

## **Dry grasslands management in Greece. Crucial points and proposals for a new sustainable policy: a case study of Epirus**

**Roukos, C.<sup>1</sup>, Chatzitheodoridis, F.<sup>2</sup>, Koutsoukis, Ch.<sup>3</sup>, Kandrelis S.<sup>3</sup>**

<sup>1</sup>Payment and Control Agency for Guidance and Guarantee Community Aids (OPEKEPE) of Greece, Regional Department of Epirus & Western Macedonia, 454 45 Ioannina, Greece

<sup>2</sup>Technological Educational Institute (T.E.I.) of Western Macedonia, Faculty of Agriculture, Department of Agricultural Products Marketing and Quality Control, 531 00 Florina, Greece

<sup>3</sup>Technological Educational Institute (T.E.I.) of Epirus, Faculty of Agriculture, Department of Animal Production, 471 00 Arta, Greece

### **Abstract**

Greece has a rich heritage in grasslands which significantly contribute to the national economy. This paper examines the necessity of developing a new land use policy, under the CAP framework, focusing on the sustainable dry grasslands management. We studied the national and European legal frame concerning grasslands management, the current grasslands management and the main points of agricultural subsidies system relating with grassland management in five representative areas of Epirus, northwestern Greece. The results pointed out the complexity of the law in grasslands management providing evidence that more importance has been given to the economic management, in terms of tax payment (grazing right) and agricultural subsidies payment rather than to the proper application of critical factors such as grazing capacity and stocking rate. Finally, a conceptual framework, in very broad lines, for a new grasslands agreement addressing grasslands sustainability is presented. The agreement will be applied by “managers of grasslands” and can be financed by the Green Fund or even from a new agri-environmental measure within the CAP framework.

**Keywords:** land use policy, grasslands management, Greece

### **Introduction**

In Greece, the majority of grasslands can be considered as dry grasslands in the sense that they are mostly found in dry and poor-nutrient soils areas. Grasslands are important feeding resources for extensive livestock farming which stretch mainly in the rural and less favorable areas (LFAs) of the country. Most of these communal grazing areas are degraded by a long term high stocking rates application.

Although dry grasslands play a key role both to the maintenance of extensive livestock farming and the viability of the primary sector in LFAs of the country (Chatzitheodoridis et al. 2007), little importance has been given in the classification, mapping and sustainable management of these precious natural resources. The study aims to a short analysis of problems

that are caused by communal and not-organized management of dry grasslands and a proposal of a new strategy for their preservation or restoration under the CAP framework.

### Materials and methods

Epirus is located in the northwestern Greece. It is a typical Mediterranean mountainous area, ranging from 0 to 2637 m a.s.l. with great variation in topography, soil and climatic conditions. The climate is typical Mediterranean, characterized by rainy cold winters and dry warm summers (Souliis 1994). Grasslands management in Epirus represents well the grasslands management of the country. Vegetation belongs to the mediterranean zone of *Quercetalia ilicis*, (subzone *Quecion ilicis*) (Dafis 1973, Horvat et al. 1974) and ranges from typical Mediterranean (macchie, phrygana) in the lower areas to subalpine in the more humid and higher areas. For the needs of this study, five representative areas of the Epirus region were selected. Grassland production data was adopted by studies recently conducted for these areas (Table 1). Generally the grasslands extend from lowlands to uplands and are suffering from high stocking rate values (Roukos et al. 2011).

**Table 1.** Studied areas of Epirus region.

Area	Altitude(m a.s.l.)	Source
Xirovouni Mt	1100 – 1453	Roukos <i>et al.</i> , 2010
Theodoriana	1100 - 2393	Nikolaou <i>et al.</i> 2007
Athamania	1100 - 2250	Nikolaou <i>et al.</i> 2007
Metsovo	1400 - 1970	Tziaila <i>et al.</i> 2000
Grammos Mt (Aetomilitsa)	1280 - 2120	Vrahnakis <i>et al.</i> 2002

The main legal framework concerning grasslands management is based on the Commission Regulations (EU) No 65/2011 and No 1974/2006, the Council 92/43/EEC on the Conservation of natural habitats and the wild fauna and flora and the EC Directive 79/409 on the Conservation of Wild Birds, their latest modifications and their incorporation into the Greek legislation.

Grazing capacity was calculated according to Holechek et al. (2004) for a grazing period of 5 months per year and a proper use factor of 50 percent. An average grazing livestock population of the selected areas was taken from data provided by Municipalities, to which producers pay for rangeland utilization (grazing right). Also, the grazing capacity was adjusted for slopes as suggested by Holechek et al. (2004). Grasslands area vector data was

obtained from Corine Land Cover 2000 (Bossard et al. 2000). Slope maps in each study area were created by conducting a spatial analysis using the raster calculator of spatial analyst tool of ArcMap software. A digital elevation model based on 50 m contours for the region was available generated for a 30 m resolution. Then, vector grasslands data was converted to raster data. Finally, the calculation of grassland area per each slope class in each study area was done by combining the raster data of slopes map and grasslands map so a unique output value was assigned to each unique combination of slopes and grasslands values for each study area. The cell size resolution of all interpolated layers was 50 m. The GIS platform used was ArcGIS version 9.3.

## Results and Discussion

In Greece, although the competence of rangelands management has been assigned to the Municipalities (Law 3955/2011; Law 3852/2010; Law 3463/2006), the Ministry of Rural Development and Foods has set management rules and plans for all altitudinal zones rangelands independently of their property status (Law 1734/1987). However, the high elevation zone rangelands are characterized as forestall area and their management involves the General Secretariat for Forests (Law 998/1979 and Law 1737/1987), which recently has been administratively incorporated into the Ministry of Environment (Common Ministerial Decision 23111/2010). As the majority of dry grasslands in Greece are stretched into high elevation zones they constitute forestall areas and thus their management involves at least three different authorities (Ministry of Rural Development and Foods, Ministry of Environment, Municipalities or Cooperatives). This common responsibility of public authorities certainly complicates every attempt for proper grasslands management and has also resulted into the interruption of a grasslands improvement program since 2004. Under the current legal frame, it seems that the application of an intergrated grazing control system addressing rangeland sustainability is not feasible.

The Law states that farmers can graze their livestock at communal rangelands (Law 1080/1980; Law 1734/1987). This is called “grazing right” and the taxes payment range from 0.20 € to 0.53 € per grazing animal (Law 2130/1993). Specific management aspects (e.g. grazeable areas, number of grazing animals per farmer, duration of grazing and amount of “grazing right”) are determined annually by the Municipal Council. The communal rangelands area remaining after this allocation to the farmers can be leased by auction. The results reveal that the grazing right fees range from 2.55 to

35.00 € ha<sup>-1</sup> (Table 2). This range is related to the stocking density in communal rangelands but in non-communal rangelands the price is determined by the free market rules and can reach up to 12 times higher (Table 2). Therefore, the value of grasslands is often over-estimated aggravating the production cost.

A critical issue is that farmers who receive direct payments or participate in the rural development measures under Common Agricultural Policy (CAP) face penalties if they do not meet the stocking density cross-compliance obligations (0,2 – 3,0 AU ha<sup>-1</sup>) (Common Ministerial Decision 262385/2010). The cross – compliance control is done by the Greek intergrated administration and control system (OSDE) which relates the grassland area with one or more cartographic parcels on an annual basis without a specific schedule.

**Table 2.** Grazing right taxes, forage production, grazing capacity and stocking rate of selected areas grasslands.

Area Name	Property status	Grazing right tax*area (€/ha)	Grasslands area (ha)	Production (kg DM ha <sup>-1</sup> )	Animal units**	Grazing Capacity***		Stocking Rate (AUM ha <sup>-1</sup> )
						(a)	(b)	
Xirovouni Mt	Communal	2.55	10.096	2586	;	0.862	0.275	0.528
Athamania	Cooperative	7.00	1.502	2075		0.691	0.241	0.304
Theodoriana	Cooperative	31.58	950	1850		1.093	0.381	0.474
Theodoriana	Communal	2.84	1.290	1850	)	0.837	0.187	1.318
Metsovo	Communal	2.81	5.572	3850	)	0.454	0.272	0.452
Grammos (Aetomilitsa)	Communal	6.00	3.053	2659	}	0.885	0.319	0.451

\*: Average grazing right tax payment, \*\*: Animal Units (includes sheep and bovines),

\*\*\*: Grazing capacity adjusted for slope (b) or not (a)

Grazing capacity and stocking rate values from the studied areas are given in Table 2. The results showed that communal grasslands are more overgrazed than non-communal grasslands enhancing the degradation of grasslands and contributing to poor range conditions (Holechek et al. 2004). This phenomenon of overgrazing is more intense when the grazing capacity value not adjusted for slopes is taken into consideration.

It certainly can be claimed that the following rangeland management policy in any case does not implement the grazing capacity determination even for the grasslands that are found in Natura sites. It is vitally important to adopt a new agreement for quality grasslands management addressing

grassland sustainability. The agreement will be a new land use policy that can be financed by a new agri-environmental measure in the CAP framework (Arnalds and Barkarson 2003) or even by the Greek Green Fund. The “managers of grasslands”, who will come mainly from the structures of local self-government (Municipalities) and from the farmers’ cooperatives will be responsible for the policy implementation.

The main policy instrument will be a five-year (minimum) contract between the farmers and the central or the regional government. An extra subsidy, additional to the direct payments, will be provided to farmers participating into the program. Grazing right will be determined according to the grazing capacity of grasslands using a grazing fee formula (Torell et al. 2003) and providing flexibility to livestock operations so as to meet both temporal and spatial variability of grasslands production. Farmers will be obliged to implement strictly defined and periodically controlled management rules in order to receive the payment. The incomes of grazing right taxes will be reciprocal and thus finance the improvement of grasslands technical infrastructure (e.g. roads, water supply, etc.) and the program management costs.

The proposed policy is organized around six complementary objectives: (a) the simplification and unification of current legislation concerning grasslands management, (b) the development of a GIS-based application for dry grassland mapping and monitoring, (c) the long – term determination of dry grasslands forage production and quality, (d) the upgrading of technical infrastructure on co-financing basis, (e) a basis creation for the implementation of management measures, and (f) the development of a grasslands management program.

One crucial point is not only to set one supervising Agency to coordinate the agreement implementation but mainly to overcome the powerful forces of farmers’ grazing common practices which are deeply rooted in the rural traditions. Critical factors such as the economical importance of the payment, management costs and a regulations framework will strongly influence the likelihood of a farmer to sign a contract (Masé 2005).

## **Conclusions**

This paper discussed the pathway of addressing sustainability in grasslands management in Greece. We suggested a new strategy framework, examining the policy measures that can be used to establish sustainable management. The feasibility of their implementation is depended on the farmers’ acceptance to participate in the program.

## References

- Arnalds, O. and B.H. Barkarson, 2003.** Soil erosion and land use policy in Iceland in relation to sheep grazing and government subsidies. *Environmental Science & Policy*, 6: 105–113
- Bossard M., J. Feranec J. and J. Otahel, 2000.** CORINE Land Cover Technical Guide – Addendum 2000. Technical report No 40. Copenhagen (EEA). 105 pp.
- Chatzitheodoridis F., A. Michailidis and G. Theodossiou, 2007.** Comparative analysis of sheep–goat farming in a typical Greek island: economy and environment. *Applied Economics and Policy Analysis*, 1 (1–2): 191–200.
- Dafis S., 1973.** Classification of forest vegetation in Greece. *Scientific Annals of the Department of Forestry and Natural Environment*, 15: 57-91 (In Greek).
- Holechek J., R. D. Pieper and C.H. Herbel, 2004.** Range Management, Principles and Practices. 5th Ed. Prentice Hall. 607 pp.
- Horvat I., V. Glavač and H. Ellenberg, 1974.** Vegetation Sudosteuropas. Gustav Fischer Verlag. Stuttgart.
- Masé G., 2005.** The management of dry grasslands in Switzerland. A Swiss federal program and its local practical application. *Biotechnologie, Agronomie, Société et Environnement*, 9 (2): 133-138.
- Roukos, C, K. Papanikolaou, S. Kandrelis , A. Mygdalia and F. Chatzitheodoridis, 2011.** A GIS-based assessment of Rain-Use Efficiency Factor and Grazing Capacity in Preveza Prefecture, Greece. *Journal of Agricultural Research*, 49 (1):97-107.
- Soulis N.V., 1994.** The climate of Epirus. Ioannina (in Greek). 216 pp.
- Tzialla C., M. Kassioumi and C. Goulas, 2000.** Grassland production and forage quality in two different climatological environments of Ioannina prefecture. In: T.G. Papachrisou and O. Dini – Papanastasi (eds). Range Science at the threshold of the 21<sup>st</sup> century. Proceedings of the 2nd Panhellenic Rangeland Congress. pp.109-116. (In Greek with English Abstract)
- Vrahnakis M.S., K. Iovi and N.M. Berdell, 2002.** Management of the pseudoalpine rangelands of the Grammos mountain. In: P.D. Platis and T.G. Papachrisou (eds). Range Science and Development of Mountainous Areas. Proceeding of the 3rd Panhellenic Rangeland Congress, p. 355-361. (In Greek with English Abstract)
- Torell L.A., N. R. Rimbey, L. W. Van Tassell, J. A. Tanaka and E. T. Bartlett, 2003.** An evaluation of the federal grazing fee formula. *Journal of Range Management*, 56: 577–584.