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*in*

Olaizola A. (ed.), Boutonnet J.P. (ed.), Bernués A. (ed.).  
Mediterranean livestock production: uncertainties and opportunities

Zaragoza : CIHEAM / CITA / CITA  
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 78

2008  
pages 49-53

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=800241>

To cite this article / Pour citer cet article

Navarro L., Ruíz F., Ruiz Avilés P. **The sustainable production of Mediterranean cheeses. Highlights of the home-made cheeses from Sierra de Cádiz (Andalusia, Spain)**. In : Olaizola A. (ed.), Boutonnet J.P. (ed.), Bernués A. (ed.). *Mediterranean livestock production: uncertainties and opportunities* . Zaragoza : CIHEAM / CITA / CITA, 2008. p. 49-53 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 78)



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# The sustainable production of Mediterranean cheeses. Highlights of the home-made cheeses from "Sierra de Cádiz" (Andalusia, Spain)

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**SUMMARY** – The production of goat and sheep milk cheeses in "Sierra de Cádiz" is an example of environmental and socioeconomic sustainable production, besides a relevant element of diversity, and rural development. The origin of the milk coming from autochthonous breeds; the extensive feeding system (Natural Parks of Grazalema and Alcornocales); and homemade production justify this assumption. In this paper, sustainable cheese production is explained, based on two surveys conducted among stockbreeders and cheese makers, besides interviews with local experts.

**Keywords:** Sustainable production, goat and sheep milk, autochthonous breeds, homemade milk cheese, Sierra de Cádiz.

**RESUME** – "La production durable de fromages méditerranéennes. Highlights de fromages artisanaux de 'Sierra de Cádiz', Andalusia (Espagne)" La production de fromages de chèvre et de brebis de la Sierra de Cádiz est un exemple de durabilité, un élément de diversification économique et, en définitive, un modèle de développement durable. L'origine du lait, provenant des races autochtones, l'influence de l'alimentation dans l'écosystème extensif (Parcs Régionaux de Grazalema et Los Alcornocales), ainsi que le mode artisanal de production des fromages sont les facteurs principaux de la durabilité. Dans cette communication on fait une description de l'influence des paramètres de la production laitière et de l'élaboration fromagère dans la diversification et le développement durable de ce milieu naturel, paramètres obtenus d'après la réalisation d'enquêtes auprès des éleveurs, fromagers et experts sur l'écosystème de travail. Les principales conclusions sont également exposées.

**Mots-clés :** Durabilité, troupeau de caprins et brebis laitières, races autochtones, fromage artisanal, Sierra de Cádiz (Montagne).

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## Introduction

Sustainability can be translated in terms of agricultural production as: "sustenance of current population without endangering the biologic capability of nature to assure forthcoming generations sustenance, and carrying out without making unfair disparities between the two social groups" (Baigorri, 2001).

Extensive goat and sheep livestock has been always important sectors in mountain areas from the social, economic, and environmental points of view: (i) well adapted to the land; (ii) keeping the ecosystem of pasturages and meadows ("dehesa" in Spanish language); (iii) protecting the area against fire, and erosion; and (iv) finally, maintaining population to rural areas. The Mediterranean basin shows besides a high technical-economic development level, cultural aspects based on traditions, and quality agrofood productions. In this framework, because the new Common Agricultural Policy (moving towards a more sustainable policy), and the increasing consumer's perception of quality sustainable productions, actions in the way to increase added value of these outputs have to be undertaken.

## Short description of the production area

The south-western part of "Sierra de Cádiz" (Fig. 1) is the area where extensive livestock of goats

and sheep make their living. It is an ecosystem of great value environmentally speaking (included in Natural Park of Grazalema). Meadows of ilex and cork trees ("dehesa"), jointly with pine trees and pasturage represent their main flora. The autochthonous breeds: "Payoya" (goat) and "Merina de Grazalema" (sheep) are the most representative ones here.

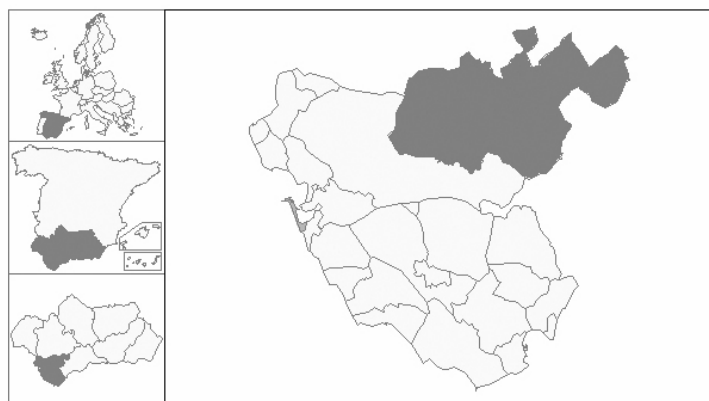


Fig. 1. Map of "Sierra de Cádiz".

Caprine is the first stockbreeding sector regarding milk production. It accounts for 44,655 goats in 325 farms (Diputación de Cádiz, 2001). Olvera, Algodonales, Grazalema, and Zahara de la Sierra are the major producing councils. The flocks of goats decreased over the last few years (around 30%), increasing significantly the number of heads/farm on the other hand (Mena *et al.*, 2005). Farms are based on a vast surface with an average of 140 goats/farm, but this number is quite variable (there are farms with less than 50 units and some others with more than 1,000 animals).

"Payoya" is an autochthonous goat breed showing tall and large individuals with a polychrome coat, and well adapted to the area, not having any competition here with any other stockbreeding species. It is at risk of becoming extinct, having the Association of "Payoya" breeders to defend their continuity and to improve their genetic.

The dairy ovine sector is shorter than the caprine one. It accounts for 5,000 heads in 30 farms. The evolution of the ovine livestock went down sharply (there were around 15,000 milking heads in Olvera in the past sixties). "Merina de Grazalema", a white and blonde sheep with fine fleece, is the most representative breed in Sierra de Cádiz, being the only autochthonous dairy sheep in Andalusia. Since it is also under the risk of extinction, the Association of "Merino de Grazalema" Breeders (34 members and 4,500 animals) works to preserve it.

The extensive system consists in feeding animals with natural pasturage from fall to summer and then with stubble coming from cereals and other cultivated crops (goats and ewes are supplemented during lactation in the milking time). Goat kidding is concentrated in fall to make the best use of pasturage and to take advantage of the best price paid for kids at Christmas time; in the case of ewe, lambing is concentrated at the end of winter to take advantage of spring natural pasturage. Most of the milk is sold to big dairy companies, despite an important part of it is devoted to local cheese factories. Some stockbreeders make organic production because it is a very close system to the traditional one.

## The production of cheeses

There are nine cheese dairies in "Sierra de Cádiz", eight of them can be considered as farmhouse cheese dairies. Despite they are distributed all along the area, it is close to "Natural Park of Grazalema" where they are mostly concentrated. Most of the firms are owned and managed by families, some others are cooperatives and the remaining ones have other association formulae. On spite of most of them has a very recent origin, the smallest firms belong to experienced cheese

makers who invested in facilities to fulfil the current public health regulations. They employ a total of 56 people with a high rate of women (5 cheese dairies are run by women).

The total volume of milk used is 3.8 millions litres/year, 3 millions litres/year is goat milk (78.1%), 700,000 litres/year cow milk (18.5%), and more than 3% (118,845 litres/year) sheep milk. The biggest cheese dairy belongs to "Fromandal S.A.". This firm and the cooperatives "Apolvera", and "El Bosqueño" make mainly cow or mix (cow and goat) fresh cheeses. The remaining ones can be considered as small farmhouse cheese dairies. It is significant to say that some cheese dairies produce organic cheeses of sheep ("La Oliva") and goat ("La Cabra Verde"). The typology of the cheeses produced in the zone is very large including: fresh cheese of goat, semi-cured and cured cheeses of goat and goat-cow and curd cheese. All cured cheeses are offered according to the following specialities: with olive oil, olive oil and cayenne pepper, lard of Iberian pork, and wheat bran.

Milk comes from local or regional stockbreeders (from the county of Cádiz or from the adjacent ones Málaga and Sevilla), 141 of them are goatherds, 27 shepherds, and 6 cattle tenders. There are two producing farmstead cheeses ("Lácteos Marant" and "Oliva"). Sales are mainly carried out in short radio (local or regional) markets. Only "El Payoyo" has a wider operational range (regional or national). It is very significant to notice that all the cheese dairies have a sale shop.

Parameters related with quality have been valued by the cheese makers, as well as the influence of quality in their profits (Figs 2 and 3). The most remarkable results are: (i) personnel's hygiene and facilities cleanliness affect directly to quality; (ii) milk quality is other important direct parameter; and (iii) the influence of the environment has been also shown, pointing out the importance that the autochthonous breeds, and the extensive feeding system have in the quality of cheeses. Handmade production, despite having been well valued in general, has a lower score in the answers of the biggest cheese dairies, mainly devoted to the production of fresh cheeses, with an important component of cow milk. These firms gave higher importance to mechanization on the other hand.

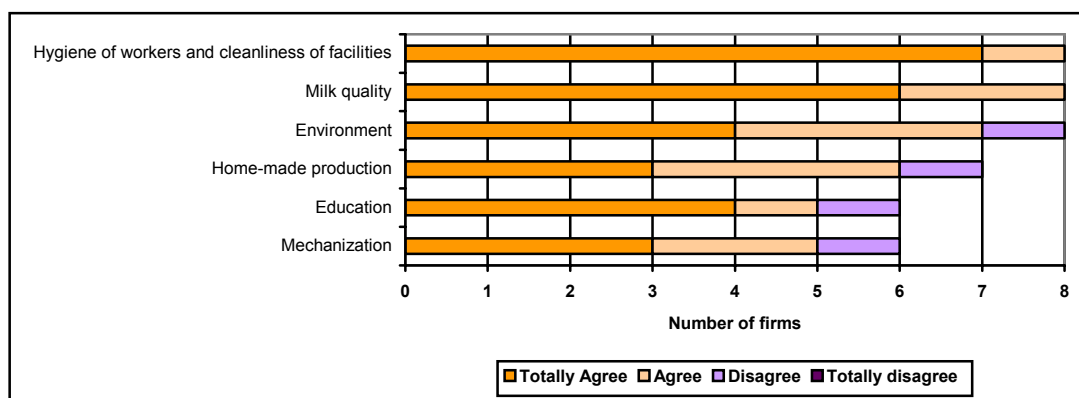


Fig. 2. Evaluation of the parameters affecting to quality handmade cheeses of "Sierra de Cádiz".

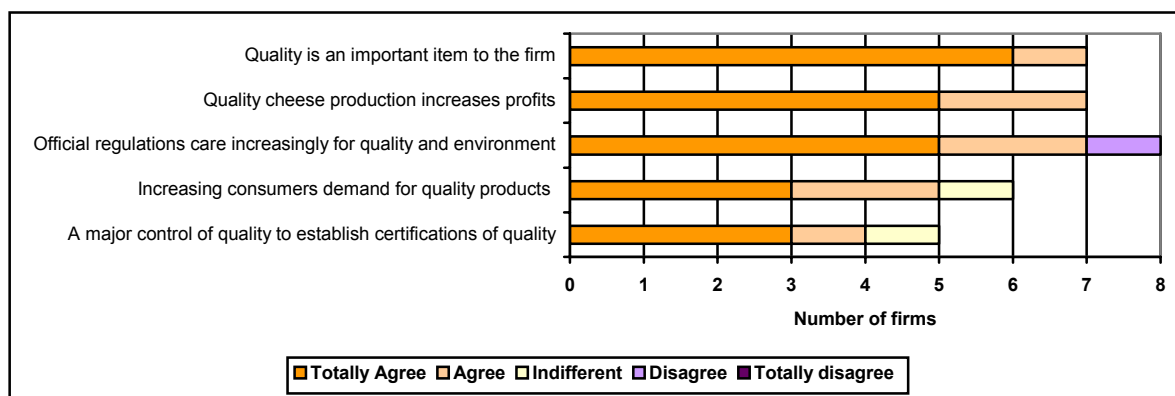


Fig. 3. Economic and administrative aspects of quality.

Regarding the economic and administrative effects of the production of quality cheeses, there is a high consensus on the importance of quality, and its relationship to the economic results, because it becomes in a major demand on the part of consumers. Nevertheless, they underline that current legislation is tending to be more and more strict (what can be translated as an extra difficulty to be part of the role of public certifications).

The Sector is asking for two Protected Designation of Origin (PDO): "Queso de la Sierra de Cadiz" and "Queso de Grazalema". The first one is devoted to the cheeses elaborated with milk of the goat breed "Payoya" and the second one to the cheeses made with milk of the sheep breed "Merino of Grazalema". In both cases factors like the defence of autochthonous races, the extensive system of feeding, and the traditional know-how in the production are underlined.

Table 1 describes milk and cheese parameters affecting sustainability<sup>1</sup>, stressing the following ones: (i) the environmental consequences of the extensive use of natural resources; (ii) the social and cultural impacts derived from activities linked to territory, and their patrimonial values (history, tradition, craft, "know-how, culture); (iii) from the economic point of view, for being activities performed by small-medium size firms, employing to many people, with a high rate of women, and being products highly demanded by select consumers; and (iv) the institutional aspects of leadership and rural development. The multifunctional effect due to their relationship with other local agro-food products (olive oil, sausages, gastronomy in general), and economic sectors linked to services (tourism, catering, etc.) are also important items to consider in addition.

Table 1. Elements of sustainability of the stockbreeding and homemade cheeses of "Sierra de Cádiz"

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<b>Environmental</b>
<b>Production of milk</b>
Use of natural resources and maintenance of the ecosystem dynamic.
Increase organic farming
Maintenance autochthonous breeds: "Payoya" goat "Merina de Grazalema" sheep
Fire and environment protection
<b>Production of cheese</b>
The environmental impacts of cheese dairies depend upon public health regulations, and because the consequences of a higher demand of better quality milk by cheese makers
Milk coming from autochthonous breeds is better valued: indirect support to these breeds
Valuation of the quality of the milk coming from animals following an extensive feeding system, and from those carrying out organic cattle raising
<b>Sociocultural</b>
<b>Production of milk</b>
To keep population in rural areas
Important activity in the area: 325 farms of goats and more than 30 farms of sheep
Associations of breeders: "Cabra Payoya" and "Merino de Grazalema"
Value added for rural areas patrimony (environment, history, landscape, etc.)
<b>Production of cheese</b>
Employment (56 direct workers, high rate of women employment)
A choice to globalization
An instrument to learn about culture and traditions
A factor for increasing rural development
A way to exchange experiences regarding production and marketing
<b>Economic</b>
<b>Production of milk</b>
Source of income for many people
Rising milk prices as a result of quality
Existing stockbreeder's cooperatives based on the production of livestock inputs and machinery
<b>Production of cheese</b>
A basic element of agricultural "multifunctionality" linked to rural tourism and local gastronomy
An increase of cheese maker's income due the higher demand of these quality cheeses
An increase of sells in short radio channels: local markets, restoration, "gourmet" shops, etc.
<b>Institutional</b>
<b>Production of milk</b>
Leadership and social organization in favour of territory.
Initiatives for local development.
Participation in groups of rural development
<b>Production of cheese</b>
As a consequence of the coming PDO and the mark "Sierra de Cádiz y P.N. de los Alcornocales"

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<sup>1</sup>This information comes from Navarro *et al.* (2005), Diputación de Cádiz (2001), and a large amount of secondary information not mentioned in the bibliography, and the overall knowledge the authors have on the stockbreeding sector.

## Conclusions

The productive natural handicaps of mountain areas, the low educational level of local farmers, and few marketing channels for handmade productions, need imaginative formulae to get added value according to quality. The keys to success for these less developed areas and quality productions are not the same as the ones followed in more productive agricultural areas and sectors. They must be linked to natural values, and local traditions on the other hand. But to reach success it is necessary to have great implication of actors in the processes of management and marketing. It is necessary to work on: (i) the characteristics and values of the product itself, and its relationship with the environment; (ii) generating marketing associations; (iii) the establishment of common bonds with culture and local patrimony; (iv) searching synergies with rural tourism; (v) increasing sales in short-radio marketing channels: farm, specific markets or specialized shops; and (vi) likewise, the public support regarding technical advice, promotion, researching and development.

We want to finish this presentation with some basic actions to improve sustainable development of quality product in rural areas: (i) participation in Spanish and European organizations involved in the defence of quality products in rural areas; (ii) requesting institutional support for both, financial and technical activities, regarding research, innovation, and education; (iii) to be involved in scientific, technical, and cooperation projects, to exchange information between producers and/or technicians; and (iv) encourage association and cooperation actions.

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