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Factors Effective on Farmer Satisfaction for the Forage Crops Supports and the Tendency to Continue Forage Crop Production (TRA-1)

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A B S T R A C T

In this study, it was aimed to determine the support satisfaction of forage crops producers who benefit from forage crops supports and the factors that are effective in continuing forage crops agriculture. A face-to-face survey was conducted with 196 farmers identified by simple random sampling method in TRA-1. Descriptive statistical methods and binary logistic regression model were used to analyse the data.

According to the results obtained in the study; It was determined that the farmers benefiting from forage crop support were on average 46 years old and 30.6% were high school graduates, 35.2% had non-agricultural income and 17.3% had social security. It was determined that 55.1% of the farms engaged in livestock and plant production together, the average land size owned was 9.2 hectares. Alfalfa (21.295 hectares) is mostly grown as a forage crop on farms. There are an average of 14 cattle and 10 sheep per farms. It was found that 60% of the farmers were not satisfied with the support, 22.4% of them grew forage crop to benefit from the support, and approximately 59% of them tended to continue forage crop farming despite being dissatisfied. In the study, the satisfaction state of forage crop producers forage crops supports and the factors affecting their continuation of forage crop agriculture were analysed separately using the logit model has been analysed. As a result of the logit model, producers' satisfaction with the supports is increasing by the insufficient pasture areas and low costs state. In addition, the high productivity of forage crops, the presence of livestock on the farm and the sufficient support amount also increase satisfaction state. Factors affecting the tendency to continue forage crop farming are determined as high level of education, lack of migration tendency, lack of alternative products, insufficient pasture areas, experience and lack of non-agricultural income.

In this context, studies should be carried out to increase the ratio of forage crop cultivation areas in the total field area in forage crop agriculture, whose sustainability will be ensured with supports, and it is recommended to provide gradual supports in parallel with the increasing cultivation area, production amount or number of animals.

1. Introduction

The TRA-1 sub-region, located in the Eastern Anatolia Region, whose economy is based on animal husbandry, suitable for animal husbandry due to its topographic and ecological features. Livestock farming is based on forage crop cultivation and pasture feeding. In the region covering 38% of our country's pastures, water erosion and stony problems restrict pasture use,

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especially in the provinces of Ağrı, Artvin, Erzincan, Erzurum and Kars. Existing pasture areas in the region have decreased due to many reasons, falling from 9 million hectares to 4 million hectares. In particular, there is excessive and misuse of pastures as well as mismanagement. For these reasons, the productivity and quality of existing pastures have decreased significantly. Although the difficulties in grazing meadows and pastures according to management rules and the lack of pasture maintenance cause their productivity to decrease (Yolcu & Tan, 2008), the changing animal profile with both support and breeding studies necessitates the necessity of feeding the animals in a closed environment (barn/pen). Considering that animals should be fed 2.5% of dry grass or 10% of green grass of their live weight daily (Çeri & Acar, 2019), it seems that the production of forage crops is inevitable and will be the most effective way to provide feed to animals (Yavuz et al., 2020). In addition, it is predicted that the deficit of quality roughage will change especially with global climate change, pasture improvement studies, and changes in animal breeds and numbers (TAGEM, 2022). Although it is envisaged to increase the forage crop cultivation areas in the five-year development plans made in our country, efforts to achieve this goal are still continuing. According to Turkish Statistical Institution data for 2024; At TRA-1 NUTS II Region (Erzurum, Erzincan, Bayburt) level alfalfa, oats, sainfoin, silage corn and vetch are the forage crops that are preferred to be cultivated. Alfalfa is the most cultivated forage crop with an area of 68.340 hectares (Figure 1).

There has been a decrease in the area cultivated in forage crops and a major change in the types of forage crops cultivated. Especially annual plants have started to be cultivated as forage crops. Among the forage crops preferred to be cultivated in all three provinces, alfalfa has the priority (Figure 2).

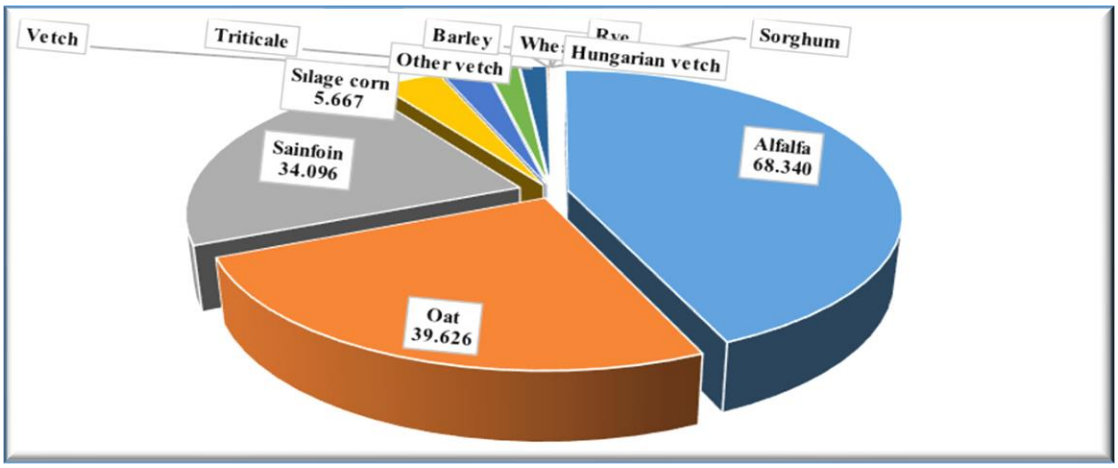

Figure 1. Forage crops cultivated areas (hectares) in TRA-1 subregion in 2023 (TUIK, 2024)

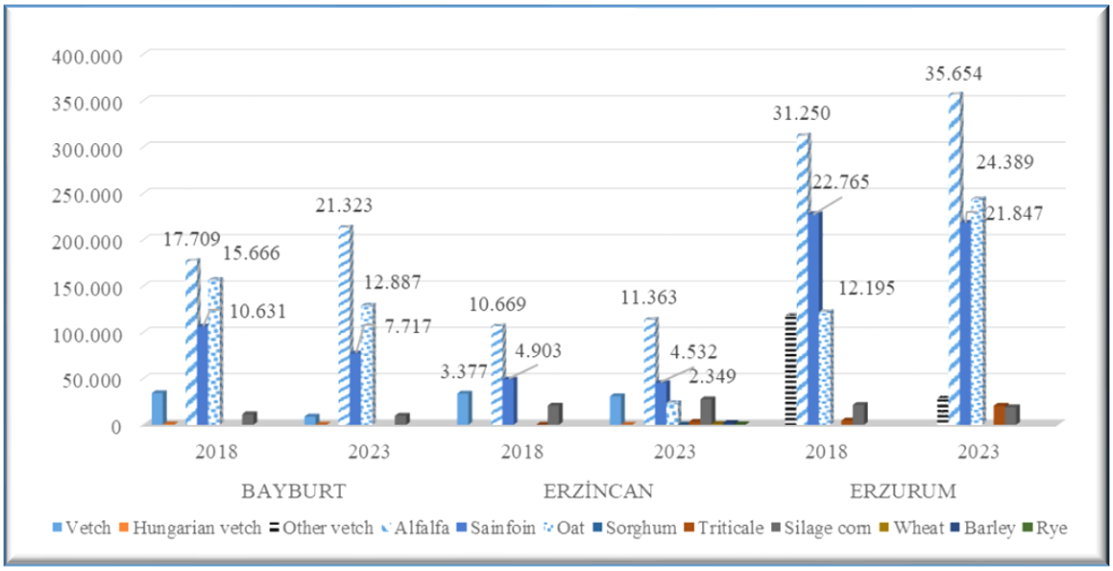

Figure 2. Changes in the amount of cultivated area (hectares) of forage crops producing green grass between 2018 and 2023 (TUIK, 2024)

In this context, studies to support forage crop production started in 2000 (Şahin & Yılmaz, 2008). According to the data of the General Directorate of Plant Production (BUGEM); In 2000, the forage crops cultivation area was approximately 54 thousand ha and the support amount was 2.4 million TL. In 2022, the area cultivated with forage crops was 950.285 ha, the amount of support given was 733.6 m TL, and the number of farmers benefiting from the support was 238.093 (Table 1). The total area where forage crops are cultivated in our country is 2.752.838 hectares. Farmers benefit from support with forage crops cultivated in approximately 35 hectares of the total area. When examined in five-year periods, it is seen that the number of farmers and the amount of cultivated area do not increase regularly. It is seen that there are increases and decreases in the number of farmers and the amount of cultivated area, especially with the effect of the studies on including different forage crops within the scope of support and regulating the conditions of support (Table 1). Within these reasons; adequate improvements in meadows and pastures ıf this cannot be achieved, it is very important to consider and organize support policies to continue the production of forage crops or to start forage crop farming and to increase the production of forage crops.

Table 1. Changes in forage crop cultivation area, number of farmers receiving support and support amount over the years (BUGEM, 2024)

			Forage crops cultivated area (ha)								
Years	No. of farmers	Support amount million (TL)	Alfalfa	Sainfoin	Vetch	Other annual forage crops	Artificial grass pasture	Silage corn	Other silage forage crops	Other perennial forage crops	Total
2000	10.741	2.4	4.325	1.723	6.320	4.556	9	36.923			53.855
2005	209.288	280.9	59.845	21.197	194.811	42.430	45	135.745			454.073
2010	189.277	252.9	51.084	28.377	291.596	32.075	124	156.706	4313		564.278
2015	157.204	343.0	36.658	22.794	223.647	20.874	1265	216.609	3885		527.732
2020	259.561	820.8	223.216	62.259	140.290	32.5313	1442	305.424	1812	16.3	1.059.772
2022	238.093	733.6	217.491	52.281	110.594	310.023	1411	256.980	1489	16	950.285

For this reason, within the scope of forage crop agriculture and the supports provided, the factors affecting the approach of forage crop producers should be addressed, the cultivation of forage crops should be encouraged, and the factors affecting forage crop supports should be revealed. In order for the studies to be carried out to increase the production of forage crops to be successful and to take precautions, it is necessary to determine why and how the supports should be given. For this reason, this study aims to discuss the factors affecting the approach of forage crop producers within the scope of forage crop cultivation and the supports provided, and to reveal the factors that are effective in promoting or sustaining forage crop cultivation.

2. Materials and Methods

Primary study data were collected from the farms benefitting forage crop support as the previous studies and the relevant records of the institutes in the study area constituted the secondary data. The following formula of the simple random sampling method, developed for finite populations, was used to determine the sample size (Çiçek & Erkan, 1996). The records provided by the Provincial Directorates of Agriculture and Forestry were used to determine the farms examined in the study. Farmers who benefit from forage crop support constitute the sampling frame.

$$n = \frac{N.\sigma^2.z^2}{(N-1).d^2 + \sigma^2.z^2} \quad (1)$$

In the formula;
n: Sample size
σ^2: Population variance
N: Population size (14.750)
z: Critical z-score at the 90% confidence interval (1.65)
d: Shows the acceptable error as a percentage of the average

When calculating the sample size, a 90% confidence limit and a margin of error of 10% of the population average were used, and the sample size (n) was determined as 196. Study data was obtained through face-to-face surveys with forage crop producers benefiting from forage crop support in purposively selected districts and villages (8 districts, 24 villages) in Erzincan, Erzurum and Bayburt provinces in 2019 years. The data obtained from surveys were transferred to Excel

2013 computer program. The percentage values were obtained by using frequency analysis in descriptive statistical method. The statistical package SPSS 26.0 (IBM Corp, released 2019) was used in the analysis of the data.

Factors affecting forage crop producers' satisfaction with the support and their ability to continue forage crop farming were determined using Binary Logistic Regression. Binary Logistic Regression Analysis is a logistic regression method applied when the dependent variable has two categories. While coding the data, the code 0 is used for no and 1 is used for yes. It is an analysis method that allows the statistical significance of each explanatory variable as a risk factor to be evaluated and the estimated risk factor (odds ratio) to be calculated (Kılıç, 2015). Logistic regression function; returns only values between 0 and 1 for the dependent variable, regardless of the values of the independent variable. Logistic regression predicts the value of the dependent variable with this formula.

$$f(x) = \frac{1}{1 + e^{-x}} \quad (2)$$

The first step in logistic regression is the "initial model" created to compare the development or improvement in model fit. The second step in logistic regression is the estimation of the intended model. This model is a regression model that includes explanatory variables. Here, it is expected that there will be an improvement in fit with the introduction of explanatory variables into the analysis after the initial model. The explanatory nature of the model is evaluated with Cox&Snell or Nagelkerke R^2 values. It is interpreted that the closer these values are to 1, the better the model. The Hosmer and Lemeshow test also gives information about whether this model is a good model or not. In order to express that the fit of the model is sufficient, it is desired that the "p" value be greater than 0.05. The variables, definitions and codes included in the logit regression models are given in the Table 2. The logit models established in the study are specified in the formulas below:

$Y1= \beta0 + \beta1X1+ \beta2X5 + \beta3X13 + \beta4X14 + \beta5X15+ \beta6X6 + \beta3X8 + \beta4X11 + \beta5X12+ \beta6X16 + \epsilon$

$Y2= \beta0 + \beta1X1+ \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5+ \beta6X6 + \beta7X7 + \beta8X8 + \beta9X9 + \beta9X10 + \beta9X11+ \beta9X12 + \epsilon$

Table 2. Variables, codes and other terms used in the logistic regression formula

In the first model	**In the second model**
Y1: Satisfaction with forage crops support or not	Y2: whether they want to continue forage crops farming
β's: regression parameters ϵ indicates the error term	β's: regression parameters ϵ indicates the error term
Independent variables	**Codes**
X1: Age of the producer 1- 18-35 2- 36-55 3- 56-65 4- 66+	AGE
X2: Education status of the farmers 1- Literate 2- Primary school 3- Secondery school 4-High school 5- University	EDUCATION
X3: Whether there is a tendency to migrate 0- doesn't want 1- want	MIGRATION
X4: Whether there are alternative products 0- no 1-yes	ALTERNATIVE CROP
X5: Whether the pasture is sufficient 0- sufficient 1- insufficient	SUFFICIENT PASTURE
X6: Whether the cost of producing forage crops is high	COST
X7: Whether the land is suitable for the cultivation of forage crops or not 0- not suitable 1- suitable	SUITABLE LAND
X8: Whether there is animal husbandry in the farm 0-no 1- yes	FARM TYPE
X9: Whether the climate is suitable for forage crops cultivation 0- not suitable 1- suitable	SUITABLE CLIMATE
X10: Whether the workforce is sufficient 0- sufficient 1- insufficient	SUFFICIENT LABOR
X11: Whether the producer is experienced or not 0- sufficient 1- insufficient	EXPERIENCE
X12: Whether there is non-agricultural income 0- sufficient 1- insufficient	NON-AGRICULTURAL INCOME
X13: Whether the yield of forage crops is high 0- low 1- high	YIELD OF FORAGE CROPS
X14: Whether there is membership in agricultural organizations 0- not member 1- member	MEMBERSHIP IN AGRICULTURAL ORGANIZATIONS
X15: indicates whether there is a marketing problem 0- no 1- yes	MARKETING PROBLEM
X16: indicates whether the forage crops support amount given is sufficient 0- sufficient 1- insufficient	SUFFICIENT SUPPORT AMOUNT

3. Results and Discussion

When the demographic characteristics of the producers benefiting from forage crop support are examined; It is seen that the average age of the producers is 46 years old and 57% of them are between the ages of 36-55. 33.7% of the farmers benefiting from forage crop support are primary school graduates and 30.6% are high school graduates (Figure 3).

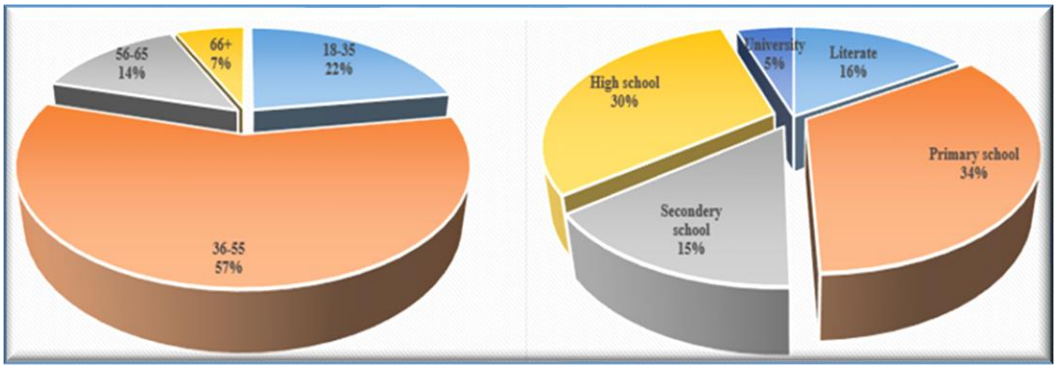

Figure 3. Age and educational status of forage crop producers

The average household size is four people, with a minimum of 1 and a maximum of 8 people. 55.1% of the farms carry out livestock and plant production together. It was determined that 35.2% had non-agricultural income and 17.3% had social assurance (security) (Table 3).

The average of the cultivated areas where producers produce forage crops is 9.2 hectares. The largest land is 75 hectares in size and the smallest land is one hectares. 35.4% of the farmers in Bayburt, 29.5% in Erzincan and 20.2% in Erzurum grow forage crops in the range of 1-2 hectares. 47% of producers grow forage crops on 80% or even all of their property lands. Producers cultivate alfalfa, sainfoin, oats, vetch and silage corn plants respectively and receive support from those crops. (Figure 4).

The farms dealing with both livestock and plant production constitute 55.1 of all respondent farms as the rest engages with only forage crop production. The rate of farms producing only forage crops is 44.9%. In livestock farming farms, mostly cattle are raised (Table 4). 64% of the farmers engage in both cattle and sheep farming. There are an average of 14 cattle and 10 sheep per farm.

In general, farmers who want to benefit from forage crop support apply with the Forage Crops Support Agricultural Land Declaration Form before harvesting the forage crop, and the total forage acreage to be evaluated within the scope of support must be at least one hectare. In addition, as a result of the harvest control, the part of the applicant's relevant parcels of vegetation should not be less than one hectare. In this context, although all producers in the study area benefit from supports, benefiting from supports is ranked first as the primary reason for the production of forage crops.

Table 3. Some demographic characteristics of forage crop producers

Membership to agricultural organizations	**Choices**	**Percentage**
Yes	120	61.2
No	76	38.8
Production type in farm		
Livestock and crop production	108	55.1
Crop production	88	44.9
Non-farmıng ıncome		
Yes	69	35.2
No	127	64.8
Social assurance		
Yes	34	17.3
No	162	82.7
Number of households		
Less than 4	103	52.6
4	47	24.0
More than 4	46	23.5

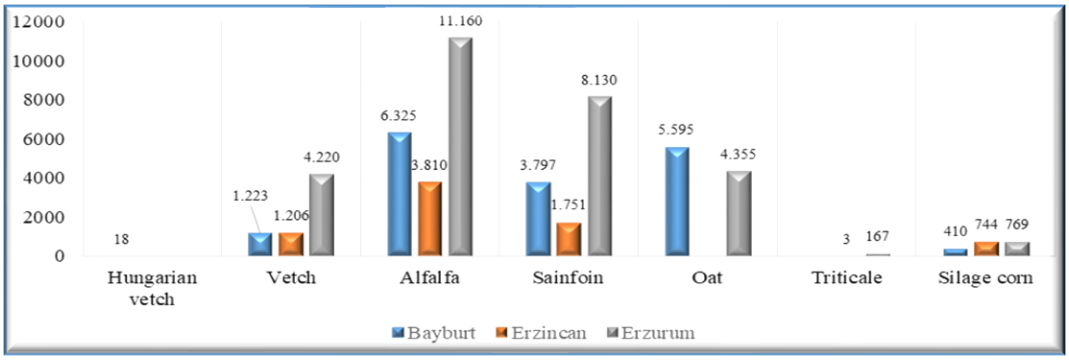

Figure 4. Forage crops cultivated in the study area (hectares)

Table 4. Some statistical data of farm and farmers

	Age of farmers	No. of house houlds	Forage crops area sown	Sheep in farm	Cattle in farm
N/ Total	196	196	196	142	179
Mean	45.9	3.47	91.5	9.95	14.25
Mod	40	2	10.0	20	2
Std. Sapma	12.9	1.49	113.6	43.7	17.3
Minimum	18	1	10,0	20	2
Maximum	80	8	750.0	300	122

The purpose of forage crops supports is to increase production, and it has been determined in this and similar studies that the aim has been achieved (Cevher et al., 2012; Ağırbaş et al., 2017). In our study; When asked about the reason for growing forage crops, 22.4% stated that they produced forage crops to benefit from supports, 21.4% stated that they produced forage crops to meet the needs of their own animals, and 18% stated that they produced forage crops because there was no market problem in forage crops (Figure 5a). Özsaglıcak & Yanar (2021) determined that 74.8% of the cattle breeding farms in Erzincan province produce forage crops, and Aşkan & Dağdemir (2016) determined in their study in the provinces of Erzurum, Erzincan and Bayburt in the TRA1 region that 82.42% of the farms produce forage crops. The absence of a market problem means that livestock is raised and used to meet the needs of one's own animals or sold to neighbours. The reason for the production of forage crops based on need is due to the fact that businesses have to carry out small-scale production (Yıldırım et al., 2001).

Although the majority of farmers stated that they were not satisfied with the support; 40% of farmers are satisfied with the support; 29.4% stated that forage plant cultivation areas increased, 19.6% stated that grass production increased and 5.2% stated that they started growing different forage crops (Figure 5b). As a result, it seems that the purpose of providing forage crops support has been achieved. The supports have led to an increase in the area planted with forage crops and forage production, and have also led to changes in farmers' cropping patterns. Similar studies have also shown that forage crop support causes the structuring of supports and the regulation of policies to be shaped according to producer requests (Balabanlı et al., 2016; Ağırbaş et al., 2017). For these reasons, the prominent factors in revealing satisfaction with supports help support policies and contribute to the literature.

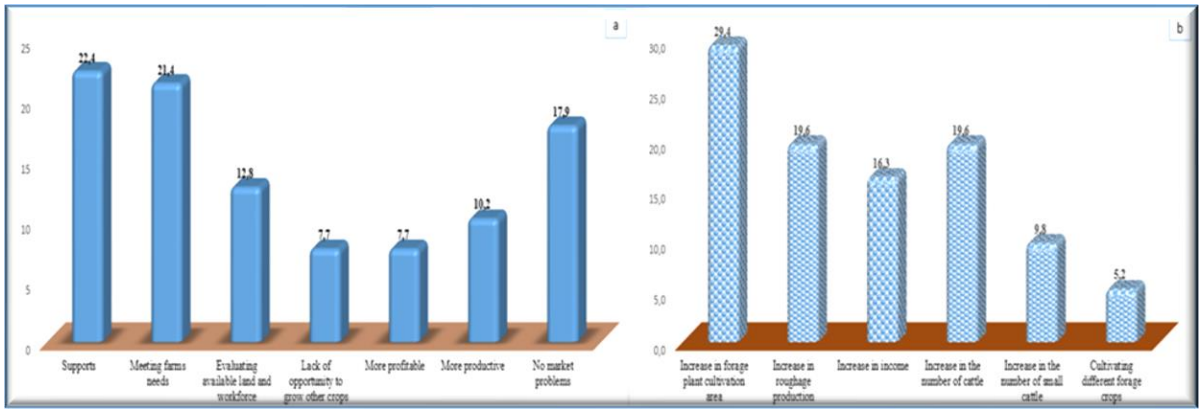

Figure 5. Reasons why forage crop producers prefer forage crops

Farmers stated that they encountered many problems in forage crop farming and that they had expectations to solve these problems. Forage crop producers in the study area; reducing the costs of seeds, fertilizers, pesticides and irrigation, especially diesel fuel, continuing the support for forage crops and certified seeds, and increasing the amount of support, increasing education and publishing activities, expanding the use of certified seeds, and states that forage crop species suitable for the region should have been produced. The problems faced by farmers in the study area similar with some studies conducted in Van and Ankara (Yavuz & Ceylan, 2005; Şahin & Yılmaz, 2008). Farmers; It has been stated that there are problems in irrigation, certified seeds, marketing, family labor shortage and equipment inadequacy in the cultivation of forage crops.

Analysis results for binary logit regression model (factors affecting the satisfaction levels of forage crop supports in forage crop agriculture)

When the satisfaction levels of supports in forage crop agriculture are examined with the logistic regression model; The model has been found to fit the data (Chi-square=124.455 $p \leq 0,01$). When R^2 values, which mean the percentage of explanation of the dependent variable by the independent variables, are examined; Cox&Snell R^2 value was calculated as 0.470 and Nagelkerke R^2 value was calculated as 0.636. Accordingly, it is determined that 47% and 63.6% of the variability on the dependent variable is explained by the independent variables considered within the scope of the study, respectively. The fact that this value is above 50% indicates that it is considered very important (Çokluk et al., 2021). Since the significance level in the Hosmer and Lemeshow test is $0.823 \geq 0.05$, it can be seen that the predictions of the model do not differ from the observations and the model fit is very good (Hosmer et al., 2013).

Approximately 40% of producers stated that they were satisfied with the supports. There is a negative and significant relationship between producers' finding the pasture areas inadequate, their low input costs for forage crops, and their satisfaction with the support. In other words, decreases in these factors increase their satisfaction. Among the factors that positively affect satisfaction, high yields from forage crops and livestock farming in the business indicate a significant relationship at 1% significance level, while the support amount being sufficient indicates a significant relationship at 5% significance level (Table 5).

Table 5. Logistic regression analysis results of factors affecting satisfaction with forage crop support

VARIABLES	B	S.E.	Wald	P value	Exp(B)
AGE	0.032	0.282	0,013	0.909	1.033
SUFFICIENT PASTURE	-1.125	0.572	3.861	0.049**	0.325
YIELD OF FORAGE CROPS	2.928	0.631	21.546	0.000***	18.691
MEMBERSHIP IN AGRICULTURAL ORGANIZATIONS	-0.217	0.594	0.134	0.714	0.805
MARKETING PROBLEM	-0.125	0.592	0.044	0.833	0.883
COST	-1.132	0.672	2.836	0.092*	0.322
FARM TYPE	1.626	0.542	9.013	0.003***	5.084
EXPERIENCE	-0.476	0.771	0.382	0.537	0.621
NON-AGRICULTURAL INCOME	0.61	0.655	0.866	0.352	1.84
SUFFICIENT SUPPORT AMOUNT	1.549	0.678	5.216	0.022**	4.709
CONSTANT	0.661	2.007	0.109	0.742	1.937

P value is significant at *0.10,**0.05,***0.01 level.

When the odd ratios of the coefficients of the model are interpreted (the odds ratio for negatively significant variables was calculated by correcting according to Tüzüntürk, 2007; Karabaş & Gürler, 2012); support from producers; It can be said that it will increase 3.08 times as long as the pastures are insufficient, it will increase 3.10 times with a unit decrease in cost, 18.6 times with a one unit increase in the yield of forage crops, 5.08 times with livestock on the farm, and 4.70 times with sufficient support amount.

The most important factors that determine producers' satisfaction with the support are the high yield from forage crops and the low cost. This is linked to the fact that producers prefer high-yield varieties, especially in recent years. They reduce the cost by using inputs more efficiently and in more appropriate amounts, and as a result, they find the amount of support received sufficient. On the other hand, due to insufficient or weak pasture areas, the need for roughage in livestock farms is high, especially in the months when the animals

need to be fed indoors, and they turn to forage crop agriculture. While similar results were obtained in other studies conducted with forage plant supports (Balabanlı et al., 2016; Aksu & Dellal, 2016), in another study, the amount of forage plant support was found to be insufficient (Erdal et al., 2013).

Analysis results for binary logit regression model (factors affecting the sustainability of forage crops cultivation)

The rate of farmers stating that they will continue cultivating forage crops was found to be 59%. In the binary logistic regression model designed to determine the factors affecting farmers' desire to continue producing forage crops; The significance value of the model is 0.000, and since this value is less than 0.05, the model was found to be suitable for the data. Cox&Snell R^2 value is 0.661, Nagelkerke R^2 value is 0.890. Since the Nagelkerke R^2 value is greater than the Cox&Snell R^2 value, it was seen that 89% of the variance in the dependent variable of the Nagelkerke R^2 value was due to explanatory variables. Therefore, the representative power of the R^2 criteria used in logistic regression models can be described as good. The fact that these values are above 50% indicates that it is very important. In the Hosmer and Lemeshow test, it was concluded that the model fit was good since 0.529≥0.05 (Hosmer et al., 2013). When the statistical significance levels of the variables related to the most appropriate logit regression model were examined, migration and pasture adequacy were found to be significant at the 1% level, while education, alternative products, experience were found to be significant at the 5% level and non-agricultural income was found to be significant at the 10% level. When the odds ratios of the coefficients of the model given in Table 6 are interpreted; As producers become less likely to migrate, the probability of continuing forage crop production will increase by 28.57 times, the possibility of continuing forage crop production will increase 1.000 times due to insufficient pastures, one unit increase in education level will increase the probability of continuing forage crop production by 2.186 times, as the alternative crop decreases, the probability of producing forage crops will be 12.66 (adjusted odds ratio) times higher than the probability of not producing forage crops, one unit increase in the experience variable in forage crops will increase sustainability in forage crops by 19.36 times, it was determined that as non-agricultural income decreases, the probability of sustaining forage crop production will increase by 8.62 times.

Table 6. Logistic regression analysis results for factors affecting the tendency to continue cultivated forage crops

VARIABLES	B	S.E.	Wald	P value	Exp(B)
AGE	-0.206	0.546	0.142	0.706	0.814
EDUCATION	0.782	0.404	3.745	0.053**	2.186
MIGRATION	-3.339	1.197	7.78	0.005***	0.035
ALTERNATIVE CROP	-2.542	1.337	3.613	0.057**	0.079
SUFFICIENT PASTURE	-7.187	1.403	26.228	0.000***	0.001
COST	0.243	0.856	0.081	0.777	1.275
SUITABLE LAND	0.776	0.981	0.626	0.429	2.172
FARM TYPE	1.873	1.222	2.35	0.125	6.509
SUITABLE CLIMATE	-0.742	1.723	0.185	0.667	0.476
SUFFICIENT LABOR	0.782	2.272	0.119	0.731	2.187
EXPERIENCE	2.964	1.454	4.157	0.041**	19.383
NON-AGRICULTURAL INCOME	-2.152	1.176	3.352	0.067*	0.116
CONSTANT	2,832	2.797	1.026	0.311	16.985

P value is significant at *0.10,**0.05,***0.01 level.

The main factors that affect them in continuing to cultivate forage crops are the lack of desire to migrate and therefore the need to continue living in the village and the insufficient pasture areas (p ≤0.01). Other factors include the farmer's good education level and experience in forage crop farming, not having a non-agricultural income, and not having an alternative product to grow (Table 6). Farmers choosing their villages as their living space and accepting agriculture as their primary source of income in the area where they will continue their lives makes their agricultural activities more efficient and sustainable. As a matter of fact, the lack of non-agricultural income was found to be another factor. It is seen that the farmers' high education levels (most farmers are high school graduates) and their experience in forage crop agriculture are also effective in their continued forage crop farming. In a study conducted in Konya; They determined that forage

crop farming will be more successful in farms where producers are young, have good education levels and experience, and also where animal husbandry and crop production are carried out together (Karadavut et al., 2011). Additionally, farmers' livestock farming and pasture lands being scarce and insufficient for animal feeding have also been identified as important factors. For many producers, the lack of pasture areas or poor pastures is an important criterion for them to turn to or continue planting forage crops. Again, although the factors of land being suitable for forage crop cultivation due to topographic, ecological and meteorological factors are not considered important in the model, it emerges as an important criterion with the factor of lack of alternative products. In similar studies, it is seen that the factors that are effective in the sustainability of forage crop agriculture are almost similar (Karadavut et al., 2011; Yavuz et al., 2016).

4. Conclusions and Recommendations

Promotion and dissemination of forage crop production in Turkey and especially in the research region is of great importance in the region with an economy based on animal husbandry. Revealing the opinions and tendencies of producers will contribute to other studies and policies.

In the study, whether forage crop producers in the TRA-1 region are satisfied with the support, the factors affecting their satisfaction levels and the factors affecting their tendency to continue forage crop farming were examined. Research data; It was obtained by conducting a survey with 196 producers who benefit from forage crop support, determined by simple random sampling method. According to the data obtained, approximately 57% of the participants were in the 36-55 age group. 35% had high school education or above, 35.2% have non-agricultural income and 17.3% have social security, farms cultivate forage crops on an average area of 9.2 hectares; it was determined that these were alfalfa, sainfoin, oats, vetch and silage corn, respectively. In the research, it was noted that approximately 40% of the farmers were satisfied with the support they received and 60% were inclined and willing to continue the production of forage crops.

According to regression analysis results; Factors that positively affect satisfaction with the support given to forage crops: High productivity in forage crops, Livestock farming is carried out in the farms, and the amount of support provided is deemed sufficient. In farms; Producers have high levels of education and experience, Farmers have no tendency to migrate, Lack of alternative crop options to grow, and lack of non-agricultural income affect their willingness to continue cultivating forage crops. It is thought that through research on forage crop supports, as in this research, guiding results can be obtained regarding the production, marketing and policies of forage crops.

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References

Ağırbaş, N. C., Sapmaz, K., & Koç, A. (2017). The effects of agricultural supports on forage crops of cultivation area and amount of production in Eskişehir Province. *Atatürk University Journal of the Agricultural Faculty*, 48(1), 65-72.

Aksu, N., & Dellal, İ. (2016). An Evaluation for Afyonkarahisar province on relationship of feed crops subsidy with bovine livestock activities. *YYU Journal of Agricultural Sciences*, 26(1), 52-60.

Aşkan, E., & Dağdemir, V. (2016). Analysis of the factors affecting the production rates of dairy livestock facilities benefitting from governmental financial supports and incentives: The sample of Erzurum, Erzincan, Bayburt Provinces. *The Journal of Agricultural Economics Researches* (JAER), 2(1), 1-12.

Balabanlı, C., Cirit, Y., Kayacan, S., Bıçakçı, E., & Yüksel, O. (2016). Determination of forage crops producer behaviour in agriculture; Example of Isparta province. *Journal of Field Crops Central Research Institute*, 25(Special issue-2), 259-264.

BUGEM, (2024, January 01). General Directorate of Plant Production https://www.tarimorman.gov.tr/BUGEM

Cevher, C., Köksal. Ö., & Ceylan, C. (2012). The effect of agricultural supports on forage crop production and sustainability: Kayseri province example. 10th National Agricultural Economics Congress 5-7 Eylül 2012, Konya.

Çiçek, A., & Erkan, O. (1996). *Research and sampling methods in agricultural economics*

Gaziosmanpaşa University Faculty of Agriculture Publications, No:12 Lecture Notes Series, No:6.

Çeri, S., & Acar, R. (2019). Use of cool climate cereals as green and dry forage in animal feeding. *Journal of Bahri Dagdas Crop Research*, 8(1), 178-194.

Çokluk, Ö., Şekercioğlu, G., & Büyüköztürk, Ş. (2021). *Multivariate statistics for social sciences: Applications of SPSS and Lisrel*. Pegem Akademi Publishing, Ankara. DOI 10.14527/ 9786055885670

Erdal, G., Erdal, H., & Gürkan, M. (2013). An evaluation by farmers on applied agricultural supports in Turkey (Case of Kahramanmaras province). *International Journal of Social and Economic Sciences*, 3 (2): 92 -98. ISSN: 1307-1149, E-ISSN: 2146-0086, www.nobel.gen.tr

Hosmer, D. W., Lemeshow, S., & Sturdivant, R. X. 2013. *Applied logistic regression*, Third Edition., Wiley.

Karabaş S., & Gürler A. Z. (2012). Predicting of the factors affecting consumer behaviour the choice of organic products by logit regression analysis. *Adiyaman University Journal of Social Sciences*, 5(10), 129-156.

Karadavut, U. Genç, A., Palta, Ç., Çarkacı, D. A., & Kökten, K. (2011). Socio-economic structure of meadow plants producers in konya province and determination of success on affecting factors. *Science Journal of Bingöl University*, 1(2), 38-50.

Kılıç, S. (2015). Binary logistic regression analysis. *Journal of Mood Disorders*, 5(4), 191-4.

Özsağlıcak, S., & Yanar, M. (2021). Feed usage and cattle feeding practices in cattle enterprises in the Eastern Anatolia Region: case of central county of Erzincan province. *Journal of Animal Science and Products*, (JASP) 4(2): 136-152.

Şahin, K., & Yılmaz, İ. H. (2008). A Research on forages cultivation, rangeland usage and socio economical structure of Van Province. *The Journal of Agricultural Sciences, Faculty of Agriculture, Ankara University*. 14(4, 414-419. DOI: 10.1501/Tarimbil_0000001060

TAGEM, (2022). Final Report of the Workshop on Evaluation of Forage Crops Production, Current Situation and Measures to be Taken within the Scope of Climate Change. 22-23 March 2022 / Ankara.

TUIK (2024, February 01). Turkish Statistical Institute. Crop production statistics. https://biruni.tuik.gov.tr/medas/?kn=92&locale=tr

Tüzüntürk, S. (2007). Entry of econometrics department graduates into working life: An experimental field study. 8th Turkish Econometrics and Statistics Congress, 24-25 May, Malatya.

Yavuz, G., & Ceylan, İ. Ç. (2005). A research on determination of effective factors on farmers' decision making process in forage crops production in Polatlı district. *Journal of Agricultural Sciences*, 11(2), 133-138.

Yavuz, T., Kır, H., & Gül, V. (2020). Evaluation of roughage production potential in Turkey: The case of Kırşehir province. *Turkish Journal of Agricultural Research*, 7(3), 345-352.

Yıldırım, İ. Şahin, K., & Şahin, A. (2001). Marketing of live animals and dairy products in the Van region. Türkiye-Netherlands Livestock and Dairy Farming Symposium. 11-12 Haziran, 2001, TEAE, Ankara.

Yolcu, H., & Tan, M. (2008). General view to Turkey forage crops cultivation. *Journal of Agricultural Sciences*, 14(3), 303-312.