Studies on the management of livestock farms in protected areas of the Canary Islands

Mata J., Bermejo L.A., Camacho A.

in

Ferchichi A. (comp.), Ferchichi A. (collab.).
Réhabilitation des pâturages et des parcours en milieux méditerranéens

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 62

2004
pages 429-432

Studies on the management of livestock farms in protected areas of the Canary islands

J. Mata, L.A. Bermejo and A. Camacho
University of La Laguna, Tenerife, Spain

RESUME – *"Etudes sur la gestion des exploitations d'élevage dans les espaces protégés des îles Canaries". Les études menées sur les espaces protégés des Iles Canaries démontrent le besoin de mieux gérer leur utilisation pastorale. Les résultats de quatre années de suivis sur 53 élevages caprins correspondant à trois zones couvrant une surface totale de 18 523 ha sont présentés. L'information a été obtenue au moyen de techniques participatives, de mesures de terrain (transepts, mises en défens, indices de consommation) et des analyses chimiques de la valeur nutritive. Les résultats mettent en évidence l'abandon des pratiques traditionnelles et la simplification des systèmes de production par augmentation du complément et diminution des surfaces pâturées qui dès lors se dégradent. L'origine de ces changements et les possibles alternatives sont discutées.*

Mots-clés*: Pâturage, zone protégée, approche participative, Iles Canaries.*

Introduction

Initial studies on grazing management in the Canary Islands were mainly devoted to technical aspects and designed to determine the stocking rate and carrying capacity of the territory (Mata *et al.*, 2000), with slight qualifications of the socio-economic background (Bermejo *et al.*, 2000). Nevertheless, when it comes to making applied proposals according to the results obtained, it was found that extensive livestock farming encompasses aspects of high socio-cultural content, which would hardly be articulated in the technical and scientific aspects, without further elaboration. This finding of the need to link the traditional land use systems with the application of science and technology, appears to reflect a disquiet without a clear answer (Gonzalez Rebollar *et al.*, 1999). Our current approach involves integrating participative approaches, with instrumental and analytical methodologies, seeking to engage and complement the results of both activities.

The problem of validating the evidence gathered through participative processes is currently the topic of different researchers. According to Chambers (2001), the participative diagnosis represents the best of both "worlds", since it supplies the figures in order to be representative and have credibility, and the perceptions to provide the close link with reality. This point is fundamental, since the widespread view about research is that PRA only provides qualitative data, while quantitative data is only generated through questionnaires and other techniques of analysis (Chambers, 2001). The relationship we try to establish between scientific research and participative research aims at overcoming many of the views that regard both types of research as incompatible. Our objective is to integrate local knowledge, through participation, with scientific knowledge, overcoming the autonomous development of each of these domains of knowledge, and of course, the substitution of one for the other (Sanchez de Puertas and Teberner, 1994).

Materials and methods

The studies have been carried out between 1998 and 2002 in three protected areas in the Canary Islands, with a total area of 18,523 hectares, a characteristic of all of them being rugged orography, pronounced slopes, climatic contrasts according to northward or southward orientation and biological diversity. The three zones are grazed by herds, mostly goat breeds of the Tenerife South and North breeds, as well as crosses with Majorera (Capote, 1989).

The calculation of stocking rate and carrying capacity, as well as the data processing is based on the methodology described by Mata *et al.* (2000), with some improvements and updating of field tools, computing and mapping. Stocking rate was monitored through: (i) 85 semi-structured interviews to characterise the livestock farms in terms of structure of production and use, and for delimiting grazing areas; and (ii) more than 200 systematized visits to assess the equipments, health state of animals, breed, and other aspects of interest.

Range sites were established for the carrying capacity in each area taking into account orientation, vegetation, and slope, which have been transformed into management units. Each of them was monitored (Paladines, 1993) by: (i) random cuts of $1m^2$ in spring, summer, autumn, and winter, summing up 600 samples to determine primary productivity in DM and UFL; (ii) 210 transects of 100 points inside and outside the grazing units to determine and compare the botanical composition and percentage of vegetation, in an attempt to design a rating system initially based on phyto-sociological studies (Rodríguez *et al.*, 1993); and (iii) 20 exclusion squares of 5 m x 5 m within the grazing areas.

Social aspects of grazing were assessed through a Participatory Rural Approach (PRA) (Ardon, 2000) with groups of livestock farmers from the same area during a week of intensive work.

Results and discussion

With regard to the structure of the livestock farms, we found important differences among the islands involved in this study (Table1). In Tenerife, farms are 1.54 times bigger than in La Gomera despite the similarity in the socio-economic profile, as they mainly consist in family farms that produce home-made fresh cheese with a similar level of income. In La Gomera, we found the most unstructured systems, with smaller costs of production, characterised by a greater grazing area per herd, even when herds were smaller, due mainly to a lower use of supplements and the practice of excessive continuous grazing. In both cases, a high negative correlation was observed between supplementation and animal units per hectare (-0.60, $P<0.05$) and between hours of grazing and supplementation index (-0.55, $P<0.05$).

Table 1. Mean values of the main variables that characterise the productive systems

Island	Nº Females	Hectares/Livestock farmer	AU/ Hectare	Goats/ Hectare	% Supplementation	Hours of Grazing
Gomera	53	144	0.16	0.24	0.48	16.45
Tenerife	82	103	0.23	0.,57	0.65	10

With respect to the territory, initially 21 range sites were determined and mapped. Subsequently, seeking operational grazing management, and taking into account the high correlation we found between altitude, distance from the sea and rainfall ($R^2=0.82$), 9 strips of territory with homogeneous productivity were defined in the protected areas according to mean annual rainfall (Tables 2 and 3). These units have been called Units of Use and currently constitute the territorial base for the management proposals (rotation of pastures and others). The ranking of the Units of Use has also been based on the prior valuation and categorisation of the pastures, made by the livestock farmers through the PRA. This corroborates the interest of combining these apparently distant approaches and methodologies.

With regard to primary production in the different Units, it was found that under 350 m.a.s.l. in Tenerife and under 370 m.a.s.l. in La Gomera, which are the altitude thresholds defining rainfall levels, the yielding is always lower than in superior heights. The correlation between rainfall and productivity was 0.51 ($P<0.05$). In any case, the productions is similar to those found in natural ecosystems in south-eastern Spain (Passera-Sassi *et al.*, 2001) where the level of rainfall is also similar (between 194 and 786 mm).

Table 2. Productivity characteristics of the Units of Use

Units of use	Area (ha)	Production (KgDM/ha)	AU/ Hectare	Maximum production (KgDM/ha)	Maximum production (KgDM/ha)	Annual rainfall (mm)
CTB350 (T)	5212.88	416.96	0.16	629.36	191.30	353.9
FTS350(T)	2893.12	1187.56	0.52	1187.56	1187.56	547.9
CTS350(T)	3046.29	388.99	0.26	647.23	130.75	496.00
CTLB370P(G)	1091.88	546.14	0.27	600.05	492.22	186.03
CTLS370P(G)	445.85	703.17	0.38	718.37	687.98	409.7
CTPB370P(G)	133.06	449.96	0.20	467.55	432.36	186.03
CTPS370P(G)	33.45	1124.22	0.49	1399.46	848.98	418.60
CTPS370P(G)	6.70	849.49	0.47	1067.25	631.74	
FTLS370P(G)	273.0	629.01	0.26	643.44	614.58	

(T): Tenerife; (G): Gomera.

Table 3. Botanical characteristics of the Units of Use

Unit of use	Main species	% Main species	Nº Total species	% vegetation
CTB350	*Hyparrhenia hirta*	19.48	51	70.9
CTB350	*Artemisia thuscula*	11.79	51	70.9
CTLB370P	*Cenchrus ciliaris*	13.23	31	48
CTLB370P	*Bituminaria bituminosa*	9.57	31	48
CTLS370P	*Hyparrhenia hirta*	15.78	37	61
CTLS370P	*Artemisia thuscula*	14.30	37	61
CTPB370P	*Hyparrhenia hirta*	65.87	9	37
CTPB370P	*Stipa capensis*	8.77	9	37
CTS350	*Teline canariensis*	16.99	37	82.8
CTS350	*Artemisia thuscula*	12.56	37	82.8
CTPS370P	*Briza media*	12.78	18	72
CTPS370P	*Avena* sp.	11.93	18	72
FTLS370P	*Hyparrhenia hirta*	19.23	18	63
FTLS370P	*Bituminaria bituminosa*	9.37	18	63
FTS350	*Artemisia thuscula*	20.03	39	82.2
FTS350	*Hyparrhenia hirta*	12.38	39	82.2
MVS600	*Oxalis pes-caprae*	21.88	38	77.5
MVS600	*Artemisia thuscula*	18.13	38	77.5

Conclusions

The use of Participatory Rural Appraisal techniques provided valid information for the design of management programs, which increases the possibilities of success of future management proposals. The greatest variability in productivity is found in the Units of Use. The primary production in the studied areas is similar to those obtained in other areas of Spain with similar climate. A strong correlation was found between supplementation level and grazing area. The studied areas were characterised by a high botanical variability.

References

Ardón M. 2000. Guía metodológica para Sistematización Participativa de Experiencias en Agricultura Sostenible. (ed) PASOLAC. El Salvador.

Bermejo L.A., Mata J., Delgado J.V., Flores M.P., Camacho A. 2000. Livestock racional use of Anaga

Rural Park. Preliminary results. Archivos de Zootecnia. 44:269-274.
Capote J. 1989. Agrupación Caprina Canaria. Actas del I Simposium Internacional de la Explotación Caprina en Zonas Áridas. 17-33.
Chambers R. 2001. The best of both worlds? . En: Qual-quant. Qualitative and Quantitative poverty appraisal: complementearities, tensions and the way forward. Institute of Development Studies. UK.
González Rebollar J.L., Robles A.B., De Simón E. 1999. Las áreas-pastos-cortafuegos entre las prácticas de gestión y protección de los espacios forestales mediterráneos: (propuestas de silvicultura preventiva). Actas de la XXXIX Reunión Científica de la Sociedad Española para el Estudio de los Pastos.145-154.
Mata J., Bermejo L.A., Delgado J.V., Camacho A., Flores M.P. 2000. Livestock use research in Canary protected areas. Methodology. Archivos de Zootecnia. 49:275-284.
Paladines O. 1992. Metodología de pastizales. (ed) PROFOGAN MAG/GTZ. Ecuador.219 p.
Passera- Sassi C.B., González Rebollar J.L., Robles Cruz A.B., Allegretti L.I. 2001. Determinación de la capacidad sustentadora de los pastos de zonas áridas y semiáridas del Sureste Ibérico. XLI Reunión Científica de la Sociedad Española para el Estudios de los Pastos. 611-617.
Rodríguez O., Del Arco M (coord.). 1993. Itinera Geobotánica de Tenerife. (ed) Universidad La Laguna.
Sánchez de Puertas F., Taberner J. 1994. Innovación y alienación en la agricultura. Una perspectiva socioecológica. Agricultura y Sociedad. 44-60.