What Does Society Demand from Rural Areas? Evidence from Southern Spain

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1. Introduction

The concept of multifunctionality first emerged in the European Union at the end of the 1990s (EC, 1998 and 1999) in reference to the wide range of goods and services that agriculture offers to society as a whole. The foregoing goods and services include both those traded commercially (private goods) and also those that lack a market to be traded on (public goods), as is the case with most environmental (e.g. conservation of biodiversity) and social externalities (e.g. the contribution to the viability of rural communities) linked to agricultural activity. From this perspective, the existence of multifunctional agricultural activity that satisfies the needs of society through the provision of non-market goods and services justifies government intervention in a market economy. In this sense, one of the main objectives of agricultural policy should be to implement incentives for such public goods to be provided accordingly (Cooper et al., 2009).

Following the same philosophy, the concept of multifunctionality has been used in other economic sectors and also applied to different types of territories. In this sense, *rural multifunctionality* refers to the (private and public) goods and services that rural areas provide, regardless of whether or not they are related to agriculture (Hoggart et al., 1995; Knickel and Renting, 2000; Potter, 2004; Holmes,

Abstract

This study analyses the preferences of Andalusian people for the functions that rural areas should perform. Based on a survey and using the Analytic Hierarchy Process (AHP), three generic (economic, environmental and social) and nine specific functions are evaluated. The results show that environmental functions are the most highly valued (52%), followed by social (26%) and economic functions (22%). There are significant differences between the urban and rural valuation of functions, the latter assigning greater importance to environmental functions. As to the nine specific functions, the conservation of land and water resources was deemed to be the most important function (23%).

Keywords: *multifunctionality, countryside, AHP, public goods.*

Résumé

Dans cette étude, nous allons analyser les préférences des habitants de l'Andalousie à l'égard des fonctions que les zones rurales devraient assurer. En s'appuyant sur une enquête et en appliquant la méthode du processus analytique hiérarchique (AHP), trois fonctions génériques (économique, environnementale et sociale) et neuf fonctions spécifiques sont évaluées. Les résultats montrent que les fonctions environnementales sont les plus appréciées (52%), suivies des fonctions sociales (26%) et économiques (22%). Par ailleurs, des différences significatives sont soulignées entre l'appréciation des fonctions par la population urbaine et la population rurale dans la mesure où cette dernière accorde une plus grande importance aux fonctions environnementales. Quant aux neuf fonctions spécifiques, la conservation des terres et des ressources en eau a été indiquée comme étant la plus importante (23%).

Mots-clés: *multifonctionnalité, paysage, AHP, biens publics.*

2006; Mander et al., 2007). This circumstance also justifies the existence of rural policy, which should consider, as one of its top priorities, promoting rural activity that maximises social wellbeing or social utility, taking into account both the costs of providing such goods and also the demand for each of them (OECD, 2006).

In this context, rural multifunctionality should be studied from two different angles (OECD, 2001 and 2003). On the one hand, we must analyse the supply side of this concept in order to define the groups of goods and services that can potentially be produced in rural areas and analyse whether public and private goods complement each other or are substitutes. On the other hand, on the demand side, we must also value each of the possible groups of such products in terms of wellbeing or social utility. Only by combining both approaches (supply and demand), we can determine optimum performance for rural areas from a public point of view. And this information is necessary to design the policy instruments required to overcome existing market failures and thereby maximise the social utility associated to rural activity.

The literature includes a growing number of studies that analyse rural multifunctionality from different perspectives within the theoretical framework described above (see the research by the OECD, 2001; van Huylenbroeck and Durand, 2003; Brouwer, 2004; and Wilson, 2007 among others). In this vein, a large number of authors have focused on the demand side (see McVittie et al., 2009 for a recent review of the literature). The majority of such studies aimed to assess the economic value of single goods and services

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generated in rural areas (landscape, biodiversity and habitats, water or air quality, etc.). However, there are few studies in this strand of the literature that have considered social preferences for the whole set of goods and services produced in rural areas (Hall et al., 2004; Gómez-Limón et al., 2012).

This research intends to fill that gap in the literature by analysing the social demand for rural multifunctionality through a public opinion survey. Therefore, the first question this paper seeks to answer is "what functions would citizens like rural areas to perform in their region?" Individuals can be expected to display a wide variety of preferences; for this reason the second stage of this study also aims to ascertain the factors that determine such opinions.

The answers to both questions are important for two main reasons. In the first place, studying the demand for the different functions that rural areas perform is useful for designing rural development strategies and policies, as mentioned previously, in order to improve the "governance" of rural areas and gear the activity towards meeting social demands (increasing social utility). In the second place, more detailed information regarding the heterogeneity of social preferences for rural multifunctionality will also be useful for politicians, who will obtain valuable data regarding the demand of each type of voter and may act accordingly (Papadakis, 1992).

In considering the territorial nature of rural multifunctionality mentioned previously, any study in the line of research proposed must obviously be performed on a specific geographical area. As a result, we have chosen the rural area in the autonomous region of Andalusia (Spain) for our applied analysis. Thus, the research addresses the opinion of the citizens in the chosen autonomous region regarding their own rural areas.

In order to achieve the objectives established above, the paper has been organised as follows. Following this introduction, the second section discusses the state of the art on the concept of rural multifunctionality and explains the methodology used in the empirical analysis of the demand for the various functions performed in rural areas. The third section describes the geographical area considered in the case study. The fourth section presents the results obtained, first by describing aggregate public opinion regarding rural multifunctionality and second by analysing the heterogeneity observed in the responses depending on the socio-demographic and economic variables of the individuals surveyed. The fifth and last section of the paper presents the conclusions drawn from this research.

2. Methodology

2.1. Defining multifunctionality

According to the OECD (2001), the concept of multifunctionality describes production systems in which the following three circumstances occur: a) the existence of *joint production processes*, which yield both private and other goods and services with characteristics of externalities, b) the *public good* nature of those externalities, and c) the existence of *market failures* due to farmers allocating production factors exclusively on the basis of producing private goods (those which remunerate the production activity), which can result in under- (over) producing the public goods and services associated to the private goods by way of joint production processes.

This notion of multifunctionality was first applied to certain economic sectors, particularly agriculture (Gómez-Limón and Barreiro, 2007; Kallas et al., 2007a). However, the idea can also be applied to a specific territory, such as the case of rural areas, which saw the emergence of *rural multifunctionality*. This concept is typically horizontal and includes all the activities that can be performed in rural areas, regardless of whether they are eminently agricultural, related to agriculture or entirely independent of that primary sector (Potter, 2004). Therefore, rural multifunctionality is based on the territory and refers to the multiple functions that rural areas perform on the basis of an integral conception of their potentialities.

It is also interesting to note that multifunctionality can be considered in two different lights: positive and normative (OECD, 2001). *Positive* multifunctionality refers to the objective features of the sectors/territories analysed in terms of the roles they perform and their effects on social utility. In this sense, there is relative agreement in the literature regarding the roles that rural areas perform in developed nations (Clout, 1991; Marsden et al., 1993; Hoggart et al., 1995; OECD, 2000 and 2001; van Huylenbroeck and Durand, 2003; Brouwer, 2004), which can be summarised as follows:

■ *Economic role*. This refers to the functionality of rural areas as a territorial base for various economic activities, ranging from traditional farming, livestock or forestry activities to those performed by industries (agrifood and others) and services. All of the above share the common characteristic of producing private goods that are traded in a market and for which rural producers are remunerated.

■ *Environmental role*. Rural areas are also a base for a large variety of ecosystems, which maintain natural life (biodiversity) and regulate the availability of the natural resources necessary for human survival (the required supply of water, land and oxygen in terms of both quantity and quality). Nevertheless, the goods and services provided by this role mainly have the characteristics of public goods, due to the absence of a market for them.

■ *Social role*. This last generic functionality is related to: a) the "legacy" role of rural areas, as homes to rich physical (historical, artistic and landscape) and intangible heritage (traditions, folklore, etc.), b) the role of hosting cultural and recreational activities for the enjoyment of the community as a whole, and c) the fact that these areas are

considered a territorial base for both rural communities (villages) and individuals from urban areas (residential areas for first or second homes) to settle[1].

From this review of the literature, we developed a draft catalogue of specific functions within the generic functions described above. This catalogue was discussed thoroughly by a group of experts in rural development and rural issues set up to support the authors of this research. Experts were recruited from Andalusia, including people with broad experience in the field and complementary points of view: a) two experts from public administrations related to rural governance (local and regional), b) three university professors specialised in different fields of knowledge connected to rural multifunctionality (economics, sociology and environmental sciences, and c) two managers of Leader programmes. The qualitative information provided by the group of experts allowed us to redefine the original catalogue and draw up a list of 'specific functions' that should be provided by the multifunctional rural space of Andalusia. Furthermore, experts also supported the resulting hierarchical structure as shown in Figure 1.

mative dimension of the concept of multifunctionality, due to this variable depending on the ideology, territorial scope and moment in time considered. This study analyses how this concept of rural multifunctionality is interpreted in Andalusia today, on the basis that the regional community as a whole should democratically establish the value judgements upon which this normative concept should be based.

In order to conclude this section, we must mention some previous studies that are relevant to this research. In the first place, we must refer to the surveys on rural areas that have been conducted by official organisations. In this sense, it is worth highlighting the special *Eurobarometer* survey on agriculture annually performed by the European Commission (EC, 2010) to learn EU citizens' opinions on various issues related to agricultural policy and rural development. It is also worth highlighting the *Agro barometer of Andalusia*, performed by the Instituto de Estudios Sociales Avanzados (Institute of Advanced Social Studies) for the Andalusia Regional Department of Agriculture and Fisheries (IESA, 2009). This survey analyses the opinion of the people of Andalusia in regard to issues related to agriculture

Figure 1 - *Weighting of the generic and specific functions of rural areas expressed by citizens of Southern Spain.*
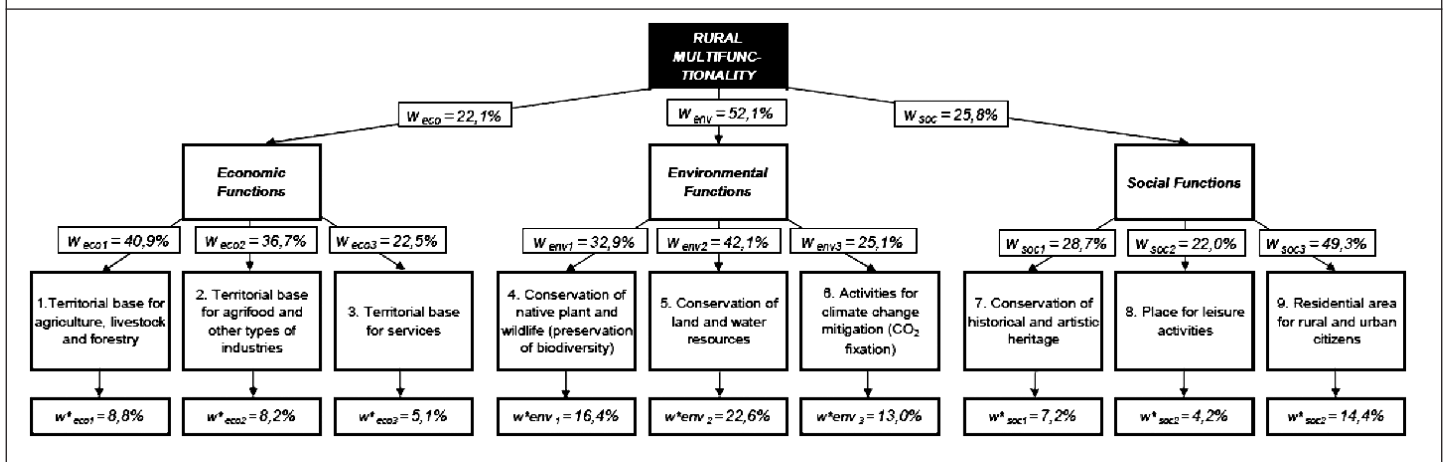
Notwithstanding, multifunctionality can also be approached as a *normative* concept, which is associated to a series of value judgements regarding how each of the functions performed in these territories should be carried out. Therefore, this notion has a political purpose, which seeks to lay down the guidelines for the "desirable" development of rural areas. Logically, there is no agreement over the nor-

and the rural world in that region. Both surveys collect information on the functions that rural areas in Europe and Andalusia should perform. However, the format of the questions results in respondents valuing such roles individually, with scores ranging from 1 to 10 in the case of the Eurobarometer or from 1 (not important at all) to 5 (very important) in the case of the Agro barometer. For this reason, we cannot extract the social demand from these results that legislators would require to efficiently design policy measures. Indeed, respondents are not confronted with the real restrictions that exist when designing a policy, which means pursuing a given objective reduces the ability to achieve the rest (conflict and trade-off between objectives). For this reason, we believe that this type of study is not suitable for defining the policy priorities that should be coordinated by the implementation of rural development policy (Hall et al., 2004).

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[1] Some doubts arise when considering the residential role of rural spaces within one of the generic functions commented above. In this case, the group of experts supporting this research has considered it as a social function taking into account its relationship with the provision of social impure public goods, mainly the fixation of population in the territory (van Dam et al., 2002; Salazar-Ordóñez et al., 2011; Gómez-Limón et al., 2012). Thus, although for this specific function markets may exist, suppliers are remunerated only partially (for example, through rural tourism or the real estate market).

The problem of measuring the social demand addressed by this study has been tackled on certain occasions more appropriately by some studies that also serve as background information for this work. In this sense, it is worth highlighting the work by Hall et al. (2004), who provide a critical review of the methodologies available to conduct studies on the opinion of society as a whole regarding the multiple roles of the rural environment and the empirical studies that have been carried out in this line to date. Some of the studies that are worthy of note as precedents to this research include Variyam et al. (1990), Gourlay and Slee (1998) and Duke and Aull-Hyde (2002). Other later studies that are also related to this research include Rico and Gómez-Limón (2008) and Gómez-Limón et al. (2012), focusing on studying social opinion and perception of government rural development policy in Castile and Leon (Spain), and the work of Salazar-Ordóñez et al. (2012) on social preferences about agricultural policy in Andalusia.

2.2. Quantifying social preferences: the Analytic Hierarchy Process

Several methodologies are available to determine the importance or relative weighting that a decision centre (society as a whole in our case) assigns to each criteria to be considered in their decision making processes (functions performed by rural areas in our case). These methodologies include point scoring systems, the Analytic Hierarchy Process (AHP), estimating trade-off rates, the SMART method, swing weighting or regression models (Weber and Borcherding, 1993). Several authors have attempted to discern which of the foregoing methods yields the best results. However, Pöyhönen and Hämäläinen (2001) indicate that such comparative studies found no significant differences between the methods, for which reason they recommend researchers to choose their method in accordance with the particular characteristics of the empirical study they plan to undertake. In this research, we have opted for a weighting method that fits the hierarchy structure of the functions performed by rural areas accordingly (generic and specific), which were defined in the previous section, and that can also be applied realistically to a large sample of people that have no specific training in this type of methods. Both circumstances justify our final decision to employ the AHP, which is also in line with the recommendations made by Hall et al. (2004).

For a detailed introduction to the AHP, we refer interested readers to Saaty (1980). Nevertheless, the following paragraphs provide a brief description of this method.

The AHP was created by Saaty (1980) as a structured but flexible technique for multiple criteria decision making. The methodology is based on formalising complex decision-making problems by employing a hierarchical framework, as shown in Figure 1 in the case of this research. Within this hierarchical framework, the relative importance or weightings (w_i) of the generic and specific functions are obtained by means of a series of pairwise comparisons that determine which of the two options considered is preferred.

In order to do so, as proposed by Saaty (1980), we have used a linear scale that ranges from 1 (functions are equally important) to 9 (one function is absolutely preferred over the other). Therefore, in order to determine the relative importance of each of the proposed functions, respondents (individuals sampled as representatives of society as a whole) must make two types of comparisons: (a) pairwise comparisons of the three generic functions, and (b) pairwise comparisons of the specific roles considered within each generic function. As a result, four matrixes have been generated (one for the generic functions and three for each specific function) for each decision maker (for each person surveyed k in our case). The matrixes have the following structure:

$$(1) \qquad A_k = \begin{bmatrix} a_{11k} & a_{12k} & ... & a_{1nk} \\ a_{21k} & a_{22k} & ... & a_{2nk} \\ ... & ... & a_{ijk} & ... \\ a_{n1k} & a_{n2k} & ... & a_{nnk} \end{bmatrix}$$

where a_{ijk} represents the value of the comparison between the function i and the function j for each individual k. For the case of perfect consistency on behalf of the decision maker (each respondent in our case), we verify that the values assigned to the pairwise comparisons actually represent ratios between the weightings given to the corresponding functions by a perfectly rational decision maker: $a_{ijk} = w_{ik}/w_{jk}$ for every i and j. In this sense, the n weightings (w_{ik}) of each function could be easily determined from the $n(n-1)/2$ values of a_{ijk} that the former has stated.

However, perfect consistency is rare in reality. For this reason, different techniques have been proposed to estimate the vector priorities ($W_k = (w_{1k},...w_{ik},...w_{nk})$) that best fit the real vector of decision maker weightings for the Saaty matrixes that display a certain degree of inconsistency. While the results obtained by the various estimation methods can differ, there is no evidence whatsoever in the literature that one method is superior to the rest (Fichtner, 1986). In view of the fact that all the methods are suitable for estimating priorities or weights, in this research we have opted for the most simple method of operations, namely the row geometric mean method (Aguaron and Moreno, 2000). Consequently, the individual weightings that each respondent assigns to the different attributes are obtained by applying the following algebraic expression:

$$(2) \qquad w_{ik} = \sqrt[n]{\prod_{i=1}^{i=n} a_{ijk}} \qquad \forall\ i,\ k$$

Finally, it must be noted that the hierarchical structure of the AHP means that the weightings obtained at each level always add up to one (e.g., see in Figure 1 how $w_{eco\_k} + w_{env\_k} + w_{soc\_k} = 1$, $w_{eco1\_k} + w_{eco2\_k} + w_{eco3\_k} = 1$, $w_{env1\_k} + w_{env2\_k} + w_{env3\_k} = 1$ and $w_{soc1\_k} + w_{soc2\_k} + w_{soc3\_k} = 1$).

For this reason, in order to be able to compare the relative importance of the various specific functions proposed, it is

necessary to obtain the corresponding normalised weightings (w^*_{ik}), as shown in Figure 1. These normalised weightings are the result of multiplying the weightings of each specific function by the weighting of the corresponding generic function; for example, $w^*_{eco1\_k} = w_{eco\_k} \times w_{eco1\_k}$, $w^*_{env3\_k} = w_{env\_k} \times w_{env3\_k}$, etc. As a result, all the duly normalised weightings of all the specific functions also add up to 1, each w^*_{ik} being an indicator of the importance of the function i in regard to total rural multifunctionality.

The AHP was initially conceived for individual decision makers, but was soon used as a valid technique for group decision making (Easley et al., 2000), based on either experts' judgements (Parra-López et al., 2007; Nekhay and Arriaza, 2009) or public surveys (Kallas et al., 2007b; Parra-López et al., 2008; Salazar-Ordóñez et al., 2011). In this sense, it is worth indicating that we summarised Andalusia public opinion following the procedure proposed by Forman and Peniwati (1998), who suggest that aggregating individual weightings estimated by the geometric mean is the best method for social group decisions:

$$(3) \qquad w_i = \sqrt[m]{\prod_{k=1}^{k=m} w_{ik}} \qquad \forall\ i$$

where w_i is the aggregate weighting of the function i, w_{ik} represents the weighting that individual k assigns to function i and m denotes the size of the group of individuals considered.

2.3. Public opinion survey

In order to collect information regarding the opinion of people in the Autonomous Region of Andalusia, an *ad hoc* survey was carried out. We prepared a specific questionnaire that comprised three sections: a) general information (definition and explanation) for respondents regarding the different functions to be potentially performed by rural areas in Andalusia, b) a set of 12 questions that pose the pairwise comparisons (a_{ijk}) required to apply the proposed AHP, whose responses were used to obtain the individual weightings of each function (w_{ik}), and c) a set of 8 additional questions to gather socio-demographic and economic information about the respondents, which have been used to analyse the heterogeneity of public opinion in this respect, as we will comment on later in the paper.

A pilot survey was carried out with 30 individuals in order to test the ability of the public to understand the explanation of the nine functions and how they should rank them. Only minor changes in the wording and in the visual presentation of the functions were needed. First,

the respondent ranked the specific functions of each generic function, then, the generic functions were evaluated.

In order to achieve results that are representative of the Andalusia people as a whole, a sample of 513 individuals was formed from the regional population over the age of 18. The technical information about the survey is displayed in Table 1.

Table 1 - *Survey technical information.*

Target population	People residing in Andalusia aged 18 or over (6,540,286 people)
Sample size	513 interviews
Type of interview	Personal interviews using a questionnaire and conducted in public places
Type of sampling	Multistage, stratified by clusters (proportional allocation to the size of the habitat), with a selection of primary sampling units (municipalities) using a random proportional procedure, and a selection of the last units of the same (individuals) by random routes and gender and age quotas
Error	The maximum absolute error expected in the results of the survey, for the frequencies of each variable, is ±3.71%, for a confidence level of 95.5%, 2 sigma $p=q=0.5$
Field work	Between the months of May and July, 2010

Source: Own elaboration.

Table 2 - *Socio-demographic and economic description of the sample*

		Sample	Andalusia	Chi-square test of equal frequencies
Age (years)	18-35	33.3%	34.6%	$\chi^2=0.079$ p-value=0.961
	36-55	36.6%	36.3%	
	>55	30.0%	29.1%	
Gender	Male	49.9%	49.5%	$\chi^2=0.006$ p-value=0.938
	Female	50.1%	50.5%	
Size of municipality of residence (inhabitants)	<10,000	23.4%	20.3%	$\chi^2=0.718$ p-value=0.698
	10,000-50,000	29.4%	29.1%	
	>50,000	47.2%	50.7%	
Education	No education	10.1%		
	Primary	28.5%		
	Secondary	40.5%		
	University	17.9%		
	DK/DA	2.9%		
Household income (Euros/month)	<1,000	15.0%		
	1,000-2,000	34.1%		
	2,001-3,000	21.1%		
	3,001-4,000	5.8%		
	>4,000	1.4%		
	DK/DA	22.6%		
Number of children	0	39.0%		
	1	22.8%		
	2	24.0%		
	3 or more	14.2%		
Relationship with rural environment (only for municipalities >50,000 inhabitants)	Minimal	15.4%		
	Little	7.4%		
	Moderate	10.7%		
	Important	5.7%		
	Very important	1.9%		
	DK/DA	58.9%		
Relationship with agricultural activity	Minimal	73.5%		
	Little	11.1%		
	Moderate	6.6%		
	Important	6.2%		
	Very important	1.9%		
	DK/DA	0.6%		

Source: Own elaboration.

Table 2 summarises the socio-demographic and economic features of the sample of the population finally considered. The chi-square tests for equality of distributions do not reject the null hypothesis of equality of sample and population proportions, supporting the representativeness of the sample. These same socio-demographic variables will also be used later to analyse the heterogeneity of public opinion in relation to rural multifunctionality.

2.4. Cluster analysis

Cluster analysis is a multivariate technique that is widely used to detect homogeneous groups of classificatory variables. Bearing in mind that the perception of the roles that rural areas should perform will more than likely depend on where respondents live and their socioeconomic characteristics, this technique first determines which groups are homogenous in terms of the weightings they assign to the generic functions. In the second place, it determines which socioeconomic variables display statistically significant differences between groups.

K-mean and hierarchical clustering procedures are normally used to obtain the clusters, despite the problems they have to initially select centroids and the number of clusters, respectively (Everitt et al., 2001). Nevertheless, when the classificatory variables are continuous, as is the case with our weightings for the three generic functions of rural areas, and there is not a high number of cases, most authors are more inclined to use hierarchical clustering, which "controls" the partitions in the clusters. Alternatively, in the case of large samples (thousands of cases) and/or simultaneously considering continuous and categorical variables as classificatory variables, two-stage clustering is recommended, based on the Akaike Information Criterion (AIC) or the Bayesian Information Criterion (BIC) (Chiu et al., 2001).

Taking into account the size of the sample, 513 respondents, and the type of classificatory variables used in this study, we decided to describe the preferences of the population for the functions that Andalusia rural areas should perform by way of hierarchical clustering. The weightings of the generic functions (economic, environmental and social) have been used as classificatory variables, cluster linking as the clustering method and Euclidean squared as the measure of distance. While there are specific algorithms that help decide the optimum number of clusters (Jung et al., 2003), the normal way to proceed, as indicated, is to perform analyses with different numbers of clusters and then, depending on the distribution of the cases and the average values recorded by the variables relevant to the study in each cluster, to decide the best number of groups.

3. Case study: Andalusia rural areas

The Autonomous Region of Andalusia is the second largest in Spain, covering 87,599 km^2, with a population of 8.1 million inhabitants. Andalusia therefore has an average population density of 93.0 inhabitants/km^2, which is slightly higher than the national average (83 inhabitants/km^2),

but lower than the average for Europe (117.5 inhabitants/km^2).

The OECD defines rural areas as territories that have a population density of less than 150 inhabitants/km^2. According to this criterion, more than 85% of Andalusian territory can be considered as "rural". In fact, only the municipal districts of the provincial capital cities and those on the coast can be considered "urban" areas under this criterion. Logically, the difference in population density between some areas and others reverse the percentages in terms of the number of people that reside in both types of municipalities; 65% of the population of the region live in urban areas, while rural areas only account for 35% of the population. These basic data give an idea of the relative importance of rural areas in the region and the potential relevance of this research.

Regarding the *economic functions* performed in rural areas, it must be said that the most characteristic industry in rural Andalusia is agriculture. This sector is one of the driving forces of economic development in the autonomous region, contributing 6% of regional Gross Domestic Product (GDP) and employing 8% of the regional working population, figures that double the national average and triple the average for Europe. Notwithstanding, it must be highlighted that this sector is much more important locally in rural areas than those percentages might indicate. Indeed, agriculture and livestock are the main economic activity in 53.7% of Andalusia rural municipalities and the leading source of household income.

The majority of agro industrial activities are also performed in these same rural areas, which account for approximately 18% of regional GDP and 20% of industrial employment in Andalusia. In fact, the agro industrial sector is the main source of income in 9.9% of rural municipalities. The rest of industries are barely significant, as they prefer to be located in urban areas.

It is also worth indicating the *environmental functions* that rural areas in Andalusia perform. These types of functions are directly related to the use of the territory. Indeed, bearing in mind the size of the rural environment, practically all the natural land ecosystems in the autonomous region are located in rural areas, maintaining the population of native plant and wildlife. Within this vast rural environment, we must differentiate two pre-eminent uses: agriculture (4.7 million ha) and forestry (4.8 million ha), which together result in these two activities monopolising more than 95% of land resources in Andalusia. Moreover, the presence of close to 900,000 hectares of irrigated land in the region means that rural areas consume the most of water resources. They extract 6,150 hm^3/year from natural sources, which account for 80% of the water resources used in Andalusia. Nevertheless, apart from largely determining the conservation of the main natural resources (land and water), rural areas perform other environmental functions of vital importance. One of the most important is the role they play

as CO_2 sinks (plant photosynthesis activity and the subsequent fixation of organic carbon in the soil and forests), in view of the vulnerability of Mediterranean ecosystems to climate changes (water cycle, desertification, erosion, etc.). Finally, we must also highlight the huge contribution made by the protected zones located in rural areas to the conservation of biodiversity. In total, Andalusia has 150 protected zones spread over 2.59 million hectares, which represent 29.6% of the regional area. All these territories are also located in rural areas.

The third and last generic role considered for this study is the *socio-cultural function*. In this sense, it must be said that the rural areas in Andalusia have inherited a rich heritage, both in physical (historical, artistic and landscape) and intangible terms (folklore). By way of example, 61% of over 20,000 cultural interest assets on the Andalusia Historical Heritage Register are located in rural municipalities. The importance of this role can be quantified by more than two million rural tourists the region receives every year.

4. Results

4.1. Aggregate results

Figure 1 shows the importance of environmental functions (52%) in comparison to social functions (26%) and economic functions (22%), weightings that are statistically different according to the analysis of variance[2]. The relative importance of the environmental functions could be explained taking into account the importance of the management of the natural resources (water and soil) and the relevance of the natural areas in the rural environment in Andalusia, which in turn, promote other economic activities (tourism, haunting, etc). However, the importance given to this function is rather surprising considering that Andalusia is one of the least economically-developed regions in Spain affected by a high unemployment rate. Probably, should the same assessment exercise be implemented nowadays (2012), as the economic crisis is more severe and the unemployment rate higher than 25% in the region, the weight attached to economic and social functions would be higher than that assigned in 2010 when the survey was carried out and the perception of the economic crisis was less worrying.

As to the specific functions, the environmental functions record a greater weighting than the majority of economic and social functions; within the former, mitigating climate change receives the lowest valuation. Conservation of land and water resources is the most highly valued function (23%), the figure being even higher than the aggregate values of all the economic functions performed in rural areas (22%) and very close to the overall value recorded by the social functions (26%). Agricultural and forestry activity is the most highly valued economic activity, closely followed by the development of agrifood and other industries. Finally, the social function of conserving historical and artistic heritage and the traditional rural landscape receives a weighting similar (7%) to the individual weighting of rural commercial roles.

While there is no prior empirical research on valuing the functions performed by the rural environment in Andalusia able to directly compare the results obtained in this study, we can highlight some results obtained for other autonomous regions in Spain, such as Castile and Leon (Gomez-Limón et al., 2012)[3] as summarised in Table 3.

Table 3 - *Comparison of importance of generic functions of rural areas in two Spanish regions.*

	regions	
Generic Function	*Andalusia*	*Castile and Leon*
ECONOMIC	22.1%	37.8%
ENVIRONMENTAL	52.1%	21.6%
SOCIAL	25.8%	Leisure and recreational: 19,5% Residential: 21.1%

* Note: Since generic and specific functions considered for both regions are not exactly the same (see footnote 3), any comparison must be done with caution. Because of this, only the comparison of generic functions are reported in this table in order to show that social preferences can vary significantly across regions and any benefit transfer could be inadequate.

As can be appreciated, the functions performed by rural areas demanded by the population vary significantly in both autonomous regions, reflecting the two different socio-economic and territorial realities of the rural environment. In the case of Andalusia, environmental functions are assigned more importance due to the problem of desertification, as a result of the marked erosion in some areas and the management of water resources in cyclical periods of drought. The relative importance of non-farm activities, such as rural tourism and the agrifood industry in the rural areas in Castile and Leon, is reflected by the greater weighting that people in that region assign to economic and social functions, in contrast to Andalusia, where the secondary and tertiary sectors play a less significant role in the regional economy. In sum, differences in the results obtained in these two case studies can be justified for both the socio-demographic traits of citizens surveyed and the differences in the nature of rural areas in both regions.

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[2] Recording a global F of 285 and a probability of 0.000, the post-hoc Ryan-Einot-Gabriel-Welsch mean comparison procedure based on an F test indicates that the three functions have statistically different means.

[3] Regarding the rural functions considered in the work of Castile and Leon, the generic and specific economic functions were similar to those of Andalusia (only separating agrifood and other industries into two specific functions in the former). Within the environmental functions, the preservation of flora, fauna and water are also included; however, the "Mitigation of climate change" specific function in Andalusia is not present in Castile and Leon; instead, the specific function "Conservation of natural ecosystems through a network of natural parks" was considered. Finally, the social generic function in Andalusia is split up into two generic functions in Castile and Leon: "Residential functions" and "Leisure and recreational functions".

4.2. Relationship between function weightings and socioeconomic variables

If we analyse the relationship between these socioeconomic variables and the specific functions (see Table 4), statistically significant relationships are observed between the size of the municipality of residence and all economic functions, the high weighting that inhabitants in large cities assign to the industrial and agroindustrial function of establishing service companies in rural areas (0.23 and 0.16, respectively) being particularly noteworthy. In contrast, the weighting of these functions decreases the more closely related respondents say they are to agriculture (-0.21 and -0.18). It is also interesting to note the negative relationship (-0.17) between the municipality size and the specific function "Residential area", suggesting that inhabitants of small villages are more concerned about the depopulation problem of rural areas, and how the importance of "Mitigation of climate change" is higher for people with more relationship with agriculture.

Gender only influences the perception of how important the industrial and agroindustrial function of rural areas is, men finding it more important (9%) than women (7%). Furthermore, the oldest people in Andalusia are those who most value the conservation of the region's historical and artistic heritage.

Education registers a slightly positive correlation with "Agrifood and other types of industries" (0.09). There is however a negative correlation with the weighting of the function of conserving historical and artistic heritage (-0.11), which may initially seem contradictory. Nevertheless, the highly positive correlation between the level of education and the level of income (0.34) may explain this result: the respondents with the most purchasing power assign greater importance to environmental functions (0.11 for the conservation of land and water resources) to the detriment of social functions (-0.13 and -0.11 for the conservation of historical and artistic heritage and place of residence, respectively).

Finally, the number of children seems to show no relationship with any specific function except "Conservation of historical and artistic heritage" (0.09), which appears to be logical considering the legacy for future generations.

4.3. Cluster analysis

Using the cluster analysis as a basis and following the hierarchical clustering procedure, four groups were selected. Frequency analysis was then employed, revealing that the four groups displayed statistically significant differences at a confidence level of 99% with the size of the municipality, 95% with education and 90% with the age of the respondent. In contrast, no statistically significant differences were found between the groups and the rest of socioeconomic variables (relationship with the rural world, relationship with agriculture, number of children, income and gender). Using the average weighting of each of the functions in each group as a basis together with the values recorded by the statistically significant socioeconomic variables, we can classify the Andalusian population into four groups:

■ *Environmentalists*. Accounting for 57% of the sample, this cluster is the largest. For this group the most important functions that rural areas should perform are environmental, with a weighting of 72%, followed by social functions (18%) and economic functions (10%). Young people with a high level of education who live in municipalities with a population of less than 10,000 inhabitants are the most representative group within this cluster.

■ *Equalitists*. The next largest cluster with 16% of respondents. This group assigns slightly greater importance to environmental functions (with a weighting of 37%) and almost equal importance to social and economic functions (33% and 30%, respectively). This group is almost entirely made up of inhabitants of large cities, who have a slightly below average level of education and are older than the average for the sample.

■ *Productivists*. This group, of a similar size to that above (15%), prefers the economic functions performed by rural areas (weighting of 70%), followed by the environmental functions (20%) and lastly by the social functions

Table 4 - *Statistically significant relationships between specific functions of rural areas and socioeconomic variables.*

		Municipality (K)	Gender (mean)	Age (K)	Relationship with agriculture (S)	Education (K)	Income (S)	Num. of children (S)
Economic Functions	Agriculture, Livestock and Forestry	0.10	ns	ns	ns	ns	ns	ns
	Agrifood and other types of industries	0.23	Male=9% Female=7%	ns	-0.21	0.09	ns	ns
	Services	0.16	ns	ns	-0.18	ns	ns	ns
Environmental Functions	Conservation of native plant and wildlife	-0.09	ns	ns	ns	ns	ns	ns
	Conservation of land and water resources	ns	ns	-0.08	ns	ns	0.11	ns
	Mitigation of climate change	ns	ns	ns	0.09	ns	ns	ns
Social Functions	Conservation of historical and artistic heritage	ns	ns	0.11	ns	-0.11	-0.13	0.09
	Leisure activities	0.09	ns	ns	ns	ns	ns	ns
	Residential area	-0.17	ns	ns	ns	ns	-0.11	ns

Note: Correlation is considered significant at 0.05 level (2-tailed). When data contain few/many tied ranks, the Kendall-Tau (K)/Spearman (S) correlation coefficients are the most appropriate ones (Howell, 1997: 293; Malhotra and Birks, 1999: 520); ns: non-significant.
Source: Own elaboration.

(10%). As was the case with the previous cluster, this group is almost entirely made up of inhabitants in large cities with a lower level of education and higher age.

■ *Humanists*. This is the smallest group (12% of respondents) and has a special interest in the social (69%) and environmental functions (21%) performed by rural areas. They consider the economic functions to be less important (10%). This group is more represented in medium-sized municipalities (between 10,000 and 50,000 inhabitants) and small municipalities (less than 10,000 inhabitants). As was the case in the previous two groups, they normally have a below average level of education and are older than the average for the sample.

This classification highlights the different perception that Andalusia people have of the functions that rural areas should perform, depending mainly on where they live (rural vs. non rural areas) and, albeit to a lesser extent, their level of education and age. Figure 2 shows the four groups in relation to the importance they assign to each group of functions.

Figure 2 - *Classification of the Andalusian population from the cluster analysis.*
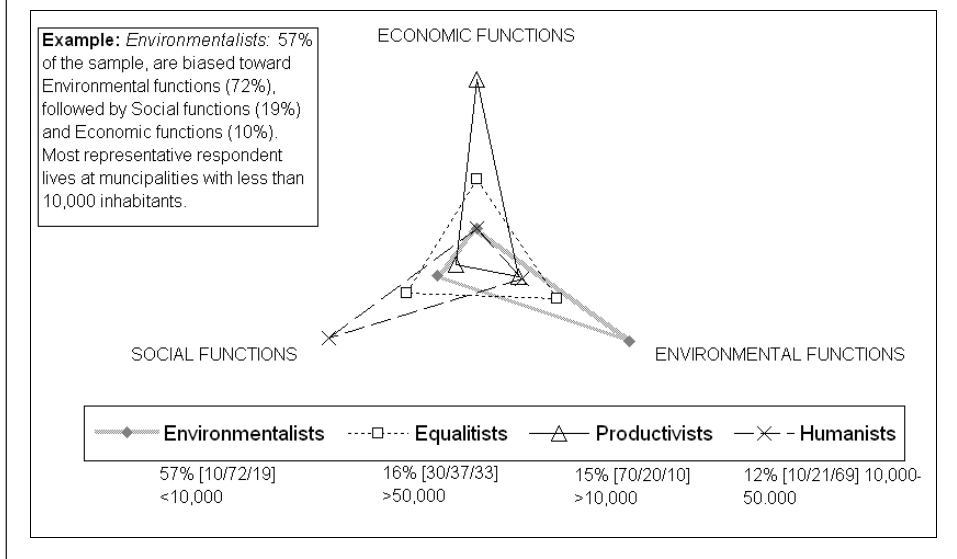
It is interesting to note that the inhabitants of small municipalities show more support, in percentage terms within their stratus, for the environmental functions of rural areas, compared to somewhat less support than expected from large cities. This result is due to residents in small municipalities assigning greater importance to the conservation of native plant and wildlife (21%) on the one hand and the conservation of land and water resources (26%) on the other, than the rest of the sample (15% and 21%, respectively).

5. Conclusions

This study aims to address the important issue of determining the priorities society has in regard to the functionality of rural areas, in this case in an autonomous region in Spain.

The difficult task of specifying the multiple roles of rural areas into a reasonable and operational number of functions has been achieved in this study by using a hierarchical framework made up of three generic functions (economic, environmental and social) and nine specific functions which are derived from them. The most relevant result of the analysis of the social weightings of those functions is that society strongly demands a multifunctional rural environment, conceiving that rural areas should perform all the functions identified a priori both effectively and simultaneously. Indeed, the people of Andalusia would like rural areas to perform both traditional functions, related merely to production and residence, and also other more contemporary functions, aimed at providing public goods and services to society as a whole: environmental sustainability and conservation of heritage and leisure resources. This societal demand in favour of a multifunctional rural environment in Andalusia justifies government intervention aimed at minimising existing market failures (provision of goods and services not remunerated by markets) and therefore maximising the social utility that stems from the roles these areas play. In this sense, it is worth underlining the idea that rural development policy, along with all other government action, must serve society as a whole and be guided by the preferences of both the rural and urban population.

The public goods that the people of Andalusia would like to receive preferential attention are basically environmental: conservation of water and land resources, conservation of native plant and wildlife and the activities that mitigate climate change. Notwithstanding, the social roles of maintaining heritage and areas for leisure activities are also deemed important, albeit to a lesser extent than those above. As previously mentioned, it would seem logical to take such preferences into account when distributing the budget of the Rural Development Programme (RDP) of Andalusia, increasing the budget allocation to the measures included in Axis 2, focusing on environmental protection, and Axis 3, aimed at enhancing quality of life and diversifying the economy of rural areas. These suggestions should be taken into account nowadays, when strategic guidelines for Rural Development programming period 2014-2020 are just being discussed by European policy-makers.

This research has nevertheless put in evidence the marked heterogeneity of individual preferences. Such differences can be partially explained by the socio-demographic and economic characteristics of the survey respondents, particularly their place of residence (rural vs. urban areas). In this sense, rural inhabitants assign greater importance to the en-

vironmental and social functions of rural areas and less to their economic functions than urban residents. It is therefore striking that the residents in villages in Andalusia demand a greater provision of public environmental goods and services from the rural environment.

Finally, it is also worth pointing out that our results, compared with other previous assessment exercises found in the literature, evidence how social preferences regarding the functions to be implemented within rural spaces can vary significantly across regions and time. Therefore, any benefit transfer should be carefully analyzed due to the local and temporal dimension of this type of estimation.

Acknowledgments

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