a comparative study which was carried out with a sampling of 540 livestock breeding enterprises in West Marmara and Northeast Anatolia regions, Demir (2009) said that the education level of the enterprise owners is important for their better utilization of the supports, especially young enterprise owners should be included in educative practices about support policies and specialized enterprises should be encouraged. Saygı and Alarslan (2012) indicated that the effects of the forage plant growing supports on milk yielding enterprises in Yozgat are positive but still insufficient in meeting the forage necessity of the animal presence in the region. In addition, producers are needed to be organized for the development of dairy cattle breeding and the government should adopt and follow a continuous and persistent policy in terms of forage plant support and dairy incentive pays. Çelik (2013) stated that the variance in support amounts is almost parallel especially with the variance in the cultivation areas of annual forage plants. It is seen that the ratio of supported vetch and forage corn areas to the total cultivation areas was decreased between 2000 and 2013. Ata and Yılmaz (2015) stated that the support utilization of developed enterprises is higher than traditional enterprises. Eroglu et al (2020), indicated that the impact of livestock supports on production and income of the beef cattle farms in Samsun. Livestock support has a statistically significant effect on the amount of beef meat produced whereas it has no statistically significant effect on the gross profits of the farms.

In this study, unlike the literature, livestock support policies were examined generally, not a specific policy tool.

The study was conducted in the TR 83 Region (Amasya, Çorum, Samsun, Tokat), and the large cattle breeders were taken into account as the target audience. The reason for this is because there is a very different and wide application for cattle breeding supports in Turkey. For this reason, the level of benefiting from support payments for cattle breeders in TR 83 Region was examined, and the perception and use of the support payments by livestock breeders were determined. Especially the difference in the distribution or use of support payments was demonstrated in statistical terms on a business scale and at the provincial level. It is considered that the findings obtained as a result of the study will reveal the defective aspects of the functioning of the existing major livestock policies, and cast light on the creation of alternative policies.

Materials and Methods

The data used in the study were obtained from official statistical resources such as the Turkish Statistical Institute (TURKSTAT), the Ministry of Agriculture and Forestry of Turkey (MAF), provincial and county organizations and Veterinary Information System. MAF and Official Gazette resources were used for acquiring information related to supports and incentives in the livestock breeding sector in Turkey. The data, which were used for stating the utilization rates of the breeders from support payments and for the analysis of the effects of the supports in terms of enterprises, were obtained from a face-to-face survey work carried out in TR83 region with the livestock breeding enterprises and their owners. The questionnaires were carried out between September and November 2015.

Determination of the Research Area
According to the Nomenclature of Territorial Units for Statistics (NUTS), the TR83 sub-region is in TR8 West Black Sea Region Level 1 unit; and it includes TR831 Samsun, TR832 Tokat, TR833 Çorum and TR834 Amasya provinces. The survey field consists of 4 provinces and a total of 48 counties of those provinces. A total of 24 of these counties, which represent agro-ecological sub-zones and where livestock breeding is intensively executed, were selected (MAF, 2014). Accordingly, Central district, Göynücek, Merzifon and Taşova counties in Amasya province; Central district, Alaca, İskilip, Mecitözü, Osmancık, Sungurlu and Uğurludağ counties in Çorum province; Alaçam, Ayvacık, Bafra, Çarşamba, Kavak, Terme and Vezirköprü counties in Samsun province; Central district, Niksar, Reşadiye, Turhal, Yeşilyurt and Zile counties in Tokat province were included in the sampling.

In the second step of the sampling, animal presence for all the villages of the counties included in the sampling were gathered from the Veterinary Information System for 2015; and villages, where livestock breeding was widely executed, were determined. A total of 100 villages were specified, no fewer than 3 and no more than 6 for each county. It was determined that there were 7137 livestock enterprises in those 100 villages included in the sampling. Enterprises which owned 5 or more cattle were taken into

consideration within the scope of the supports given by the Ministry of Food, Agriculture and Livestock of Turkey. Stratified random sampling method was decided to be used as the computed coefficient of variation, which is calculated with the average animal presence of enterprises and standard deviation, and was found to be 124.7% (Çiçek and Erkan 1996). Sampling size confidence interval was 95% and the deviation from average was 5% in the study.

The data from a total of 478 surveys were used in the study. Among the enterprises, those owning 5 to 14 animals were identified as small-scale (small) enterprises (231 surveys), enterprises which owned 15 to 29 animals were identified as medium-scale (medium) enterprises (128 surveys), and those owning 30 or more animals were identified as large-scale (large) enterprises (119 surveys). Weighted averages of each group were calculated in the general assessment of the enterprises and presented under the "Overall" title.

Analyzing Survey Data
Logit regression model, which is one of the limited dependent variables models, was used in the study to determine the utilization likelihood of the livestock enterprises executing livestock breeding in TR83 region of the support payments and the factors affecting these probabilities.

Logistic regression is the appropriate regression analysis to conduct when the dependent variable is binary. In other words, the Logit Regression Model is a model that is designed for at least two variables, and is non-linear, but can be linearized with proper conversions (Stok and Watson 2007). Like all regression analyses, logistic regression is a predictive analysis. Logistic regression is used to describe data and to explain the relationship between one dependent binary variable and one or more nominal, ordinal, interval or ratio-level independent variables (Hosmer and Lemeshow 2001).

In this study, the dependent variable was considered in the binary (zero and one) category in the logit regression model. The dependent (explained) variables of the model that were expressed as binary logit regression were; 0 = enterprises not benefiting from policy-oriented support payments; 1 = enterprises benefiting from policy-oriented support payments; 1 denoting the occurrence of the event, 0 denoting not occurrence of the event.

In this study, the SPSS Program was used in the estimation of Logit Regression estimation. The basic Logit Regression Model is shown below (Green 2000).

$$P_i = E\left(Y_i = \frac{1}{X_i}\right) = \beta_1 + \beta_2 X_i$$

$$P_i = E(Y_i = 1/X_i) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}} \quad (1)$$

To facilitate notation, if $Z = \beta_1 + \beta_2 X_i$ in Equation (1); the following is obtained:

$$P_i = \left(\frac{1}{1 + e^{-Z_i}}\right) \quad (2)$$

In this function, Z_i -∞ and +∞ and P_i are within 0 and 1 range.

Since P_i in the model shows the probability of an event to occur, the probability of the event not to occur becomes $1-P_i$.

$$1 - P_i = \left(\frac{1}{1+ e^{-Z_i}}\right) \qquad (3)$$

When the probability of occurrence and not occurrence is rated;

$$\frac{P_i}{1- P_i} = \left(\frac{1+e^{Z_i}}{1+ e^{-Z_i}}\right) \qquad (4)$$

When the logarithm of both sides is taken in the equation, the following is obtained;

$$L_i = L_n\left(\frac{P_i}{1 - P_i}\right) = Z_i \ln e \qquad (5)$$

In Equation 5, when Ln e =1 and $Z_i = \beta_1 + \beta_2 X_i$ are placed, the following is obtained;

$$L_i = \beta_1 + \beta_2 X_i \qquad (6)$$

In this way, the Non-linear Logit Regression Model is linearized according to the parameters and the variables.

In Equation 1 and Equation 6, β_2 coefficient represents slope, and X_i represents independent variables.

In the Logit Model, the odds ratios are the proportion of the number of the event to occur to the event not to occur. In this way, Equation 4 is the Odds ratio. On the other hand, the inclination coefficients in the Logit Model measures the change in the Logit for one unit change in the independent variable (Erdal and Esengün 2008).

Findings and Discussion

Socio-Economic and Demographic Characteristics of Enterprise Owners and Enterprise Features

The socio-economic and demographic features of the enterprises according to farm size are given in Table 1.

The age average of enterprise owners is 50. The average number of individual in enterprises is 6. Most of the enterprise owners (64.83%) are primary school graduates. the percentage predominantly covers the small-scale enterprises. It is observed that as the scale of the enterprise increases. the education level increases as well. as it is expected.

It is identified that 11.03% of the enterprises have no state guarantee. It can be said that these enterprises are mostly found in small and medium-scale enterprise groups. A total of 71.28% of the enterprise owners are insurance holders. which is an expected situation as 90% of the big scale enterprise owners are insurance holders as well. A total of 83.25% of the enterprises do not execute any other activity other than agriculture.

The average land property of the studied enterprises has been calculated as 64.65 decares. The average land usage for growing forage plants is 21.01 decares and this area expands as the enterprise-scale increases. The average animal production income of the enterprises has been calculated as 14 474 TRY and this amount increases depending upon the enterprise scales. The ratio of the enterprise incomes from livestock supports and incentives to the total animal production income is approximately 4%.

Table 1. General Information and Socio-Economic and Demographical Features of the Enterprises

		Small	Medium	Large	Overall
Mean age (years)		50.29	49.22	49.76	49.96
Mean individual Count (pcs)		5.58	6.10	5.96	5.75
Educational level (%)	Illiterate	2.60	0.78	0.00	1.89
	Primary School	69.26	56.25	57.98	64.83
	Secondary School	15.15	25.00	21.85	18.33
	High School	12.12	16.41	18.49	13.83
	High School and Faculty	0.86	1.56	1.68	1.12
State security (%)	No state security	11.69	10.94	6.72	11.03
	Insured	67.10	75.00	89.92	71.28
	Retired	15.58	9.38	3.36	12.83
	Green Card Holder	5.63	4.69	0.00	4.86
Agricultural activity status (%)	Always agricultural activity	83.55	82.81	82.35	83.25
	Non-agricultural Activity	16.45	17.19	17.65	16.75
Working status in different jops (%)	Public Sector Employee	10.53	0.00	9.52	7.71
	Civil Servant	0.00	4.55	0.00	1.18
	Private Sector	15.79	13.64	28.57	16.42
	Self-employed	21.05	40.91	28.57	26.90
	Construction Employee	18.42	22.73	0.00	17.82
	Other	34.21	18.18	33.33	26.97
Membership in any producer union (%)	Member	47.62	82.03	71.43	58.77
	Not Member	52.38	17.97	28.57	41.23
Farmland size (da)		42.99	92.74	136.87	64.65
Forage crops land (%)		18.56	25.78	45.69	21.02
Livestock income (TRY)		10 149	17 543	35 952	14 474
Support income (TRY)		337	775	1 637	572

Cattle presence has been stated as 15.91 animals for the enterprises in the study area. This average presence consists of 7.77 cows. 3.27 calves (0-6 months old). 1.65 calves (older than 6 months). 1.65 livestock and bull. 1.41 heifer and 0.16 water buffalo. There are differences in animal presence and dispersion in terms of enterprise-scale groups. The average animal presence for small-scale enterprises is 9.64 animals and 5.13 of it is a cow. The average animal presence for medium-scale enterprises is 21.82 and 10.55 of it is a cow. The average animal presence for large-scale enterprises is 42.52 and 18.30 of it is cow and 7.94 of it is bull.

In the study. 84% of the enterprises have been executing their businesses for 16 years or more in terms of operation periods. The most given reason for choosing livestock breeding as a field of operation is that "it is a widespread activity among the people in their village or neighboring villages". On the other hand, the reason for predominantly larger enterprises to choose livestock keeping as a field of operation has been stated as "appealing supportive payments for livestock breeding". Among the enterprises in the study. 13% of them stated that they carry out livestock breeding to supply their daily household needs. It can be seen that small and medium-scale enterprises are centered upon dairy farming whereas large enterprises focus on livestock breeding. The average daily milked animal count in dairy farming enterprises is calculated as 5.66. This amount is 14.01 in large-scale enterprises. The calculated average milk production amount per animal to be higher in large-scale enterprises (20.58 liters per day). It is detected that enterprises mostly (66.93%) graze their animals in the shared pasture of the village. Forage needs are covered by themselves in 57.53% of the enterprises. Wide usage of (88.01%) artificial feed has been detected among the enterprises. The usage of artificial feed increases as the enterprise-scale expands. In the study. 92.83% of the enterprises stated the expenses for feed as the priority expenses in livestock. A total of 60.86% of the enterprises stated that the expenses for drugs were the expenses with second priority. 57.86% stated that transportation expenses. 52.48% the expenses for shelter and maintenance-repairs. 49.14% stated that the veterinary expenses were the most important expenses.

It is found out in the study that 58.77% of the breeders are not members of any breeder/producer association. The most common association that breeders join is milk producers' union (57.60%). which is followed by cattle breeders' association (47.63%).

Utilization Status of the Enterprises from Livestock Supports

According to the survey results stated utilization rates are given in Table 2 below.

Enterprises that cannot utilize livestock support put forward their reasons as their insufficient animal presence. This percentage is 30.58% and 8.33% in small and medium-scale enterprises. respectively. There is no large-scale enterprise that cannot utilize livestock supports for the reason of not having sufficient animal presence. Per animal support payment is available for exotic breed and crossbred animals and is paid for at least 5 animals. Native breed animal percentage of the enterprises covered in the study 18% and this situation causes especially small-scale

enterprises not to be able to utilize this item of support payments. In brief, as especially small-scale enterprises cannot fulfill the animal presence requirements (Official Gazette 2015) and the percentage of their native breed animal is high (22.61%), they are not able to utilize the supports efficiently.

The overall average support and incentive revenue of the enterprises in the study is TRY 572. This value is TRY 337 and TRY 1637 for small- and large-scale enterprises, respectively. The maximum utilizable support and incentive revenue for the enterprises has been calculated as TRY 2249. The ratio of the received support and incentive revenues to the maximum utilizable support and incentive revenue is 25.43%, which is not a significant variable rate in regard to the enterprise-scale groups (Table 2). Other reasons for the enterprises not being able to utilize the supports can be stated such as red-tapism (20.72%) and not being a member of producer unions (19.34%).

The most utilized support items by the 55.19% of the enterprises, which are utilizing livestock support payments, are calf support (84.14%), support per animal (83.34%), forage plant support (68.42%) and raw milk production support (46.68%) items. Enterprises are able to utilize more than one support item at once (MAF 2016).

Knowledge Levels of the Enterprise Owners about Livestock Supports

The satisfaction levels of the enterprises from support payments and their knowledge about applied terms for payments were investigated in terms of some support items. The knowledge levels of enterprise owners about support per animal payments were the first investigated item and is summarized in Table 3.

A total of 85% of enterprise owners (Official Gazette 2015) are informed about the requirement of being a member of a breeder/producer union to utilize livestock supports. However, the percentage of member enterprises to a union is 59% for the general enterprise scale. This rate is above 70% for medium and large-scale enterprise groups (Table 1). The ground of the enterprises for not being a member of a union is mainly having an insufficient number of animals. especially in small-scale enterprises group. In fact, there is not any minimum animal amount requirement for being a member of a union. however, the requirement of having at least five exotic breed and crossbred brood cattle (Official Gazette 2015) to utilize brood cattle support affects especially small-scale enterprises in terms of being a member to a union. they find it ineffective to be a member of a union as they cannot fulfill this requirement and utilize brood cattle support. On the other hand, 24% of the non-member enterprises think that membership and subscription fees of unions are too high. and 14% of them think that unions are ineffective. This situation reveals the fact that actions should be taken to eliminate the prejudices of enterprise owners against unions to provide better effectiveness of the breeder/producer unions in the region. The increase of subscription fees of unions to 2-3% after 2016 should also be re-evaluated (Official Gazette 2016).

On the other hand, approximately 22% of the breeders utilizing livestock support payments have no information about the requirements of payment per animal. 65% of the enterprises think that the support per animal payment is insufficient yet it is the most important item among others

to increase animal presence. However, support per animal payments for brood catles and water buffalos. which is assumed as a fundamental support item by most of the enterprises. was repealed by the year 2016 according to the council of ministers' decision (Official Gazette 2016). It is determined that enterprises widely have information about the requirements (Official Gazette 2015) for calf support payments (Table 4).

A total of 86.16% of the enterprise owners stated that they are well informed about the requirement "*calves must be born of artificial insemination*" which is significantly important among others. The grounds of enterprise owners who do not prefer artificial insemination (16.00%) are that

it is usually unsuccessful. and they find it expensive besides its religious aspects.

A total of 66.73% of the enterprise owners who had their animals inseminated artificially are satisfied with the artificial insemination. On the other hand, 65.93% of them find it difficult for their animals to impregnate by artificial insemination and their grounds are that animals are not well cared (68.10%). planning of insemination periods are imprecise (68.70%) and second and third inseminations are not followed. Thus, the requirement "calves must be born of artificial insemination" for calf support payments was repealed by the year 2016 according to the council of ministers' decision (Official Gazette 2016).

Table 2. Utilization Status of the Enterprises from Livestock Supports (%)

	Small	Medium	Large	Overall
Yes (%)	47.62	71.88	61.34	55.19
No (%)	52.38	28.13	38.66	44.81
Support. incentive revenue (TRY)	337	775	1 637	572
Max. Utilizable Support. incentive revenue (TRY)	1.350	3.055	6.250	2.249
Percentage of utilized support. incentive revenue (%)	24.96	25.37	26.19	25.43

Table 3. Knowledge Levels of Enterprise Owners about Support per Animal Payments (%)

	Small	Medium	Large	Overall
It is required to have at least five exotic breed and crossbred brood cattle needed to be recorded in the database of Turkvet or E-Breeding to receive support per animal payment				
Yes	75.32	80.47	79.83	77.08
No	6.06	3.91	1.68	5.09
She/he has no knowledge about	18.61	15.63	18.49	17.83
No quantity requirement in the condition of being under the record of Turkvet database				
Yes	54.55	71.09	53.78	58.77
No	13.85	12.50	18.49	13.93
She/he has no knowledge about	31.60	16.41	27.73	27.30
It is required to be a member of a breeder/producer union to utilize support per animal payments				
Yes	81.39	91.41	89.92	84.78
No	18.61	8.59	10.08	15.22
Support per animal payment cannot be paid to a breeder who utilizes Enterprise Purged from Diseases Support				
Yes	12.55	15.63	24.37	14.45
No	18.18	7.03	15.13	15.00
She/he has no knowledge about	69.26	77.34	60.50	70.55

Table 4. Knowledge Levels of Enterprise Owners about Calf Support Payments (%)

	Small	Mid	Large	Overall
Calves must be born of artificial insemination				
Yes	84.85	91.41	80.67	86.16
No	3.46	0.78	2.52	2.68
She/he has no knowledge about	11.69	7.81	16.81	11.16
Did you get your animal inseminated artificially?				
Yes	83.98	92.19	61.35	84.00
No	16.02	7.81	38.65	16.00
Calves must be born on the date of application for the support and be recorded in Turkvet Database				
Yes	80.95	91.41	80.67	83.64
No	4.33	1.56	2.52	3.44
She/he has no knowledge about	14.72	7.03	16.81	12.92
Female calves must be vaccinated against brucella				
Yes	81.39	89.06	75.63	82.84
No	4.76	2.34	7.56	4.40
She/he has no knowledge about	13.85	8.59	16.81	12.76

Table 5. Definitions of the Variables Used in the Model

Code	Definition
	Dependent Variable
Support	Utilization of support (yes 1, no 0)
	Independent Variables
Scale	Enterprise scale (animal number)
Education	Educational status of the enterprise owner (primary 1, secondary 2, high school 3, college and faculty 4)
Age	Age of the enterprise owner (number)
Assurance	State guarantee of the enterprise owner (yes 1, no 0)
Distance	The distance of the enterprise to the directorate of agriculture (number)
Territory	Territorial difference of the enterprise (Tokat 1, Çorum 2, Amasya 3, Samsun 4)
Membership	If the enterprise a member of a union (yes 1, no 0)
Non-Agricultural	Non-agricultural activities of the enterprise owner (present 1, not 0)
Year	Livestock breeding experience of the enterprise owner (number)
Broodcatte	If the enterprise owner has knowledge about the requirement of having at least five exotic breed and crossbred brood cattle to utilize support per animal (informed 1, not informed 0)
Insemination	If the enterprise owner gets his animal inseminated artificially (yes 1, no 0)
Knowledge on membership	If the enterprise owner has knowledge about the requirement of being a member of a union to utilize supports (informed 1, not informed 0)

After the repeal of brood animal supports by the year 2016. calf support has become the fundamental support item among other supports and payment amounts have been increased five times compared to before (Official Gazette, 2016). This change might be seen positive by breeders, however, allowing cross-breeding and repealing artificial insemination requirement brings forward the concerns about the deterioration in the outcomes of taken rehabilitative actions which have been carried out for years with a certain amount of investment and in exotic breed that have been created ever since.

Among the surveyed enterprises, 75.68% of them grow forage plants. Enterprise owners are substantially informed about the requirement of their field being recorded in farmer's register system (86.11%) and that support payment is only paid for annual forage plants (84.41%). However, the rate of the enterprise owners who think that forage supports increase forage plant growth is 22.73%. Most of the enterprise owners (75.27%) declared that they grow forage plants whether they are getting support payments or not. 60% of the enterprises find the forage plant support payment amounts insufficient while 77% of them indicate that they also utilize fuel and fertilizer support as well. A total of 87.20% of the surveyed enterprises declared that they have faced no significant disease in their herds.

A total of 70.35% of the business owners said their most important problem was high feed prices. 45.16% insufficient capital. 20.82% inadequate labor, and 20.56% rough feed problems. These findings show that the business owners in the area have problems, particularly about the high feed prices. When feed is considered as the most important cost element in livestock. it seems inevitable that the support that will be provided for feed plants will directly contribute to feeding production as well as animal presence indirectly. In a study conducted on this subject in the literature. it was determined that the support provided for feed plant production had significant effects on the continuation of production. and in case the support

for businesses in the region continues. clover and trefoil production will increase (Altıntaş et al., 2017).

Approximately 20 % of the enterprises stated that they used credits either from state or private banks and they used these credits for buying animals (51%) and financing their feed expenses (26%). Enterprises make a willingness to use bigger credits in appropriate conditions however they fulfill the required conditions (title deed registry, rental agreement, etc.) on the other hand. enterprise owners stated that they had to sell their animals they bought as they have difficulty in paying back their credit debts. In fact, grant supports of 50%-70% are given for current projectized or newly-established livestock enterprises in the region. which is in the scope of rural development and support. Besides. Small and Medium Enterprises Development Organization gives grant credits and state-funded zero interest livestock credit for entrepreneurs who want to practice livestock breeding to be used to build facilities, arrange product packaging and preparation or buy modern livestock machinery such as milking machine. However, as the enterprise owners have no knowledge about these supports, they also have no competence in making the application. This situation brings the requirement of unions and the Ministry of Food Agriculture and Livestock to take action against it.

Binary Logit Regression Model

The variables. that are planned to create the Binary Logit Regression Model to be used to determine the utilization possibilities of the enterprise owners who practice livestock breeding in TR83 area from support payments and the factors affecting these possibilities. are defined in Table 5. Single models were tested for each of these variables and statistically significant variables are included in the multiple models.

Ten variables have been found statistically significant after the single variable model tests of each 14 independent variables. These variables are "scale, education, age, assurance territory, member, brood cattle, insemination and membership". All statistically significant variables

were tested by multiple model tests and only five of them have been found statistically significant (scale, education, age, territory and brood cattle) as the result of the influence of variables on each other. The likelihood ratio of the multiple models (Loglikelihood 593.5) and the goodness of fit index R^2 values (Cox and Snell R^2 11%. Nagelkerke R^2 15%) are also sufficient. The model results are given in Table 6. According to the obtained results. enterprise-scale is affecting the utilization of the supports as it is expected (P<0.001). The utilization likelihood of medium scale enterprises is found 3.1 times higher compared to others and the same likelihood is found as 1.7 times higher for large scale enterprises compared to others.

The educational status of the enterprise owner also affects the likelihood of utilization. Especially the likelihood of utilization of a high school graduate enterprise owner is 2.1 times higher than others.

In a study conducted by Demir and Yavuz (2010). the educational status of the farmers in the Western Marmara Region was found to be higher than the farmers living in the North-western Anatolia Region. It was reported that this facilitated the acceptance of the farmers in the region of innovations more easily. and the general educational status of the farmers was an important parameter for modern livestock breeding. In terms of the supports. it was determined that the farmers in the Western Marmara Region benefited more from supports provided in the fields of artificial insemination, calf, feed crops, and milk.

Again. in another study. the status of livestock breeding projects of the Ministry of Agriculture in Tokat Province before the application in 2005 and after the application in 2009 was examined. It was determined in the study that Breeding Cattle and Dairy Farming Projects positively affected cooperative organizations. and had significant effects especially on the increase of exotic breed animal presence (Şanlı 2011).

The age variable was also found statistically significant (P; 0.054). Age is a factor that brings experience. The likelihood of utilization increases 1 time as the age increases one unit. according to the model.

Having knowledge about the requirement of having at least five five exotic breed and crossbred brood cattle to utilize support per animal decreases the likelihood of utilization of the payments by 0.5 times compared to the enterprise owners who have no knowledge about the requirement.

The territorial difference among the provinces in the TR83 area also affects the utilization rate. It is determined that enterprises in Amasya province utilize livestock support payments 1.8 times more compared to the enterprises in Tokat province. This information can be evaluated as enterprises and their owners in Amasya province are better in fulfilling the requirements of the support payments. their education level is mostly high. and they are consciously managed (Table 6).

Table 6. Binary Logit Regression Model

Variables	Coefficient	Std. Error	Wald	SD	Sig.	Odds rate
Scale (medium)	1.14	0,24	22.43	1	<0001	3.14
Scale (large)	0.51	0,24	4.65	1	0.03	1.67
Education[2]			6.83	3	0.07	
Education (second)	0.08	0,26	0.09	1	0.77	1.08
Education (high)	0.76	0,31	5.98	1	0.01	2.13
Education (higher)	-0.47	0,84	0.31	1	0.58	0.62
Age	0.01	0,01	3.71	1	0.05	1.01
Broodcow	-0.66	0,21	9.61	1	0.00	0.52
Territory[3]			9.15	3	0.03	
Territory (Çorum)	0.02	0,28	0.00	1	0.95	1.02
Territory (Amasya)	0.60	0,29	5.03	1	0.02	1.83
Territory (Samsun)	-0.19	0,28	0.45	1	0.50	0.83
C (fixed)	1.82	0,58	9.80	1	0.00	6.17
Loglikelihood 593.47, CoxandSnellR[2] .115, NagelkerkeR[2] .154						

Note: [1,2,3] reference categories respectively: small. elementary school. Tokat.

With the in-function analysis of the coefficients obtained from the Binary Logit Model and given in Table 5. the utilization likelihood of an enterprise owner of support payments was calculated. According to the calculation results. the livestock supports utilization likelihood of an enterprise owner. who is in Amasya province and a high school graduate. has a medium scale enterpris aged around 50 and has knowledge about the requirements of brood cattle support is found 99%.

The main feature that distinguishes Amasya province from other provinces in the region. which stood out in the analyses. might be considered as making significant progress in cultural race livestock breeding. In a previous study, a 32.29% increase was expected in the total number of cattle in 2020, and this increase would heavily be realized in the cultural race (74%). It was also reported that

the presence of cultural breed cattle in the province was the largest increase between 2004 and 2014 as the animal type (Erdal et al., 2016). With the increase in the cultural race in Amasya province. it is an undeniable fact that differences will appear between other provinces in terms of meat and milk efficiency. The meat and milk yield of the cultural breed animals advantage also brings the necessity of the regional farmer to specialize in animal breeding. For this reason this specialization also raises awareness about achieving livestock supports, affecting the possibility of use positively. While the effectiveness of the native and crossbred cattle, buffalo, and small cattle is dominated by other provinces like Çorum, Samsun and Tokat. it was determined that there was progress towards productive races because of the influence of livestock support (Erdal et al., 2016).

Conclusion

As a result, it has become clear that there is a need for a high level of education, experience and consciousness behind the fact that a livestock enterprise can almost fully benefit from the livestock support payments. On the other hand, it is also an undeniable fact that the regional differences that come to the forefront in the degree of benefit from supports are still highly dependent on the level of education and consciousness. In this sense. the business owners engaged in major livestock activities need to be aware that they can fully perceive and realize the conditions that are needed to benefit from the supports. It is especially very important to program the working systems of the breeders and producer organizations to promote the concept of modern livestock enterprises in the region and to ensure their qualifications. In this sense. the operation of the milk producers and cattle breeder unions in the area and investigating the working principles to benefit more from the supports are important. and the works in this respect must be run in a planned manner. On the other hand, sustaining the livestock support policies is important for it to be a driving force in modern business formation. which plays an important role in the development of livestock and the provision of animal production. Special support items must be created at the regional level, considering the geographical conditions and economic development levels of each region in the country. Payments must be categorized according to specific conditions. and it must be made sure that modern production is implemented in a friendly manner to nature and environment.

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References

Acs S, Hanley N, Dallimer M, Gaston KJ, Robertson P, Wilson P, Armsworth PR. 2010. The Effect of Decoupling on Marginal Agricultural Systems: Implications for Farm Incomes: Land Use and Upland Ecology. Land Use Policy, 27: 550-563. DOI: https://doi.org/10.1016/j.landusepol. 2009.07.009

Altıntaş G, Altıntaş A, Çakmak E. 2017. Effect of feed plant supports on feed plant production (Sivas province example). Journal of Agriculture Gaziosmanpasa University, 34: 116–127. doi:10.13002/jafag4286

Ata N, Yılmaz H. 2015. Reflections of Implementations of Livestock Production Support Polices On Dairy Farms in Turkey: The Case of Burdur Province. Suleyman Demirel University, Journal of the Faculty of Agriculture, 10: 44-54.

Bartolini F, Viaggi D. 2013. The Common Agricultural Policy and The Determinants of Changes in EU Farm Size. Land Use Policy, 31: 126-135. DOI: https://doi.org/10.1016/j.landusepol.2011.10.007

Benin S, Ehuiand S, Pender J. 2003. Policies for livestock development in the ethiopian highlands. Environment Development and Sustainability, 1: 491-510. doi: 0.1023/A:1025737315629

Bournaris T, Manos B. 2012. European Union agricultural policy scenarios' impacts on social sustainability of agricultural holding. The International Journal of Sustainable Development and World Ecology, 19: 426-432. doi: 10.1080/13504509.2012.670670

Breen JP, Hennessy TC, Thorne FS. 2005. The Effect of Decupling On The Decision To Produce: An Irish Case Study. Food Policy, 30: 129-144. DOI: https://doi.org/10.1016/j.foodpol.2005.03.001

Czyzewski B, Poczta-Wajda A. 2017. Effects of policy and market on relative income deprivation of agricultural labour. 160th Seminar. December 1-2. 2016. Warsaw. Poland 249759. European Association of Agricultural Economists, doi: 10.22004/ag.econ.249759

Çelik A. 2013. The Effect on Forage Crops Cultivation and Production of Agricultural Support in Turkey. Agricultural Economics and Policy Development Institute. Publication No: 215 Ankara

Çiçek A, Erkan O. 1996. Research and Sampling Methods In Agricultural Economic. Gaziosmanpasa University. Faculty of Agriculture Publication No: 12. Tokat.

Erdal G, Esengün K. 2008. The analysis of the factors affecting fish consumption in Tokat province by logit model. Ege University Journal of Fisheries & Aquatic Sciences, 25:203-209. doi 10.12714/egejfas.2008.25.3.5000156596.

Erdal G, Erdal H, Yavuz H, Çallı A. 2016. The Present and Future Statues of Animal Presence in Turkey; The Declination of TR83 Area. Turkish Journal of Agriculture - Food Science And Technology, 4: 668-675. DOI: https://doi.org/10.24925/turjaf.v4i8.668-675.762.

Daugbjerg C, Tranter R, Jones P, Little J, Costa L, Knapp T, Sottomayorand M, Swinbank A. 2005. The Visibility of Agricultural Subsidies and Market İllusions in The Common Agricultural Policy: Some Evidence From Farmers' Views in Germany. Portugal and The United Kingdom. European Journal of Political Research, 44: 749–766. DOI: https://doi.org/10.1111/j.1475-6765.2005.00246.x

Demir N, Yavuz F. 2007. Hayvancılık desteklerinin yem bitkileri üretimine etkilerinin analizi. Türkiye VII. Tarla Bitkileri Kongresi 25-27 Haziran. Erzurum. s. 65-69

Demir N. 2009. Regional Comparative Analysis of The Effect of Support Policies on Livestock Sector. PhD Dissertation. Atatürk University Institute of Science, Erzurum, Turkey.

Douarin E, Bailey A, Davidova S, Gorton M, Latruffe L. 2007. Structural. location and human capital determinants of farmers' response to decoupled payments. EU FP6 Project IDEMA (Impact of Decoupling and Modulation in the Enlarged EU: a sectorial and farm level assessment). Deliverable 14

El Benni N, Finger R, Mann S. 2012. Effects of agricultural policy reforms and farm characteristics on income risk in Swiss agriculture. Agricultural Finance Review, 72: 301-324. doi: 10.1108/00021461211277204

Eroglu NA, Bozoglu M, Bilgic A. 2020. The impact of livestock supports on production and income of the beef cattle farms: a case of Samsun province, Journal of Agricultural Sciences, 26: 117-129. doi: 10.15832/ankutbd.487493.

Genius M, Karagiannis G, Tzouvelakas V. 2008. Assessing European farmers' intentions in the light of the 2003 CAP reform. In: Paper Presented at the 109th European Association of Agricultural Economics (EAAE) Seminar "The CAP after the Fischer Reform: National Implementations. Impact Assessment and the Agenda for Future Reforms', 20-21 November, Viterbo, Italy.

Giannoccaro G, Berbel J. 2013. Farmers' Stated Preference Analysis Towards Resources Use Under Alternative Policy Scenarios. Land Use Policy, 31: 145-155. DOI: https://doi.org/10.1016/j.landusepol.2011.12.013

Greene WH. 2000. Econometric Analysis. Fourth Edition. Prentice Hall International. Inc.

Guth M, Smȩdzik-Ambroz˙y K, Czyz˙ewski B, Stȩpien S. 2020. The economic sustainability of farms under common agricultural policy in the european union countries. Agriculture, 10: 1-20. doi: 10.3390/agriculture10020034

Hosmer DW, Lemeshow S. 2001. Applied Logistic Regression. Newyork: John Wiley & Sons.

Latruffe L, Dupuy A, Desjeux Y. 2013. What Would Farmers' Strategies Be In A No-CAP Situation? An Illustration from Two Regions in France. Journal of Rural Studies, 32:14. DOI: https://doi.org/10.1016/j.jrurstud.2013.04.003

Lobley M, Butler A. 2010. The Impact of CAP Reform On Farmers' Plans for The Future: Some Evidence from South West England. Food Policy, 35: 341-348. DOI: https://doi.org/10.1016/j.foodpol.2010.04.001

Majewski E, Sulewski P, Raggi M, Viaggi D. 2011. Differences in possible reactions of EU farmers from selected European regions to CAP Change. Acta Scientiarum Polonorum Oeconomia. 10: 45-56.

MAF, 2014. Ministry of Agriculture and Forestry of Turkey. Plan. Program and Activity Reports. Provincial Investment Master Plans. Available from: http://www.tarim.gov.tr [Accessed 5 March 2013]

MAF, 2016. Ministry of Agriculture and Forestry of Turkey. Livestock Supports in 2015. Available from: http://www.tarim.gov.tr/Konular/Tarimsal-Destekler/ Hayvancilik-Desteklemeleri [Accessed 15 February 2016]

Ministry of Finance, 2016. Turkey's Ministry of Finance. General Directorate of Budget and Fiscal. Budget Realizations Reports. Available from: http://www.bumko.gov.tr/ TR.916/merkezi-yonetim-butce-gerceklesmeleri-ve-beklentiler-ra-.html [Accessed 15 March 2016]

Morgan-Davies C, Waterhouse T, Wilson R. 2012. Characterization of Farmers' Responses To Policy Reforms In Scottish Hill Farming Areas. Small Ruminant Research, 102: 96-107. DOI: https://doi.org/10.1016/j.smallrumres.2011.07.013

Official Gazette, 2015. Official Gazette of Turkey. Livestock Support About Application Notification. n. 2015/17. Available from: http://www.resmigazete.gov.tr/eskiler/ 2015/05/20150512-2.htm [Accessed 15 August 2015]

Official Gazette, 2016. Official Gazette of Turkey Decision on Agricultural Supports to be made in 2016. n. 2016/8791. Available from: http://www.resmigazete.gov.tr/eskiler/ 2016/05/20160505-3.pdf [Accessed 08 June 2016].

Riasat A, Zafar MI, Khan IA, Amir RM, Riasat G. 2014. Rural development through women participation in livestock care and management in district Faisalabad. The Journal of Global Innovations in Agricultural and Social Sciences, 2: 31–34. doi: 10.17957/JGIASS/2.1.458

Saygı YD, Alarslan ÖF. 2012. The Effect of Coarse Feed Subvention Practices On Dairy Cattle Breeding in Yozgat Region. Journal of Turkish Veterinary Medical Society. 83: 25-35.

Saghir A, Ashraf I, Kousar R, Tabassum H. 2016. Mitigating migration through bridging production gap in livestock sector. The Journal of Global Innovations in Agricultural and Social Sciences, 4: 106–110. doi: 10.22194/JGIASS/4.2.735.

Sckokai P, Moro D. 2006. Modeling the reforms of the common agricultural policy for arable crops under uncertainty. American Journal of Agricultural Economics, 88: 43-56. doi: 10.1111/j.1467-8276.2006.00857.x

Severini S, Tantari A. 2013. The Effect of The EU Farm Payments Policy and Its Recent Reform on Farm Income Inequality. Journal of Policy Modeling, 35: 212-227. DOI: https://doi.org/10.1016/j.jpolmod.2012.12.002.

Shrestha S, Hennessy T, Hynes S. 2007. The effect of decoupling on farming in Ireland: A regional analysis. Irish Journal of Agricultural and Food Research 46: 1-13.

Şanlı İ. 2010. Impacts of Animal Husbandry Projects Launched by (MARA) Ministry of Agriculture and Rural Affairs on Organization of Cooperatives and Its Stakeholders. Master Thesis, Graduate School of Natural and Applied Sciences, Gaziosmanpasa University, Tokat, Turkey.

Stok JH, Watson MW. 2007. Introduction to Econometrics. Peareson Addions Wesley. Boston. USA.

TURKSTAT, 2015. Turkish Statistical Institute. Livestock statistics. Available from: http://www.tuik.gov.tr [Accessed 12 Octoter 2015].

TURKSTAT, 2016. Turkish Statistical Institute. Agricultural holding structure statictics. Available from: http://www.tuik.gov.tr/VeriBilgi.do?alt_id=1003 [Accessed 20 June 2016).

Viaggi D. 2011. Approaches to research in support to agricultural policy: The experience of the CAP-IRE Project. Acta Scientiarum Polonorum Oeconomia 10(2): 83-94

Weber JG, Key N. 2012. How much do decoupled payments affect production? An instrumental variable approach with panel data. American Journal of Agricultural Economics, 94: 52-66. doi: https://doi.org/10.1093/ajae/aar134.

Wise TA. 2004. The Paradox of Agricultural Subsidies: Measurement Issues. Agricultural Dumping and Policy Reform; Global Development and Environment Institute. Tufts University: Somerville. MA. USA.