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The mountainous pastoral livestock farming in Tzoumerka, Epirus: The economic dimension of activity and the sustainable management of pasturelands

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Abstract. The aim of this paper is to depict the structural characteristics of livestock farms in the area of the Pindos Mountain. A questionnaire survey held in June 2013 was used to examine 75 out of a total of 441 heads of livestock farms, mainly pastoral, in order to identify their attitudes and perceptions about their income, professional satisfaction, as well as their practices that ensure the sustainability of mountainous pasturelands. The results show that most of the farmers are not satisfied by the subsidies they receive through the Common Agricultural Policy; even more, they are not familiar with the regulatory requirements of the cross compliance, while the majority of them believe that the current payment system (decoupling) is not fair and is not conducive to livestock farming. Thus, they seem to be dissatisfied with their income. Finally, the participants claim that they are not satisfied with the low forage production as a result of overgrazing of mountainous pasturelands. Moreover, they are willing to pay a higher rent for the pasturelands in case of improved technical infrastructure and increased forage production.

Keywords. Pastoral farmers – Mountainous and sub-alpine pasturelands – Cross compliance – Overgrazing.

Le système d'élevage montagneux pastoral de Tzoumerka, Épire: La dimension économique de l'activité et la gestion durable des pâturages

Résumé. *Le but de cet article est de décrire les caractéristiques structurelles des exploitations d'élevage dans la chaîne de montagnes du Pinde. Cet article utilise une enquête par questionnaires, qui a eu lieu en juin 2013, pour examiner 75 sur un total de 441 éleveurs, essentiellement pastoraux, pour identifier leurs attitudes et perceptions concernant leurs revenus, leur satisfaction professionnelle, ainsi que leurs pratiques assurant la durabilité des pâturages mantagneux. Les résultats démontrent que la plupart des producteurs ne sont pas satisfaits par les paiements qu'ils reçoivent à travers la Politique Agricole Commune; en plus ils sont encore moins familiers avec les exigences réglementaires de l'écoconditionnalité, alors que la majorité estime que le système de paiements actuel (découplage) n'est ni juste ni propice à l'élevage. Ainsi, ils semblent ne pas être satisfaits de leur revenu. Enfin, les participants affirment qu'ils ne sont pas satisfaits de la faible production de fourrage à la suite de la surutilisation des pâturages montagneux. En outre, ils sont prêts à payer un loyer plus élevé pour les pâturages si l'infrastructure technique est améliorée et la production de fourrage est augmentée.*

Mots-clés. *Éleveurs pastoraux – Pâturages montagneux et sous-alpins – Ecoconditionnalité – Surpâturage.*

I – Introduction

In Epirus, mountainous pasturelands are considered to be important feed resources for pastoral livestock farming (Roukos *et al.*, 2011) and they play a key role both in cost-effective production

of safe animal origin quality products, and for the pastureland sustainability (Chatzitheodoridis *et al.*, 2007; Papachristou *et al.*, 2005). Even when the pasturelands provide vital ecosystem services, it seems that they continue to be abandoned because of limited economic viability and from the unintended consequences of the Common Agricultural Policy (CAP). In this frame, the examination of the work satisfaction and income of livestock farmers constitutes a useful determinant of their overall satisfaction (Kalleberg and Loscocco, 1983). This factor is also associated with farmers' perceptions about the economic and the non-economic rewards of farming (Coughenour and Swanson, 1988). Molnar (1985) affirmed that net farm income is a more important determinant of farmers' satisfaction. According to Flores and Sarandon (2004), farmer's satisfaction is considered an important indicator of sustainability. The purpose of this study is to identify farmers' satisfaction about their income from livestock activities and to record their perceptions on the techniques they apply ensuring the sustainability of mountainous pasturelands in a Greek mountainous area (Tzoumerka - Pindos).

II – Materials and methods

This survey is based on primary data, collected on field with a questionnaire survey in June 2013 among 75 heads of livestock farms in the area of the Pindos mountain range (Fig. 1). In the study area the natural grasslands and the shrublands cover 68.4% of the total area – with a maximum altitude of 2429 m, and are utilized by 441 livestock farms with 68,000 sheep, 5,800 goats, and 3,600 cattle mainly under a pastoralist system. Descriptive statistics were used to illustrate environmental management practices and economic opinions and logistic regression was applied to depict the characteristics that affect farmers' income satisfaction (Field, 2005).

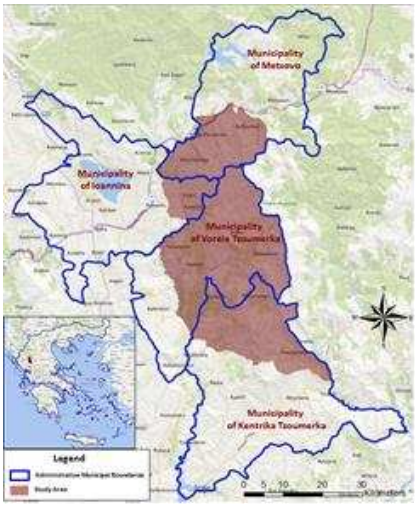

Fig. 1. The study area.

III – Results and discussion

The vast majority (94.7%) of livestock farmers are transhumant (Table 1) utilizing the mountain pastures only for a certain period of the year. In addition, a negative relation between farm size and farmers age was found: the smaller farm size the greater farmer's age and vice versa.

With regard to the EU subsidies, 72% of the respondents stated that their income is not satisfactory even with the subsidies. However, the majority of farmers (81.3%) said that they keep their livestock farm only due to the income they earn. On the other hand, 85.3% of the respondents believe that the financial assistance provided through subsidies is not enough. Additionally, 65.3% of the respondents claimed that the EU subsidies and their requirements affect their farm size and the number of the animals they rear. Subsequently, farmers chose their flock/herd size according to the amount of subsidies. Finally, 78.7% of the participants claimed that without the EU subsidies their farm is not viable (Table 2).

Table 3 presents livestock farmers' perceptions about sustainability management in the examined area. It is important to note that the majority of farmers claim that the pasturelands in the examined mountainous areas are overgrazed without sufficient forage production and, even more, that the existing infrastructure (such as roads, watering places and stabling facilities) is

insufficient. However, farmers are willing to pay higher rents for pastureland in case there are improvements in the aforementioned infrastructure.

Table 1. Farm size, farmers' categories and ages in the examined area

Livestock Units*	Categories	Frequency	Age
	Transhumant farmers	9	65.11
0.1 - 7.50	Permanent farmers	3	73.00
	Sub-group total	***12***	***67.08***
	Transhumant farmers	9	53.67
7.51 - 15.00	Permanent farmers	1	52.00
	Sub-group total	**10**	**53.50**
	Nomads	27	46.26
15.01 - 30.00	Farmers	--	--
	Sub-group total	**27**	**46.26**
	Transhumant farmers	22	41.36
30.01 - 60.00	Permanent farmers	--	--
	Sub-group total	**22**	**41.36**
	Transhumant farmers	4	41.25
60	Permanent farmers	--	--
	Sub-group total	**4**	**41.25**
	Transhumant farmers	71	47.79
Total	Permanent farmers	4	67.75
	Total	**75**	**48.85**

*: 1 Livestock Unit = 6.67 sheep = 1 mature cattle.

Table 2. Farmers' Perceptions about Subsidies and Common Agricultural Policy

	Yes (%)	No (%)
Awareness of the Cross – Compliance scheme	47 (62.7%)	28 (37.3%)
Decoupling is a Fair system	52 (69.3%)	23 (30.7%)
Decoupling promotes livestock faming	16 (21.3%)	59 (78.7%)
Subsidies affect your livestock farm size	26 (34.7%)	49 (65.3%)
The amount of European Union Subsidies is sufficient?	11 (14.7%)	64 (85.3%)
Is your farm viable without EU Subsidies?	16 (21.3%)	59 (78.7%)
Being a livestock farmer depends on EU subsidies	61 (81.3%)	14 (18.7%)

Table 3. Farmers' Perceptions about Pastureland Sustainability Management

	Yes (%)	No (%)
Sufficient Forage production	17 (22.7%)	58 (77.3%)
Mountainous areas are overgrazed	58 (77.3%)	17 (22.7%)
There is sufficient infrastructure	26 (34.7%)	49 (65.3%)
Willingness to pay higher rents for improved infrastructure	70 (93.3%)	5 (6.7%)

The next step in the analysis was to determine the characteristics that formulate farmers' decision to express satisfaction or dissatisfaction with their income. According to Table 4, the estimated model correctly predicts 4 out of 5 cases (with a cut value of 0.45 based on the examination of the ROC curve between the observed and the predicted values for satisfied and dissatisfied farmers). The classification table and the different types of goodness-of-fit measures

suggest that the estimated model adequately fits the data. The statistically significant variables that determine livestock farmers' income satisfaction are presented below:

Livestock Farm Size has a strong impact with the income satisfaction: the largest the farm the more satisfied the livestock farmers are. In general, for the logistic regression results when Exp (B) is more than 1, increasing values of the variable correspond to increasing odds of the event's occurrence. Thus, when farm size is increasing then the probability that a farmer is "satisfied" increases. The farmers' answers on the questions "*Is the amount of European Union Subsidies sufficient?" and "Is your farm viable without European Union Subsidies"* affect positively the income satisfaction. Having in mind the values of Exp (B) which are greater than 1, then an increase in the values of the variable correspond to increasing odds of the event's occurrence. Thus, when come is quite higher than the average then the satisfaction from the income is higher. However, bearing also in mind that the majority of the livestock farmers state that the amount of subsidies is not enough, we can conclude that the livestock farming in the examined area is based largely on European Union subsidies. To summarize, it must be mentioned that it is possible to determine farmers' satisfaction based on: their farm size and their perceptions about the amount of European Union's Subsidies.

Table 4. Logistic regression analysis for the livestock farmers' income satisfaction

Variables (characteristics affecting income satisfaction)	B	S.E.	Wald Statistic	Wald Sig.	Exp(B)
Age	Finally, omitted from the examined model				
Nomadic	Finally, omitted from the examined model				
Stable owner (yes/no)	Finally, omitted from the examined model				
Livestock Farming is a way of living	Finally, omitted from the examined model				
Is your farm viable without EU Subsidies	2.001	0.751	7.097	0.008*	7.397
Livestock Farm Size (in livestock units)	0.772	0.308	6.261	0.000*	2.164
The amount of European Union Subsidies is sufficient enough?	2.048	0.826	6.152	0.013**	7.752
Constant Term	4.144	0.957	18.740	0.000*	0.016

Estimation Method = Forward Stepwise (Likelihood Ratio).
R^2 = 0,216 (Chi2 4,5, df = 8 - Hosmer & Lemeshow), 0.295 (Cox & Snell), 0,426, (Nagelkerke).
Significance: * p<0.01, ** p<0.05, *** p<0.1

IV – Conclusions

The livestock farmers in mountainous area of Tzoumerka understand the problems associated with low forage production and overgrazing of grasslands. It seems that the continuation of the mountain livestock farming is strongly associated with the changes to the Common Agricultural Policy as the viability of the sector is based mainly in European Union subsidies. It is very likely that livestock farming will be abandoned by a significant number of livestock farmers in the future mainly by those with small size farms, as they claim that EU subsidies are not sufficient and so their incomes are not satisfactory. In this case, there will be a serious impact in the economy, the society and the environment of these mountainous and less favourable areas (LFAs).

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