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Full Length Research Paper

The effect of grassland quality and other factors on farm success: The case of Erzurum province

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ABSTRACT: With a special emphasis on the grassland quality, the factors affecting success and effectiveness of the farms were researched in this study. Study area covers Erzurum Province, Türkiye. Villages were purposively selected from those of which grassland quality degrees had been studied previously. Stratified sampling method was employed in determination of the sample size. Data were collected from the randomly selected farmers through face to face interviews resulting in 99 completed questionnaires. Collected data by structured questionnaires were of 2004-2005 production year. In analysis of the data was used correlation analysis. Of the farm success criteria, net product was calculated for every studied farm and relationships between net product and each of farm success factors were investigated. According to the results, it was determined that grassland quality, cattle breed, distance to grassland and stable type had positive and significant correlation with net product as stocking rate and existence of small ruminant herd in the village was significant and negatively correlated with net product. It was concluded that more robust and long-term studies should be conducted using a wider variation in grassland quality, in order to confirm the study findings since the present study is the first instance.

Keywords: grassland quality, Erzurum province, Türkiye

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Introduction

Natural vegetations, pastures and meadows, are composed of a wide variety of plant species having different characteristics. Along with their ecological functions, they primarily produce feed for a considerable part of animal kingdom as they preserve the soil and water on the other hand. So they are among the most important natural wealth components (Altun *et al.* 2005; Hopkins & Holz 2006).

Animal production is naturally experienced to be dependent on the natural grasslands in eastern Anatolia which comes first among other regions in Türkiye regarding the size of pasture and meadow assets. Since animal production has an important share in total farm income in the region (Tahtacıoğlu *et al.* 1998; Kara 2000), it is expected that there should be a meaningful relationship between grassland quality and farm income.

In this study, was investigated the relationship between farm success criterion and the factors possibly affecting farm effectiveness in the villages with different grassland quality degrees.

MATERIAL and METHOD

Study material was collected with structured questionnaires from the randomly selected farms. Also, information and records of the public organizations especially Eastern Anatolia Agricultural Research Institute (EAARI) and provincial and district directorates of agriculture were used as secondary material.

In determination of the sample size, the villages of which grassland quality degrees were calculated for a previous study were selected purposively (Anonymous 2006). All farms in these villages were taken as sampling frame. Stratified sampling method was employed in determination of sample size (Çiçek & Erkan 1996) at 90% confidence intervals with an error of 10% of population mean. Face to face farmer interviews resulted in 99 completed questionnaires. Collected data from the farms were of the 2004-2005 production year.

In economic analysis of the farms, calculations for the value of farm products were based on the prices stated by the respondents. Household population was calculated in male labor unit (MLU) (Erkuş & Demirci 1996). Animal asset of the farms were calculated in animal unit (AU) of 500 kg live weight (Anonymous 1998). Net product (NP), an objective criterion to assess the farm success and effectiveness (Erkuş & Demirci 1996; Karagölge 1996), was calculated for each farm by subtraction of operating costs from gross product.

Relationships between NP and the factors were investigated through correlation coefficients (CC). The variables were in nature of quantitative and categorical (dichotomous) characteristics. So, Pearson correlations were calculated for the relationships between two quantitative variables as point biserial correlations were estimated for one dichotomous and one quantitative variable (Yaffee 2003).

Findings and Discussion

Correlation analysis results were given in Table 1 and 2. According to the results it was revealed that significant and positive relationships were determined between net product and grassland quality ($p < 0,01$). This suggests that the higher the grassland quality the more the farm income. Similar relation was found between net product and number of cattle as net product significantly and negatively correlated with number of labour ($p < 0,05$). This can be explained by the high idle labour in the study area (Kara 2000; Peker 1997).

No meaningful relationship was determined between forage acreage and net product as total acreage and farmer age were insignificantly correlated. Contrary to the expectations due to that energy consumption increases by the longer distances to walk (Spörndly & Wredle 2004), a positive relationship was observed between net product and distance to grassland even though not significant. This can be explained by higher deteriorations in the closer parts of the grasslands because of early grazing in the spring (Sürmen 2004). Stocking rate was negatively correlated to net product as expected.

Table 1. Correlation coefficients for continuous variables

Net Product	Pearson Correlation	Significance
Grassland quality (%)	0,38	**
No of cattle (AU)	0,25	*
No of sheep (AU)	-0,19	ns
No of labour (MLU)	-0,22	*
Forage acreage (ha)	0,00	ns
Total acreage (ha)	-0,09	ns
Farmer age (year)	-0,16	ns
Distance to grassland (m)	0,13	ns
Stocking rate (AU/ha)	-0,1	ns

** Significant at 1% confidence level; * significant at 5% confidence level; ns: not significant

On the other hand, only crossbreed cattle were significantly correlated to net product. Conforming to the literature reportings (Lockheed *et al.* 1980) net product was negatively correlated to lack of farmer education as this relationship was positive to the status of primary and higher education level even though not significant. It is simply because that farmer himself is the locomotive of the farm activities, and farm success suggests the success of farmer (Ansaloni 1995).

Moreover, negative and significant correlation coefficient was calculated between net product and the status of small ruminant herd existence in the village ($p < 0,01$) since the damage of trampling is more severe in sheep than in cattle (Gökkuş & Koç 2001; Laycook & Harniss 1974).

As reported in previous studies that housing conditions should be enhanced to cover basic behavioral and physiological needs of farm animals for better performance (Hristov *et al.* 2008; Sabuncuoğlu *et al.* 2007). stable type and net product were found positively correlated to each other in this study which may be better understood remembering about 150 kg live weight gain difference reported by (Özlütürk *et al.* 2002) for 15 months of age calves having the same genetic traits obtained and reared in bad and relatively good conditions simultaneously.

Table 2. Correlation coefficients calculated for one continuous and one dichotomous variable

	Net Product	Point Biserial Correlation	Significance
Farmer Education Level	Illiterate (1=illiterate, 0=others)	-0,11	ns
	Literate (1=literate, 0=others)	-0,07	ns
	Primary school (1=primary, 0=others)	0,05	ns
	Secondary school (1=secondary, 0=others)	0,13	ns
Cattle Breed	Local breed (1=local, 0=others)	-0,06	ns
	Crossbreed (1=crossbreed, 0=others)	0,28	**
	Purebreed (1=pure, 0=others)	0,03	ns
	Existence of small ruminant herd in the village (1=exist, 0=not)	-0,31	**
	Stable type (1=modern, 0=traditional)	0,31	**

** Significant at 1% confidence level; * significant at 5% confidence level; ns: not significant

According to the results, it was concluded that grassland improvement and management studies should be given the first priority. Grazing pressure and early grazing should be prevented and rotational grazing systems should be introduced and put into action for sustainable benefits. Also, it is required that the change in grassland quality by improvement studies be researched along with the impact assessment and monitoring studies for better evaluations. Moreover, animal housing conditions should be enhanced for better animal welfare standards and higher farm income.

In present study, grassland quality and farm success relationship was studied with a somewhat narrow range of variation (30,8-52,1%). So, more robust and long-term studies should be conducted using a wider variation in grassland quality, in order to confirm the study findings since the present study is the first instance.

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