Deer and traditional agrosilvopastoral systems of Mediterranean Spain. A new problem of sustainability for a new concept of land use

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Deer and traditional agrosilvopastoral systems of Mediterranean Spain. A new problem of sustainability for a new concept of land use

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SUMMARY - Many traditional Mediterranean agrosilvopastoral systems have being abandoned in rural areas of Spain since the 1960's. The utilization of such land units for deer raising and hunting is a new type of agrosilvopastoral system worth considering for private and public land owners and also for agricultural and environmental policies. It may guarantee the conservation of traditional landscapes and the achievement of a certain level of socio-economic activity which is necessary for rural development. However, its profitability has led to intensification through fencing and sometimes artificial feeding. High stocking rates, periods of hunger due to shortage of fresh fodder (summer and sometimes winter) and the inability to control browsing result in the lack of regeneration and the degradation of woody vegetation. This paper analyses the dynamics and sustainability of this new agrosilvopastoral system.

Key words: Red deer, agrosilvopastoral systems, Mediterranean ecosystems, hunting.

RESUME *- "Systèmes agro-sylvo-pastoraux traditionnels et avec cervidés dans l'Espagne méditerranéenne. Un nouveau problème de durabilité pour un nouveau concept d'utilisation du sol". Beaucoup de systèmes agro-sylvo-pastoraux méditerranéens traditionnels ont été abandonnés dans l'espace rural d'Espagne depuis les années 60. L'utilisation de ces terrains pour l'élevage et la chasse des cervidés constitue un nouveau type de système agro-sylvo-pastoral qui présente un grand intérêt pour les propriétaires privés et publics comme pour les politiques agricoles et de l'environnement. Ce système peut en effet garantir la conservation des paysages traditionnels et un certain niveau d'activité socio-économique nécessaire au développement rural. Cependant, sa rentabilité a conduit à une intensification liée à l'utilisation des clôtures et quelquefois à la pratique de l'alimentation artificielle. L'augmentation de la densité d'animaux, l'existence de périodes de disette liées au manque de fourrage vert (en été et quelquefois en hiver) et l'impossibilité de contrôler l'aboutissement entraînent l'absence de régénération et la dégradation de la végétation ligneuse. Ce travail analyse la dynamique et la durabilité de ce nouveau système agro-sylvo-pastoral.*

Mots-clés : *Cerf, systèmes agrosylvipastoraux, écosystèmes Méditerranéennes, chasse.*

Traditional agrosilvopastoral systems in Mediterranean mountain areas of Spain

The landscape of Mediterranean mountain areas of Spain has been modified by rural people for centuries. Those people lived exclusively on natural resources coming from their immediate environment, so they had to use them as efficiently as they could. Therefore, they developed sustainable management techniques and modified their environment, creating human ecosystems or agrobiosystems. As a consequence, agrobiosystems are more efficient than natural ecosystems in satisfying human requirements, but are unstable as their perpetuation requires management. The traditional pattern of land use in Mediterranean mountain areas of Spain might be described as follows:

(i) Steep slopes are not suitable for agriculture, but play a fundamental role in the control of erosion and biogeochemical cycles. The need for fuelwood and charcoal resulted in the utilization of the coppice system in natural oak stands. Therefore, the most important vegetation types are coppiced forests and dense shrublands. They provided fuelwood and also browse for domestic livestock (mostly goat) and wildlife.

(ii) Gentle slopes have a higher potential for herb production. However, trees are essential for providing microclimatic stability, fuelwood and food for domestic livestock and wildlife (acorns and

browse). Therefore, the usual vegetation type was a multiproductive open woodland: the dehesa. Cultivation was eventually carried out with the double aim of producing agricultural crops and controlling the invasion of woody vegetation.

(iii) The best soil types are located on valley bottoms and flat lands. As a consequence, they were used as agricultural lands for human consumption. However, the usual low fertility resulted in the utilization of 2-4 year cycles of cultivation. Therefore, part of that land was covered by stubble and annual grasslands which were important fodder sources for domestic livestock (mostly sheep).

The traditional pattern of land use in Mediterranean mountain areas of Spain is shown in Figure 1.

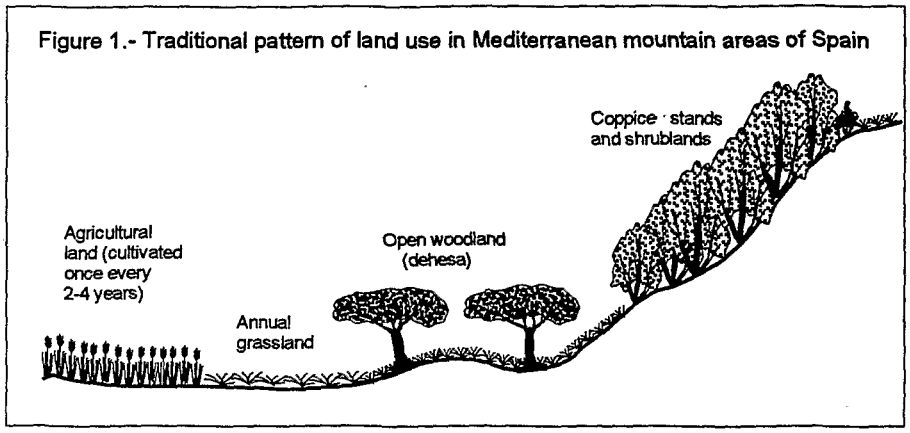

Fig. 1. Traditional pattern of land use in Mediterranean mountain areas of Spain.

Current situation after socio-economical changes and new agricultural and forest policies

The traditional pattern of land use in Mediterranean mountain areas of Spain has changed dramatically since the 1960's. The situation could be described as follows:

(i) The use of fossil fuels made fuelwood and charcoal value drop. Therefore, the coppice system was almost abandoned. Now, coppiced stands show very high density, strong competition between saplings, growth stagnation and lack of regeneration (vegetative and sexual). In spite of their low profitability, those stands are still very important as stabilizing ecosystems, but they are more susceptible to fire, pests, diseases and climatic changes (e.g. drought periods).

(ii) The improvement of the Spanish socio-economical situation in the 1960's resulted in the abandonment of mountain areas by many people and in a dramatic decrease of goat and sheep herds. As a consequence of their infra-utilization, many mountain rangelands lost quality and economic value.

(iii) Changes in the European Common Agricultural Policy have led to the abandonment of marginal agricultural lands, such as those of many Mediterranean mountain areas of Spain. Their cultivation is no longer profitable for human consumption. The abandonment of those marginal agricultural lands results in the increase of erosion and fire risk.

(iv) The above mentioned situation resulted in the reduction of socio-economical activity in those areas.

(v) The lack of suitable management results in a loss of quality and in problems of perpetuation for most traditional agrosilvopastoral systems.

(vi) Current agricultural and forest policies promote extensive and environmentally sound management techniques, with low costs and quality products. Sustainable rural development is one of the most important priorities.

The role of deer hunting in sustainable rural development

Red deer (*Cervus elaphus hispanicus*) has always been present in Mediterranean mountain areas of Spain, but in low densities. However, the achievement of optimal stocking rates and the utilization of hunting as an economic activity might be a very interesting alternative for those rural areas. Red deer hunting is in extensive use, with low costs and quality products. Red deer may be regarded as a kind of wild and very profitable livestock (the price of shooting rights for an average male stag might be close to US$ 1,000) and its hunting promotes a very interesting socio-economic activity which is essential for sustainable rural development. Basic requirements are shelter, feed (herb, browse, forest fruits) and water. Therefore, such hunting may guarantee the perpetuation of agrosilvopastoral systems. Dense woody vegetation is essential as a source of shelter and browse; open woodlands provide grazing resources, acorns and some browse, and marginal agricultural lands could be cultivated to provide feed (fodder or grain) in periods of shortage of green grass. The interest in red deer hunting is not merely theoretical. Many land owners have changed from traditional management techniques to this new agrosilvopastoral system, and agricultural and forest policies are paying much attention to it as a way of reaching a necessary and sustainable rural development.

A new problem of sustainability

In spite of its interest, the raising and hunting of red deer creates a new problem of sustainability in Mediterranean mountain areas. The utilization of rangelands by domestic livestock was based on traditional management techniques developed after centuries of experience. However, little is still known about the technical management of traditional agrobiosystems for red deer hunting (Soriguer *at al.*, 1994). The most important limitations for this new concept of land use are the following: (a) there are periods of lack or shortage of green grass, and the most important one (summer) coincides with the season of highest nutritional requirements in females: the lactation period; (b) the red deer is an opportunist species: it grazes if green grass is available, but browses otherwise, which might produce severe problems for the natural regeneration and development of palatable woody species; (c) daily movements and browsing are almost impossible to control, and (d) parasites and diseases which do not constitute a threat to domestic livestock may become limitant factors for wild red deer populations. Current trials of intensification through fencing and increasing stocking rates are cutting natural regeneration of woody vegetation and also resulting in the degradation and disappearance of palatable shrubs in large areas of Mediterranean mountain areas (Montoya, 1996).

The necessary sustainability of this new agrosilvopastoral management system requires an integrated approach from at least four points of view: red deer population control, rangeland management, agriculture and silviculture (San Miguel, 1993; San Miguel *et al.*, 1995). Red deer sustainable stocking rates are limited not only by fodder availability but also by natural regeneration of trees and shrubs, by animal health and by the population dynamics of other valuable animal species (e.g. roe deer). Rangeland management is necessary to provide optimum grazing resources for red deer populations. Agriculture may be suitable to reduce hunger periods; it could provide green grass in winter and cereal grain in summer and, therefore, contribute to reduce browsing and to improve red deer body condition and reproduction rates. Finally, silviculture is essential to guarantee the stability and perpetuation of forest stands and could provide some browse in hunger periods through pruned branches and stump and root resprouts.

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