# Farmers' attitudes towards lamb meat production under a Protected Geographical Indication

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## A R T I C L E   I N F O

## A B S T R A C T

The aim of the present work is to analyse farmers' attitudes towards the production of lambs under a Protected Geographical Indication in Spain as well as to identify farmer profiles based on these attitudes. The information used in this study was chiefly obtained from surveys carried out on a sample of 49 sheep farmers producing PGI lambs, located in *Aragón*, a region in the north east of Spain, which is an area that typically produces lamb meat. The statistical analysis consisted of descriptive analyses and the development of factor analyses and a cluster analysis, the latter aimed at segmenting farmers according to attitude. The results suggest it is commercial aspects that most determine the farmer's choice to produce PGI lambs. Furthermore, three segments of producers with considerably differing attitudes towards PGI production were identified. A first segment of producers acknowledge the commercial benefits that PGI production offers. The second segment of farmers, although they produce lambs under the PGI, are not particularly convinced of the potential commercial advantages and the third segment, which is the largest, is fairly indifferent towards the production of lambs under the PGI. Producer age and family composition enable the three segments of farmers to be differentiated.

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## 1. Introduction

Unlike consumers, from the producers' point of view, quality is essentially based on the measurement of product characteristics, i.e., qualities that can be technically measured and compared with predetermined standards (Grunert et al., 1997; Bello and Calvo, 1998; Becker, 2000; Maza and Ramírez, 2006; Osorio and Osorio, 2006). Standards are specifications or groups of specifications relating to the characteristics of a product or processes that act as a type, model, norm, pattern or reference (Bredahl and Normile, 2001). Standards are technical requirements that are often legislated or established by governments but they can also be developed and implemented voluntarily at a specific point or at different points in the agro-food chain (Bredahl and Normile, 2001).

Quality marks such as publically owned Protected Geographical Indications or PGIs, are in effect quality assurance schemes aimed at assuring production methods and the integrity of traditional and regional products (Becker, 2009; Bredahl and Normile, 2001; Ilbery and Kneafsey, 2000). PGIs are considered to respond to consumers' concerns or the demand for "traditional", "authentic" products, but furthermore they are seen as a way of favouring the interests of private producers and of promoting development in the

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most disadvantaged rural areas (Ilbery and Kneafsey, 2000; Dimara et al., 2004). This latter aspect is particularly important with sheep farming, due to its capacity to use grazing resources in disadvantaged areas and employ family labour away from the large urban nuclei, thus playing an important role in preventing depopulation in depressed areas (Milán et al., 2003).

For the producers, especially the smallest ones, adopting quality assurance schemes involves a considerable economic effort, chiefly due to the on-farm inspections that have to be carried out once the scheme has been implemented (Fearne and Walters, 2004; Gómez et al., 2003), hence it is only to be expected that producers want to obtain some kind of return (improvements in their well being) from this extra investment into resources (Lapan and Moschini, 2009). Obtaining higher prices can be considered to be a significant motivating aspect in the decision to produce under a PGI, however, adopting voluntary quality assurance schemes is not always associated with obtaining a higher price for the product (Dimara et al., 2004; Fearne and Walters, 2004). Hence, other benefits such as access to markets and improvements in farm administration may also be aspects that motivate farmers' actions in adopting such schemes (Dimara et al., 2004; Hubbard et al., 2006; Fearne and Walters, 2004).

In spite of the importance attributed to PGIs and contrary to the case of consumers, there is very little literature on aspects that motivate farmers to adopt these production-differentiating mechanisms (Dimara et al., 2004). In spite of this, amongst the studies that have been carried out on this subject, those by Fearne and Walters (2004), Verbeke et al. (2005), De Haes et al. (2004), Bosmans et al. (2005), Spriggs et al. (2000) and Gómez et al. (2003), chiefly concerned with the bovine and porcine sectors, are particularly noteworthy. The aim of the present work is to analyse the attitudes of farmers towards the production of lambs under a PGI in Spain as well as to identify the different profiles of producers based on these attitudes. The profiles are characterised by the extent to which the farm is oriented towards PGI production, the farmers' objectives (economic, lifestyle and sustainability) and socio-demographic variables.

## 2. Methodology

In the lamb meat sector in Spain, which is the subject matter of our study, there are five PGIs. In 2007 these PGIs, as a whole, accounted for 1.8% of Spain's total lamb meat production. This study concentrates on the Ternasco de Aragón PGI which was the first specific designation for meat that was approved in Spain and has the greatest market share at national level (46.2%) within PGI lamb meat production (MARM, 2007, 2008). In addition to its significant economic importance, the beneficial effects of sheep farming in preventing depopulation in rural areas, its contribution to achieving an ecological balance as well as the tradition of this farming activity in this part of the country, are to be taken into consideration (Milán et al., 2003; Pérez et al., 2003). The lambs produced under the Ternasco de Aragón PGI are young animals fed from birth on their mothers' milk and natural cereals and slaughtered at a carcass weight of between 8.0 and 12.5 kg, and an age of between 70 and 90 days (MARM, 2010).

### 2.1. Selection and description of the sample

The information used in this study was mainly obtained from personal interviews based on questionnaires, carried out on a sample of 49 sheep farmers located in rural areas of *Aragón*, in the north east of Spain. A convenience sample was carried out (Santesmases, 2004) and information was compiled during the winter and spring of 2008.

Bearing in mind the aims of this study, the farmers selected all produced lamb meat under the *Ternasco de Aragón* PGI. The producers form part of the economic-technical data recording program for meat sheep carried out by the Technological College of Huesca (University of Zaragoza) and *Carnes Oviaragón SCL* farming cooperative. The farmers belonging to this programme have participated in other studies related to this same sector (e.g. Pardos et al., 2008), due to their willingness to provide information and the reliability of said information. It is important to highlight that *Carnes Oviaragón SCL* farming cooperative, apart from being one of the largest organisations for the production of lamb meat in Spain, has the highest percentage of PGI *Ternasco de Aragón* lamb production. The socio-demographic characteristics of the sample are shown in Table 1.

The sample of farmers is chiefly formed by men with a mean age of 44.8 years, located in 31 municipalities in *Aragón*. 76.7% of the producers interviewed live with their partner and 70.8% have children. Furthermore, the mean lamb production experience that the producers interviewed have is 24.6 years although there are producers with less experience (1 year) or much more experience (62 years) producing lambs. The mean percentage for PGI lamb production in the sample is 76.9%.

The information on the percentage of PGI-produced lambs for the same year as that in which the information was gathered (2008) was extracted from the data base of the economic-technical data recording program. This mean percentage (76.9%) is considerably higher than expected as only 15.5% of lamb meat production in *Aragón* corresponds to *Ternasco de Aragón* PGI (MARM, 2007, 2008). This mean value is, however, due to the special characteristics of the sample since, as previously mentioned, it refers to farmers who were already producing lamb meat under the PGI. In the sample we can find a range of producers: from those with a low orientation towards lamb production under a PGI (less than 50% of the total population) to those with a high orientation towards PGI lamb production (more than 90% of the total production).

### 2.2. Survey design

The closed-type omnibus questionnaire comprised three blocks of questions. The first block referred to farmers' attitudes towards the production of lambs under the *Ternasco de Aragón* PGI. The second block asked about the farmers' objectives and the third block referred to socio-demographic variables such as age, gender, family composition, and years farming.

To assess the attitudes of farmers towards the production of *Ternasco de Aragón* PGI lambs, a Likert 5-point scale was used, where 1 = total disagreement and 5 = total agreement. The statements in this block of questions (see Fig. 1), are based on previous works by Verbeke et al. (2005), De Haes et al. (2004) and Bosmans et al. (2005). Furthermore, to obtain information on the importance of a series of objectives that the farmers aspire to achieve, an ordinal value scale from 1 to 5 was used, where 1 = not important at all or of very little importance, 2 = not very important, 3 = averagely important, 4 = quite important and 5 = very important. The items included in this block of questions and their grouping into economic objectives, lifestyle objectives and sustainability objectives (see Annex A, factor analysis tables), were chiefly obtained using the tool for measuring farmers' objectives developed by Willock et al. (1999), and the items proposed by Gil et al. (2003) and Maybery et al. (2005). The attitudes towards PGI and farmers' objectives to a certain degree determine the behaviour of the farmers, which in our case is the production of lambs under the PGI (Maybery et al., 2005; Willock et al., 1999).

**Table 1**
Socio-demographic characterisation of the producer sample.

| Socio-demographic variables | |
| --- | --- |
| Age of producer (mean in years) | 44.8 |
| Sex (percentage) | |
|   Men | 91.1% |
|   Women | 8.9% |
| Living with partner-Yes (percentage) | 76.7% |
| Has children-Yes (percentage) | 70.8% |
| Experience in lamb production (mean in years) | 24.6 |
| PGI lamb production (mean percentage) | 76.9 |

**Attitudes of farmers towards PGI lamb production**



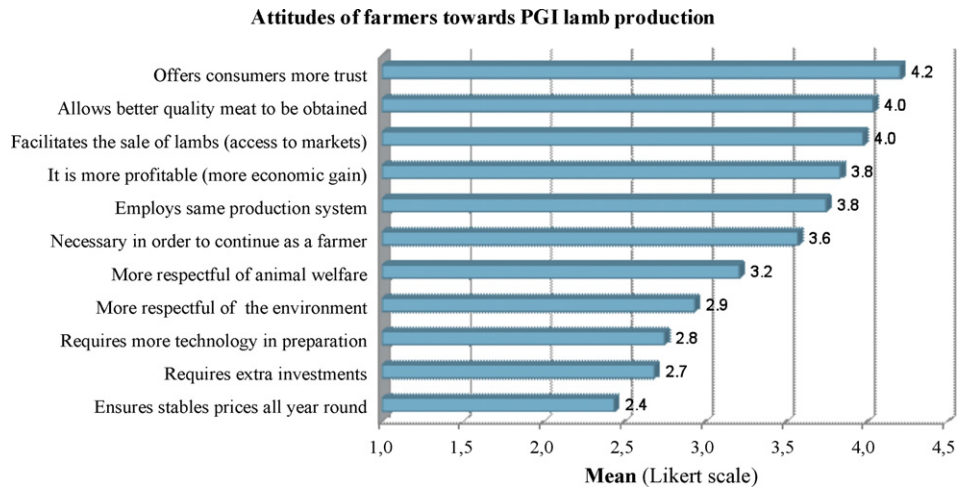| | Mean (Likert scale) |
|---|---|
| Offers consumers more trust | 4.2 |
| Allows better quality meat to be obtained | 4.0 |
| Facilitates the sale of lambs (access to markets) | 4.0 |
| It is more profitable (more economic gain) | 3.8 |
| Employs same production system | 3.8 |
| Necessary in order to continue as a farmer | 3.6 |
| More respectful of animal welfare | 3.2 |
| More respectful of the environment | 2.9 |
| Requires more technology in preparation | 2.8 |
| Requires extra investments | 2.7 |
| Ensures stables prices all year round | 2.4 |

**Fig. 1.** Attitudes of farmers towards "Ternasco de Aragón" PGI lamb production.

Once the initial design of the questionnaire had been decided it was discussed by a panel of experts formed by researchers from the Technological College of Huesca (University of Zaragoza) and technicians from the *Carnes Oviaragon SCL* farming cooperative, in order to decide on the questions to be included in the final questionnaire.

### 2.3. Statistical analysis

The SPSS statistical package, version 14.0 was used to analyse data. Two multivariate statistical techniques were used, factor analysis and cluster analysis. Prior to this univariate analyses were carried out on all the variables included in the study to observe their individual behaviour and to detect outliers.

The factor analysis, a technique employed to reduce and summarise information, was carried out on the blocks of questions referring to the farmers' attitudes towards PGI lamb production (Likert scale) and on the block of questions relating to farmers' objectives. In these blocks of questions that included ordinal type variables, a factor analysis was used to reduce the information since, from a statistical point of view, in this technique the assumptions of linearity and normality in the variables can be obviated, whilst at the same time bearing in mind the need for a minimum number of approximately 50 observations in order to apply it (Hair et al., 1999). Unlike other data-reducing techniques such as the Non-linear Principal Components Analysis which is based on the use of qualitative variables, we opted to use the factor analysis because it is easier to identify the relationships between variables and the components to be retained (Saegusa et al., 2004). However, given the differences that exist between attitudes and farmers' objectives (Willock et al., 1999), the factor analyses were performed separately between blocks of questions, as conceptually this would be of little validity.

The principal components method was used to extract factors and the Kaiser–Meyer–Olkin index and Bartlett's test of sphericity were used to measure correlation between variables. Those variables with a low communality, $h < 0.6$, were not included in the factor analyses since this indicates that these variables are not sufficiently correlated with the new factors obtained. The factors selected were those that presented eigenvalues $\geq 1$. In order to gain a better understanding of the factors obtained, an orthogonal rotation was carried out by the Varimax method. The factor scores were estimated by the regression method and they were consequently saved as new variables to be used in the cluster analysis (Hair et al., 1999; Uriel and Aldas, 2005). The results of the factor analyses in terms of farmers' objectives are presented in Annex A, whilst the results of the factor analyses relating to attitudes are presented in Table 2.

A cluster analysis was carried out in order to identify farmer profiles in accordance with their attitudes towards PGI lamb production. The conglomeration method used was the two-step method. Unlike hierarchical and non-hierarchical methods, this method was used in order to take maximum advantage of the benefits that both methods offer (Hair et al., 1999). The distance measurement used was that of maximum likelihood, calculated using the factors relating to attitudes obtained in the previous step (Table 2) and the number of conglomerates was automatically identified. Having defined the clusters, they were then characterised based on their orientation towards PGI production, socio-demographic variables (having children, living with partner, age and experience in the activity), factors relating to attitudes, factors relating to economic objectives, lifestyle and sustainability objectives (Table 3). In order to identify the most important variables that allow discrimination between clusters,

**Table 2**
Factor analysis of attitudes of farmers towards PGI production. Rotated component matrix.

| Attitudes towards PGI lamb production (Likert scale) | Components | | |
|---|---|---|---|
| | Marketing factor | Friendly production factor | Investment factor |
| Offers consumers more trust | 0.81 | 0.03 | 0.18 |
| Allows better quality meat to be obtained | 0.78 | −0.06 | −0.08 |
| Facilitates sale of lambs (access to markets) | 0.77 | 0.14 | 0.23 |
| Employs practically the same production system | 0.56 | 0.19 | −0.47 |
| Is more respectful of the environment | 0.10 | 0.88 | 0.33 |
| Is more respectful of animal welfare | 0.19 | 0.86 | 0.25 |
| Ensures stable prices all year round | 0.30 | −0.51 | 0.39 |
| Requires extra investments | 0.03 | 0.21 | 0.82 |
| Requires more technology in preparation | 0.14 | 0.25 | 0.76 |
| Percentage of explained variance | 32.0% | 21.8% | 14.4% |

*Note*: The variables "it is more profitable (more economic gain) and it is necessary to continue as a farmer" were not included in the factor analysis because they displayed low communality ($h = 0.470$ and $h = 0.474$, respectively).

**Table 3**
Characterisation of the clusters obtained.

| Variables | Cluster 1 ($n = 11$) | Cluster 2 ($n = 20$) | Cluster 3 ($n = 14$) |
|---|---|---|---|
| Production of lambs under PGI/Total production of lambs (mean percentage)[**] | 81.2 | 62.0 | 87.8 |
| Socio-demographic (a) | | | |
| Has children-Yes (percentage)[**] | 63.6% | 90.0% | 50.0% |
| Living with partner-Yes (percentage)[*] | 90.0% | 87.5% | 57.1% |
| Age of producer (mean)[****] | 56.00 | 43.15 | 39.29 |
| Time in lamb production (mean in years)[***] | 37.27 | 23.00 | 17.14 |
| Attitudes towards PGI lamb production (b) | | | |
| It is more profitable (more economic gains)[***] | 3.91 | 3.30 | 4.64 |
| It is necessary to continue as a farmer | 3.64 | 3.32 | 3.79 |
| Marketing factor[****] | 0.10 | −0.57 | 0.93 |
| Friendly production factor[***] | 0.84 | −0.10 | −0.48 |
| Investment factor | 0.32 | −0.27 | 0.04 |
| Economic objectives of the farmers (b) | | | |
| Good state of the farm factor | −0.33 | −0.11 | 0.32 |
| Additional sources factor | 0.16 | 0.08 | −0.23 |
| Technology factor | −0.44 | 0.07 | 0.22 |
| Economic resources factor[*] | −0.35 | 0.26 | −0.09 |
| Lifestyle objectives of the farmers (b) | | | |
| Personal and family development factor[*] | −0.57 | 0.42 | −0.21 |
| Status factor | −0.40 | 0.13 | 0.12 |
| Quality of life factor | 0.03 | −0.08 | 0.15 |
| Sustainability objectives of the farmers (b) | | | |
| Sustainability factor | 0.28 | −0.07 | −0.08 |

*Note*: To identify the most significant variables that describe the clusters, the following tests were carried out: (a) Chi-square test and (b) Kruskal–Wallis test for comparing two independent sample ranges.

[*] $p$ value < 0.1.
[**] $p$ value < 0.05.
[***] $p$ value < 0.01.
[****] $p$ value < 0.001.

the contingency tables were employed with their respective Chi-square tests and Kruskal–Wallis test to compare ranges of independent samples (Glantz, 2006; Uriel and Aldas, 2005).

## 3. Results

### 3.1. Attitudes of farmers towards PGI lamb production

The results obtained from the Likert scale relating to the farmers' attitudes towards the production of lamb under a PGI are shown in Fig. 1. Producers in general consider, to a greater extent, that producing lambs with a quality mark offers consumers greater trust, allows a better quality of meat to be obtained, facilitates the sale of lambs, is more profitable and that, basically, it employs the same production system as non-PGI lamb production systems. However, producers tend to agree less with the statement that the production of lambs under the PGI is more respectful of the environment and animal welfare, that it requires more production technology, an extraordinary investment and ensures stable prices during the whole year.

After carrying out a factor analysis, three factors were obtained that explain 68.2% of the total variance (see Table 2). Bartlett's sphericity test ($p$ value < 0.001) and the KMO = 0.592, indicate that the variables included in the analysis are significantly correlated to each other. The first factor relating the variables: "producing PGI lambs . . . offers consumers greater trust, allows better quality meat to be obtained, facilitates the sale of the lambs and it practically employs the same production system", has been

termed the marketing factor. The second factor obtained that positively relates the variables: "is more respectful of the environment, more respectful of animal welfare" and negatively relates the variable "ensures stable prices all year", has been termed the friendly production factor. The third factor that positively relates the variables: "requires extraordinary investments and more technology in production" and negatively relates the variable "practically employs the same production system", is termed the investment factor. It is important to note that the variable "employs the same production system" is correlated with the first and last factor but with moderate coefficients. Hence, the farmers' attitudes towards lamb production under production differentiation schemes can be resumed in three attitude constructs: marketing, friendly production and investment attitudes.

### 3.2. Segmentation of farmers

The cluster analysis carried out using, as distance variables, the factor scores of the producers with regard to the three factors related to attitudes, suggests that there are three groups of producers. The characterisation of the clusters that was carried out using socio-demographic variables, percentage of PGI production and the factors obtained from attitudes and farming objectives, are presented in Table 3.

The percentage of production of *Ternasco de Aragón* (orientation towards PGI production) ($p$ value < 0.05),

socio-demographic variables such as the fact of having children ($p$ value < 0.05), living with partner ($p$ value < 0.1), age of producer ($p$ value < 0.001) and the farmers' experience in lamb production ($p$ value < 0.001), enable us to discriminate between the clusters obtained. Furthermore the variables "it is more profitable", the marketing factor and friendly production factor belonging to the group of variables that refer to the attitudes of the farmers also help us to achieve a better characterisation of the three clusters ($p$ value < 0.01). Only two factors corresponding to the farmers' objectives: the economic resources factor and the personal and family development factor, are shown to be significant when discriminating between the segments obtained ($p$ value < 0.1).

The three segments are of a substantial and comparable size. The first segment has been termed "pessimistic producers of quality lamb", the second segment has been given the name of "producers with little orientation towards quality lamb production", and the third segment has been called "optimistic producers of quality lamb".

Cluster 1 is formed by farmers who produce a high proportion of PGI lambs, the average being 81.2%. Furthermore they are the farmers with the highest mean in age and years of production (56.0 and 37.37 years, respectively) and in 63.6% and 90.0% of the cases they have children and live with their partners. They hold PGI lamb production in high regard, considering that it is more profitable than initiatives that do not involve the PGI. However their attitudes are not as positive when it comes to considering the quality initiative of PGI lamb production rather than non-PGI lamb as a key factor in marketing their production. On the other hand they have quite a positive attitude towards considering this quality initiative to be more respectful of the environment and animal welfare. In relation to economic objectives, the attitude towards the economic resources factor is fairly negative, indicating that, amongst their expectations in life, they do not contemplate obtaining income outside the farm in order to keep their activity going, but rather focus their attention on obtaining maximum profit from their farm. With regard to lifestyle objectives, they are not particularly positive towards the personal and family development factor and state that they do not aspire in particular to having holidays on a regular basis, devoting their time to other activities and spending more time with the family.

Cluster 2, which is larger in size, is formed by the farmers with the least percentage of PGI production, corresponding to an average of 62.0%. In this case, it includes the largest proportion with children (90%) and a high proportion that live with their partner (87.5%), and intermediate ages and years producing lambs. They are not as convinced that producing lambs under the PGI is a more profitable activity. In addition their attitudes are fairly negative towards the marketing factor and they are not as much in agreement with the fact that this quality initiative boosts consumer confidence, allows better quality meat to be obtained and facilitates the sale of lambs. They have scores that are slightly negative towards considering that PGI lamb production is environmentally friendly and respectful of animal welfare. Within the farming objectives, they are those who are most interested in obtaining income outside the farm rather than obtaining the maximum profit possible from it. Furthermore they tend to be keener on

achieving personal and family development and want to have holidays every year, devote time to other activities they like and to spend more time with their family.

Cluster 3 is formed by the farmers who have the highest percentage of PGI production, with a mean of 87.8%. In this case they have the least proportion of children (50.0%) and living with partner (57.1%) as well as the youngest ages and least farming experience.

There is a high level of agreement that the PGI production is more profitable than lamb production that does not come under this quality initiative. Furthermore, they have the most positive stance in relation to the marketing factor. They thus consider to a greater extent, that producing lambs under the PGI offers the consumer a greater trust factor, allows better quality meat to be obtained, and helps in the sale of lambs.

However, their more negative position towards the friendly production factor, leads us to believe that they are less inclined to acknowledge that that producing PGI lambs is an activity that is more respectful of animal welfare and the environment. As far as the economic resources factor is concerned, they display intermediate scores. It could be interpreted that they consider both obtaining other income outside the farm and obtaining the maximum profit possible from the farm, but do not opt for a single strategy to obtain resources unlike those forming clusters 1 and 2. In relation to the personal and family development factor, they reveal a position that is not as positive towards wanting holidays each year, being able to devote time to other activities they like and spending more time with their family, although their positions are less negative than those presented in cluster 1.

## 4. Discussion

This research focused on analysing the attitudes of sheep farmers towards the production of lambs under production differentiation schemes and, at the same time, on identifying profiles of farmers by relating them to their orientation towards PGI production, socio-demographic variables, farmers' attitudes and farming objectives.

As a rule it is commercial aspects that most encourage farmers to embrace PGI production since offering greater consumer trust, obtaining better quality meat and facilitating lamb sales are all highly valued aspects. Ilbery and Kneafsey (2000), Hubbard et al. (2006), Fearne and Walters (2004), Verbeke et al. (2005) and Spriggs et al. (2000) underlined that the motivations that lead producers to form part of voluntary quality assurance schemes are: remaining in business and guaranteeing access to markets. In these initiatives, market access may be through specialised advertising and offering consumers greater trust (Ilbery and Kneafsey, 2000). Bosmans et al. (2005) and Spriggs et al. (2000) pointed out that producers of meat with quality marks place greater expectations on said marks than producers who did not have them, since they considered that the quality mark was an important buying factor for consumers whilst, at the same time offering consumers greater confidence.

It is also noteworthy that in general the farmers interviewed consider that PGI production systems, compared

to conventional systems are similar and do not require more technology or resources. De Haes et al. (2004) indicated that many farmers considered that there was little difference between production systems with or without quality marks. Furthermore, Fearne and Walters (2004) found in the United Kingdom, that the costs of compliance for farmers to opt for quality assurance schemes were generally minimal as the vast majority complied with the pre-established requirements of the norm.

An interesting aspect that is worth highlighting is that the farmers consider that producing PGI lambs is a more profitable activity. Our results do not coincide with those obtained by Gil et al. (2003) who pointed out that farmers did not seem to associate greater profits with producing better quality. This divergence is due to the fact that the sample used by Gil et al. (2003), included a very small percentage of producers oriented towards PGI lamb production and thus this association would be related more to the farmers who did not produce PGI lamb. Although it is true that it is only in a setting in which there are no subsidies that the percentage of PGI lamb sales significantly affects the economic results of sheep farms (Maza et al., 2008), what would seem to be clear is that producing under certain quality assurance schemes allows higher product prices to be obtained and better farm management practices to be put in place, which can lead to greater economic efficiency (Fearne and Walters, 2004).

In more detailed terms, it would seem that there are segments of farmers with diverging attitudes and that this is closely related with their degree of orientation towards PGI production. Three segments of farmers were identified: the optimists with a high orientation towards PGI production (cluster 3), the pessimists with a high orientation towards PGI production (cluster 1) and the lesser PGI producers (cluster 2). Hence, within the producers with a high orientation towards PGI production (clusters 1 and 3) there would seem to be two segments of producers. To this regard, De Haes et al. (2004) and Ilbery and Kneafsey (2000) found that within the segment of farmers that produced under a quality mark, less than half of them considered the mark as an initiative that generates commercial value.

The segment of farmers considered to be more optimistic is found to be highly convinced of the commercial benefits and greater profitability of producing under this differentiation scheme. Gil et al. (2003) pointed out that the most optimistic producers in the sheep sector were those that opted for PGI lamb production. This segment of optimistic farmers is clearly represented by the younger producers. Consequently, the younger producers are those that appear to be more willing to adopt quality assurance schemes since, in comparison to those who are older, they are more willing to take risks in adopting new methods and forms of production (Dimara et al., 2004; Johansson, 2007; Ilbery and Kneafsey, 2000). Furthermore, younger farmers are more open to new ideas and new technological changes which may help them to take decisions that increase their production efficiency, from which greater economic gains may derive (Johansson, 2007). The farmers belonging to this same segment seem to be more open to different initiatives for generating economic income and do not appear to be as concerned about their personal and family development. Whilst the former indicates that the younger farmers are more open to new opportunities, the latter may be due to the moderate percentage with partners and children, which characterises this segment.

The segment of pessimistic farmers, characterised by a high orientation towards the PGI production is formed by the older producers and with an average proportion having children. Contrary to the optimists, they are not as convinced that PGI production is an important higher quality initiative although they have a certain positive perception towards PGI generating more economic income. The latter is of importance if we bear in mind that for those forming part of this cluster it is very important to obtain the maximum benefits possible from their farm, hence PGI could be seen as a means to achieving this objective.

Gil et al. (2003) found that it would seem that the farmers who have been in production for the longest time were those who placed the emphasis on maximising profits. This concern about obtaining the maximum profit possible, can be explained by the current crisis that sheep farming is experiencing (Gil et al., 2003), together with the fact that the hopes of achieving a better remunerated activity decreases with age, which would mean that they focus their actions more on their own farm (Clark et al., 1996).

Contrary to the optimists, the pessimistic producers have a more positive attitude towards PGI lamb production as an activity that is environmentally friendly and respectful to animal welfare. It would thus seem that for the older farmers, i.e., the pessimists, there is a greater link between agricultural production and nature conservation (Ondersteijn et al., 2003). In addition, from the point of view of some farmers, production under quality schemes is wrongly associated with ecological production, probably because PGI production is usually associated with traditional production methods and environmentally friendly production methods (Dimara et al., 2004).

The segment of farmers with least orientation towards PGI production is not as convinced that PGI is an important initiative for higher quality, also coinciding in their evaluations in that PGI production does not generate large economic gains. Hence, the less the orientation towards PGI production is, the less the perceived benefits of said production are (Gil et al., 2003; Ilbery and Kneafsey, 2000). The farmers belonging to this segment are more interested in obtaining income outside the farm and in developing at a personal and family level. A greater interest in obtaining income outside the farm may be due to: (i) the current crisis that the sector is experiencing, (ii) the need for economic stability and to reduce risk due to the composition of the household (living with children and partner) and (iii) the possibilities that they may have to work outside the farm, due to the mean age that characterises this cluster. A greater interest in personal and family development is patent if we observe that 90.0% of those forming this group have at least one child and this would be a motivation for wanting to spend more time with their family.

## 5. Conclusions

This work analyses the attitudes of farmers towards meat lamb production under a PGI in Spain. Furthermore

it identifies segments of farmers in accordance with these attitudes and their relationship with a series of socio-demographic variables, farming objectives and the degree of orientation of farms towards the production of quality lamb.

The commercial aspects that are most valued by farmers for PGI lamb production were identified. Hence, better access to markets and offering consumers greater trust are considered to be decisive factors by farmers who opt for this quality production. Another noteworthy fact is that choosing PGI lamb production rather than conventional methods is not seen as an activity that demands more resources and technology, and this can be considered as a positive aspect in relation to more farmers taking on PGI production.

Three segments of farmers were obtained, clearly characterised by their motivations, production orientation and socio-demographic variables. The objectives sought by the farmers, were not very discriminating in terms of characterising the segments obtained, with the exception of a couple of objective constructs relating to lifestyles and economic aspirations. The segment of farmers formed by the younger persons, with a low percentage having children and living with a partner, which could be considered as those who are at the growth stage (Ondersteijn et al., 2003), are those who, to a greater extent, acknowledge the potential advantages derived from the production of lambs under a PGI. Furthermore, this segment displays the greatest orientation towards PGI lamb production. Consequently the PGI regulatory bodies and farmer cooperative groups should consider this segment of producers in order to analyse their tendencies with the aim of establishing future policies and strategies to encourage a greater adoption of the PGI if this is laid down as a priority objective.

Although this study is limited to a specific area of Spain, the results obtained are indicative of certain aspects that motivate farmers to produce foods under production differentiation schemes such as the PGIs. Given the importance of this issue and the scarce literature available, future research work should be carried out to corroborate our results and widen knowledge in this area.

### Acknowledgements

### Annex A. Results of the factor analyses (farming objectives)

Economic objectives of farmers. Rotated component matrix.

| Economic objectives of farmers. Ordinal value scale | Components | | | |
|---|---|---|---|---|
| | Good state of farm factor | Additional sources factor | Technology factor | Economic resources factor |
| To have the best flock | 0.84 | −0.19 | −0.02 | −0.01 |
| To maintain buildings, equipment and machinery in a good state of repair | 0.75 | 0.29 | 0.03 | −0.17 |
| To have as little indebtedness as possible | 0.53 | 0.30 | −0.36 | 0.30 |
| To have other training apart from being a farmer | 0.07 | 0.75 | 0.06 | 0.15 |
| To have other activities on the farm apart from sheep | 0.05 | 0.74 | 0.07 | −0.06 |
| To adopt new production technologies | 0.02 | −0.08 | 0.85 | 0.24 |
| To use their own resources on the farm | −0.08 | 0.30 | 0.78 | −0.10 |
| To obtain income outside the farm in order to maintain the farming activity | 0.07 | 0.26 | 0.23 | 0.80 |
| To obtain the maximum profit possible from the farm | 0.40 | 0.37 | 0.15 | −0.64 |
| Percentage of explained variance | 23.9% | 19.7% | 13.5% | 11.4% |

*Note*: The variable: "increase the size of the farm" was not included in the factor analysis due to the fact that it displayed low communality ($h = 0.42$).

Lifestyle objectives of farmers. Rotated component matrix.

| Lifestyle objectives of farmers. Ordinal value scale | Components | | |
|---|---|---|---|
| | Personal and family development factor | Status factor | Quality of life factor |
| To have holidays each year | 0.86 | 0.16 | 0.13 |
| To be able to devote time to other things I am interested in | 0.85 | 0.18 | 0.10 |
| To spend more time with my family | 0.75 | −0.14 | 0.05 |
| To participate and win in demonstrations and shows | 0.16 | 0.79 | 0.00 |
| To pass on the farm to a member of my family | −0.04 | 0.76 | −0.06 |
| To be well considered by my neighbours and by other farmers | −0.04 | 0.58 | 0.56 |
| To save for retirement | 0.11 | 0.02 | 0.84 |
| To improve quality of my life and that of my family | 0.49 | −0.25 | 0.58 |
| Percentage of explained variance | 33.1% | 20.6% | 13.6% |

Sustainability objectives of farmers. Rotated component matrix.

| Sustainability objectives of farmers. Ordinal value scale | Component Sustainability factor |
|---|---|
| To help in conserving the environment | 0.88 |
| To ensure that I leave the land in the same good state as I found it. | 0.85 |
| To maintain the rural world | 0.80 |
| To use chemicals as little as possible | 0.79 |
| To improve the quality of the farm | 0.74 |
| Percentage of total explained variance | 66.4% |

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