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# Typification and economic analysis of beef-producing farms in Spain

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**Abstract-** In spite of different economic agents' interests, as well as the Administration's effort in promoting extensive beef-producing systems over the last years, this kind of activity still hasn't reached the desirable levels, being necessary that farmers perceive an appropriate benefit which supports their activity. In this sense, this paper, using the data obtained by a statistical survey representing all the extensive beef-producing farms existing in Castile and Leon (Spain), aims to analyze the economical results of extensive beef-producing farms, previously classified in representative groups according a quantitative method. The study is a preliminary research which intends to generate additional knowledge about the role of the different variables which make part of the economic results, and takes part of a research project financed by Castile and Leon Regional Governments, Education and Culture Council, through the annual program to support research projects (Order EDU/1143/2004).

Keywords- Cluster Analysis, extensive beef producing systems, economic accounts.

## I. INTRODUCTION AND OBJECTIVES

Some different studies point out the advantages of extensive beef production systems, both from an environmental and a nutritional point of view [1], [2]. The European Commission, aware of this fact, has set different mechanisms (not all of them being successful) with the aim of encouraging these productions, as well as solving some of the problems affecting the beef sector (high international competitiveness, existence of internal surplus, food crisis...), trying this way to adapt the demand to the supply, and taking care of other aspects related to the environment and animal welfare, demanded by the European consumers [3].

Anyway, for this process becomes a reality, farmers (as any other economic agent) must perceive a benefit, linked, in this case, to their activity's economic results. This benefit could be provided by both, market prices or internal supports mechanisms and policies which

try to compensate the absence of a remuneration of the social services provided by extensive farmers in the present markets.

Thus the interest on analyzing economic results of extensive beef productions, but research into agriculture presents a certain difficulty; although each farm has its own specific characteristics, problems and decisions, which require different solutions, unfortunately, in practice, it is unfeasible to carry out an individualised analysis of each farm, and it is necessary to bring the agricultural businesses with similar characteristics together into homogeneous groups, in such a way, that a series of common recommendations can be made [4]. In fact, many international classifications try to specify the regional typologies and classifications of the agricultural systems, recognising the importance of basing the typification on quantitative methods, since, according to experts, qualitative-type methods may lead to different results [5].

In this framework, as a preliminary research, the present study aims to analyze the economic results of extensive beef-producing farms, previously classified in representative groups according a quantitative method.

## II. METHODOLOGY

A personal survey was designed and subsequently carried out on farmers who manage extensive cattle farms in Castile and Leon (Spain) in order to obtain data regarding the economic, social and technical situation of these farms, along the year 2006.

The framework of the survey was the census of extensive cattle farms in 2005, minimizing with this election the different types of error that can be found in a framework [6]. After considering different aspects, such as: the statistical framework available, the duration of the research, the available budget, the questionnaire model, the way the questionnaire is administered, and even the statistical objectives with

regard to the degree of accuracy of the estimates to be achieved, as recommended by some authors [6], a simple random sampling, appears to be the most appropriated sampling method according the objectives of this investigation.

Once checked different sample sizes, searching a compromise between the cost of a large sample and the reliability of the results as it's advisable to be done [7], a sample made of 250 firms was adopted, with an error rate of 6.2% according to the mathematical expression:

$$e = k \cdot \sqrt{\frac{N-n}{N-1} \cdot \frac{pq}{n}} \quad (1)$$

Where:

$e$  = Error.

$N$  = Population's size

$n$  = Sample's size.

$p = q = 0,50$ .

$K = 2$ .

Then, a structured questionnaire was drawn up; this was mostly made up of a series of open questions, with the purpose of obtaining the most important data of a socioeconomic nature.

Once the survey data had been carried out, the answers to the questionnaire were processed using Excel to calculate some economics variables such as the financial accounts. Later, a Cluster Analysis was carried out, for being one of the techniques most frequently used to determine the different typologies of farms and agricultural production systems is [8].

### III. RESULTS

Five groups of farms have been identified when using Cluster Analysis. Some of the most important socio-economic characteristics of them are summarized and described afterwards.

#### A. Group 1

Together with groups 4 and 5, this stratum groups the largest farms (average number of suckler cows: 75,3) with the highest values of Total Agricultural Production, animal output, animal sales and total

subsidies, accounting subsidies on livestock products for the highest percentage over the total subvention.

In spite of it, it's in the fourth place regarding the Net Added Value per Agricultural worker, due to the businessmen's profile managing these farms: we find here the highest percentage of farmers who are working in agriculture as a secondary occupation (mainly retired people or those with another job), as well as the oldest ones.

These farms have the highest degree of capitalization, being noticeable the difference investment among this group and the rest ones, which is mostly due to an important investment in own land, specially grazing land (being in the first place with regard to this variable), which results in a lower expense in fodder and rented grazing land, but in higher taxes payments.

#### B. Group 2

The predominance of agriculture is the main difference between this stratum and the rest ones: Agriculture reaches here the highest yields per ha, accounting for 48% of the total production. The small size of these farms stands out, with scarcely 40.8 suckler cows, and the subsequent less values for the animal output, as well as for the Total Agricultural Production

There is a certain similarity between this group and the precedent one, concerning the kind of farmers running these businesses (as, in both groups, the oldest businessmen as well as the higher percentage of retired people may be found) and the capital investment, land capital standing out, but unlike group 1, arable crops rather than grazing land are here the most important investment.

In this group, intra-unit consumption can be highlighted, thus contributing to the reduction of the costs outside the farm as well as improving final economic results.

#### C. Group 3

The smallest farms have been grouped here, both arable crops surface and total number of cows reach here the lowest values, which results in the scarce values of animal and crop production.

The worse economical results are here found, with the lowest values for the rate of crop production/ha and animal output/cow, as well as for labour hand productivity (half than the average value).

Subsidies (mostly subsidies on livestock) become an important support, compensating the negative result for the Gross Added Value (at the basic price), thus entrepreneurial income could reach a positive value (though the lowest value existing among the different groups).

These bad economic results are not only consequence of the scarce total output but also of the highest costs outside the farm (being the rate of outside costs over Total Output about 80%).

#### *D. Group 4*

It clusters the largest livestock farms (76 suckler cows) (together with groups 1 and 5), though the size of the arable land (excluding group 3) is the smallest one. The average surface area of the farms is 14,6 hectares, all of them located in unirrigated land with very low yields, reaching the productivity per arable crop hectare one of the worse values (close to the precedent group).

Similar to group 3, the rate of costs outside the farm over the total output is very high and notably superior to those of the rest groups, reaching intra-unit consumption one of the lowest values. Nevertheless, as well as group 5, this stratum shows the best relation between the variables entrepreneurial income vs total output, due to the compensation exercised by the subsidies, as well as for the incomes coming from the animal sales (though productivity per cow is one of the lowest, being lose to group 3).

In this stratum are grouped the younger farmers with livestock being the former activity, and with the least investment in land and buildings.

#### *E. Group 5*

The largest farms are grouped here, standing out the arable crop surface, as well. Both facts make this group be the most important recipient of subsidies among the different groups. The best results for Agricultural Total Output, as well as the Gross Added Value are located in this stratum.

Productivity rate for the different variables (hand labour, unit surface, or unit suckler cow) reaches the highest values in this stratum, making this group be the one having the best economic results.

## IV. CONCLUSIONS

Five groups are clearly differentiated with regard to their productive structure and economic variables. Practically all the farms combine agricultural and livestock activity, thus being a way to increase the added value by means of the intra-consumption of part of the crops output.

Though the size of the farm plays an important role in the economic results, these ones increasing with the number of cows, is not the only variable to be considered, as other important aspects are subsidies, businessman's profile, costs outside the farm, intra-unit consumption or the degree of complementation existing between livestock and agriculture

Subsidies are important not only for the survival of small farms, but also to compensate the high costs of those of a larger size (as group 4).

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