

Article

The Dehesas of Extremadura, Spain: A Potential for Socio-Economic Development Based on Agritourism Activities

José-Manuel Sánchez-Martín ^{1,*} , Rocío Blas-Morato ² and Juan-Ignacio Rengifo-Gallego ² ¹ Faculty of Business, Finances and Tourism, University of Extremadura, 10071 Cáceres, Spain² Faculty of Letters, University of Extremadura, 10071 Cáceres, Spain

* Correspondence: jmsanche@unex.es; Tel.: +34-927-257-480; Fax: +34-927-257-481

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Abstract: *Dehesas* form an agroforestry system which is highly developed in Extremadura as they occupy over 1,000,000 hectares. This is an extensive production system based on exploitation by stockbreeding with certain complements of agricultural and extractive products. It is however underexploited for activities other than agrolivestock production. As a result this research starts from the hypothesis that greater socio-economic development is possible in areas near this type of ecosystem if we consider that it is extremely attractive to tourism, at least in some of its forms. Complementing agrolivestock exploitation with tourist exploitation means that it is necessary to be familiar with the situation of the current availability of accommodation. In order to do so we analyse the main parameters characterising rural accommodation in Extremadura, Spain, the results of which reflect low occupancy for a large part of the year and consequently seasonal variation is high. This fact contrasts with the huge potential of *dehesas* for agritourism. In order to carry out this study we resort to the use of spatial statistics, in particular the grouping analysis. In its configuration we consider the location of the rural accommodation and its proximity to areas of *dehesas* made up of holm oaks (*Quercus ilex*) and cork oaks (*Quercus suber*) together with protected natural spaces, basing ourselves also on proximity to livestock trails and natural swimming pools. The results lead to the creation of 5 homogeneous groups of which 3 correspond to accommodation establishments capable of setting up agritourism and agriecotourism initiatives; this affects 45% of the establishments. However, no current initiatives of this type exist despite the fact that the National Reference Centre for Agritourism is located in Extremadura. From this can be inferred the need for implementing tourist policies to encourage the generating of tourist products specifically intended to exploit the potential of the *dehesa* as a complement to the current availability of rural accommodation.

Keywords: *dehesas*; agritourism; agriecotourism; grouping analysis; Extremadura

1. Introduction

Throughout history the *dehesa* has been defined in very varied terms, in many cases in an incomplete, contradictory, and even very vague manner in the case of the legislation regulating it. As far as regulations are concerned, in Andalusia a *dehesa* is understood to be (Law 7/2010) a farm occupied for the most part by a *dehesa* formation (a surface area of forest covering between 5% and 75%) which allows the development of pastures for stockbreeding or hunting use. In the case of Extremadura, Law 1/1986 of 2nd May on the *dehesa* in Extremadura defines the latter in its Article 1 as any rural estate in which over 100 hectares of its surface area is capable of stockbreeding exploitation under an extensive system in accordance with its most suitable agricultural purpose. *Dehesas* are equally considered to be all estates belonging to the same holder and which are part of an agricultural farm

unit, provided that they are situated in the same municipal district or in adjacent districts and that the sum of their respective surface areas which are capable of stockbreeding exploitation under an extensive system in accordance with its most suitable agricultural purpose exceeds 100 hectares [1]. It can be inferred from this that at a legislative level in Extremadura the only important element is the minimal surface area and the type of extensive stockbreeding exploitation. For this reason this definition is not an efficient one as many estates can be included in it even if they do not have much to do with the idea of the *dehesa* which has prevailed for centuries in Extremadura. Indeed its long history and also its peculiar ecology, which redounds to an economy adapted to the environment and which stands out for its high level of sustainability, has been treated profusely by experts on the *dehesa* systems from varied perspectives [2–5].

For some authors it is an agro-sylvo-pastoral ecosystem typical of the southwest of the Iberian peninsula of great socio-economic and conservational importance in which grazing is a dominant activity which is carried out on a mantle of *Quercus* tree species, shrubs, and pastures [6]. For others in contrast it is a degraded form of holm oak grove [7] noteworthy for its origin as a human creation so as to adapt to poor soils in a harsh climate in which man attempts to achieve a balance between agricultural, stockbreeding, and forestry exploitation [8]. At the same time they tried to describe it as scattered woodland of holm oaks maintained by constant human intervention [9]. It has even been linked to the production of the Iberian pig and sheep and cattle, in addition to being orientated towards hunting [10]. Other authors propose a working definition of it as a functional system of stockbreeding and/or hunting exploitation in which at least 50% of the surface area is occupied by pastureland with adult scattered trees which produce acorns and with a proportion of the canopy cover of from 5% to 60% [11].

The complexity and diversity of definitions increases if it is taken into account that in common with any other agricultural landscape it is not a static unit but rather changes over time and in space as it reflects a balance between society, the institutions, and the ecological potential which takes shape on the land in accordance with the pressure which is exerted on each of them [12]. It is also noteworthy for its conceptualisation as a transformed space as a consequence of the process of the humanisation of Mediterranean woodland shaped by means of the conjunction and overlapping of numerous uses [13], which have been observed since the late Middle Ages as an area for sustaining large stockbreeding herds [3].

There are various ways of exploiting *dehesas* from both an agricultural and stockbreeding perspective although they have extensive exploitation in common. This type of management has been gradually abandoned as a consequence of successive reforms carried out within the framework of the Common Agricultural Policy. In order to counteract its effects, numerous rural development plans have been set in motion designed to encourage the sustainable handling of farms in such a way so as to contribute to their maintenance [14]. Despite this, most of the scientific production concentrates on the analysis of the management of these spaces based on agriculture and stockbreeding [15–17]. There are also studies which concentrate on *dehesas* as suitable areas for the hunting of game [18–20]. Some start from the crisis which is being faced by traditional agricultural systems as is the case on the *dehesa*, which has a low profitability [21] albeit interesting potential if synergies are carried out between the various economic sectors present in this space [22,23]. However, these systems materialised into *dehesas* are threatened owing to abandonment or on the contrary to excessive use; these cases can be reduced by appropriate handling practices and strategies [24] as otherwise we are concerned with non-sustainable management.

On the other hand, the *dehesa* evokes values and social sensitivities such as respect for the environment, the quality of the production processes, biodiversity, or the cultural heritage, many of which can be presented as tourist attractions [25].

Traditional exploitation of the *dehesa* based on agriculture and stockbreeding under extensive systems, in addition to its exploitation for hunting, may be vital to the economic development of the spaces in which it predominates, constituting itself as the essential mainstay on which agritourism

and even agriecotourism can be based. Indeed it is possible that this activity may contribute to the diversification of agricultural farms [26], although it has been shown that those in charge of the same prefer to establish a clear distinction between the tourist business and the agrolivestock business [27]. Despite everything, there is no clear exploitation of the agritourism development potential of *dehesas*, which can be attributed both to supply and demand [28]; above all it is taken into account that on this type of farm tourist activities are carried out as part of agricultural exploitation.

There is no doubt that the combined bid of agriculture, stockbreeding, and tourism must constitute the foundations on which to build a production and sustainable management model for these spaces, as can be observed with the drawing up of sustainability indicators adapted to *dehesa* agroforestry systems [29]. It reconciles agricultural interests with the protection of the environment and at the same time inculcates traditional values such as extensive production systems, the preservation of the historical and cultural heritage which is sometimes intangible, and naturally the maintenance of a form of ancestral exploitation which benefits all ecosystems [30].

Clear links exist between agricultural or stockbreeding production and tourism [3,31], although this does not affect all spaces in a homogeneous manner [32]. The conservation of specific biotopes and biocoenoses on the *dehesas* encourages the development of ecotourism as an outstanding element, especially if it is taken into account that part of these spaces are protected so as to preserve their ecosystems [32]. This potentiality stands out in contemporary society in which there is a growing environmental awareness which highlights forests for development and ecotourism according to current analyses of the tourist market [33]. Indeed the aim is to fight the depopulation of rural areas by taking agritourism as a reference [34,35] as numerous benefits are thus provided to areas offering this activity [36].

Despite the great interest in *dehesas*, society is not familiar with agroforestry systems in any way other than seeing them as places associated with food production [37]. However, both the supply of and the demand for this kind of activities have increased in recent decades and their popularity continues to rise, although society does not differentiate between products such as agritourism or farm visits, for example [38].

This brief outline of the literature on *dehesa* systems highlights the complexity of the very definition of the concept, which is further compounded by the legislation which has attracted strong criticism from all sectors involved in the use and management of *dehesas*. At the same time it is clear that the *dehesa* must be regarded as more than an agricultural and/or stockbreeding space as the activity of hunting is also carried out. Furthermore, in some areas it is beginning to be shown that it is ideal for setting in motion policies linked with tourist development.

The article starts from the premise that the *dehesa* is an unusual space which is dominated by woodland consisting of *Quercus* species (*Quercus ilex* L. and *Quercus suber* L.) which supports a system of pastures and *montanera*. The latter feeds a livestock population under an extensive system although it also allows exploitation in the form of hunting in specific areas. As an appropriate complement, this ecosystem has enormous potential for the development of rural tourism in a generic manner or more specifically linked to agritourism, albeit without ruling out other segments such as birdwatching or indeed gastronomy, with the essential mainstays of the latter being pigs and cattle although sheep should not be forgotten. The livestock population is of excellent quality and generates agrofood products of the same high quality, especially in the case of Denominations of Origin such as that of the Dehesa of Extremadura, which monitors the certified quality of pigs of the Iberian breed; and those of Extremadura Veal or Extremadura Lamb [39]. Moreover, it must be taken into account that many *dehesas* include traditional buildings (*cortijos*) which represent an additional asset that can be used for accommodation after appropriate renovation in order to comply with administrative requirements.

As our main hypothesis we put forward the potential importance of rural tourism in the development of *dehesa* areas. This form of tourism is currently highly concentrated in space and time, owing to which alternatives must be sought to help to ease the congestion in certain areas such as the north of the province of Cáceres and seasonally, i.e., in summer. This can be achieved by encouraging

agritourism and agriecotourism concentrated on *dehesas*. This circumstance can be understood if we consider the excellent spatial distribution of *dehesas* and their attraction in equinoctial seasons and even in winter.

This would involve the putting forward of a very clear general objective, i.e., the analysis of the current tourist activities of these spaces contemplating the presence of the essential resource, and naturally the consideration of the implementation of supply and its effect on demand. From this we can infer the importance of the study proposed as tourism in these areas is characterised by little demand as a consequence of the lack of a specific tourist product and by having the endemic disadvantages of tourism in inland Spain (a seasonal nature, low occupancy), to which can be added the limitation and dispersed population of the area under study.

2. Materials and Methods

2.1. The Case-Study

The study area is that of the autonomous region of Extremadura, an inland and peripheral region of Spain. It is characterised by its low population density; its 41,635 km² only had 1,072,863 inhabitants in 2018 [40]. The production basis, which is concentrated in the primary sector, has given rise throughout history to very widespread emigration. This reveals two structurally and virtually endemic problems: a small and aged population with a majority of men in certain areas and based in small municipal districts; and in its turn agriculture and stockbreeding which is extensive in many areas and conditioned by its low productivity. These disadvantages are compounded by the fact that access is poor and concentrates on communication by road; the region lacks a quality rail and airport network.

The adversities and the age-old neglect to which Extremadura has been subjected by the central governments has had however the positive effect of the conservation of a natural environment in excellent condition, as is shown in Table 1. Indeed over 30% of its surface area is protected as it contains privileged ecosystems. However, perhaps the most significant effect as far as forestry is concerned is the widespread development of the *dehesas* which are made up mainly of holm oaks and cork oaks. It is here that a large livestock population has become established, which in many cases is of acknowledged quality owing to its Denomination of Origin certificates, for example those referring to pork, veal, and lamb [41].

Table 1. GIS design project.

Area Type	Area (Hectares)	% Area Extremadura
<i>Dehesas</i>	1,014,865	24.35%
Holm oaks/Cork oaks	1,245,859	29.89%
<i>Dehesas</i> of holm oaks and cork oaks	552,133	13.25%
SPAB	1,089,232.9	26.13%
SAC	828,949.17	19.88%
Protected Natural Spaces (PNS)	1,257,787.05	7.54%
Protected Spaces (SPAB + SAC + PNS)	1,276,288.09	30.62%
<i>Dehesas</i> of holm oaks and cork oaks in PNS	439,464	10.54%

This type of *dehesa*, which is a natural example of a cultural landscape [42] created over centuries, can be used as a lure to encourage rural tourism [22,23,43] in its forms of agritourism and agriecotourism, in such a way that its inhabitants have access to higher levels of income than those exclusively deriving from agriculture or stockbreeding. Numerous rural accommodation establishments which do not make use of local resources to establish collaboration strategies to increase the attraction factor of their businesses would also benefit.

Extremadura has a surface area of *dehesas* amounting to 1,014,865 hectáreas, 24.35% of the whole of the territory of this region. In it the predominant system is an agroforestry one of land use and management based mainly on the extensive stockbreeding exploitation of a continuous surface area of pastureland and Mediterranean woodland essentially consisting of leafy species of the genus *Quercus*,

in which the intervention of man is fundamental for its conservation and maintenance over time. Its average tree cover per farm is at least 10 trees per hectare for this production type [44].

This surface area is even greater if we consider the holm oak and the cork oak or a combination of both species as the predominant vegetation. It amounts to as much as 1,245,859 ha, of which 729,048 ha correspond specifically to the production of the montanera, which is suitable for the feeding of animals which generate products marketed under the “acorn” reference as a quality identifier [44].

The above areas overlap numerous natural protected areas. These include in particular Special Protected Areas for Birds (SPAB) with 1,089,232.9 hectares together with the admittedly superimposed Special Area of Conservation (SAC) which account for 828,949.17 hectares.

The protected areas and the dehesas of holm oaks and cork oaks constitute an important natural heritage, the main exploitation of which is based on agriculture and stockbreeding. This system however underestimates certain potentialities which are mentioned in numerous studies carried out on the territory analysed, among which stand out the tourist exploitation which should occur in these spaces [23,45–47].

Despite the enormous tourist potential of dehesas (Figure 1) and the natural areas which overlap some of them, the available accommodation to be found in these territories is characterised by having significant circumstantial and structural problems. Among the former we can mention in particular the strong dependence on a Mediterranean type climate of irregular characteristics, which has immediate repercussions on the environment. In contrast, as a structural threat the marked seasonal variation stands out; it is a consequence of the concentration of overnight stays in July (10.7%) and August (15.9%); furthermore the level of occupancy is low as the average is less than 25% and the average stay is also low at 2.2 days [48].

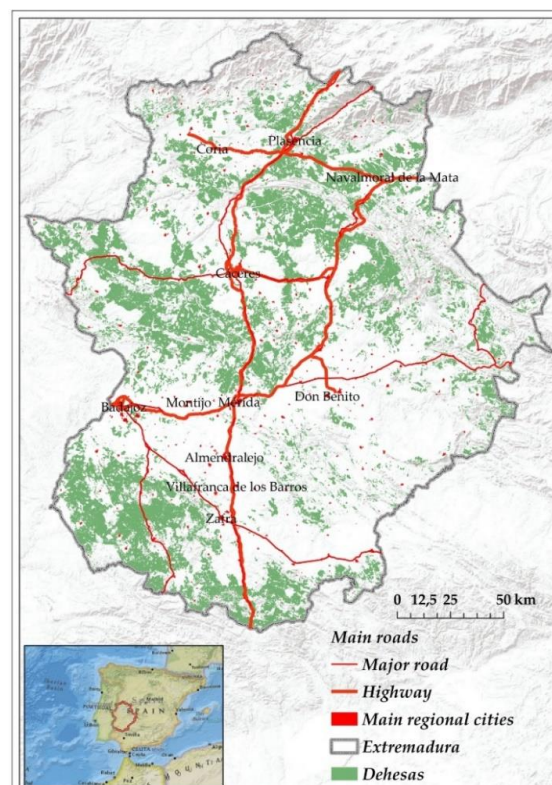


Figure 1. Locations of *dehesas*.

2.2. Data

The maps used in this study have been drawn up by the National Geographical Institute (Instituto Geográfico Nacional, IGN, Madrid, Spain) [49] and the Extremadura Territorial Information System

(Sistema de Información Territorial de Extremadura, SITEX) [50], both of which hold the Creative Commons CC-BY 4.0 International licence which protects their unrestricted use without charge for legitimate purposes with the sole obligation of acknowledging and mentioning their origin and ownership. The work scale chosen was 1:100,000 as it is sufficiently detailed for the purposes established in the research. Its spatial resolution is 20 m.

On the other hand, the alphanumeric data corresponding to rural tourism establishments come from the Extremadura Registry of Tourist Companies [51]; these were updated on 31st December 2018 and make up the database corresponding to the tourist accommodation available. To them have been added the offerings of tourist activities corresponding to that date. This alphanumeric database has been conveniently georeferenced for its subsequent implementation in a geographical Information System.

Both databases have been implemented in a Geographical Information System by using the ArcGIS 10.5 software (Table 2).

Table 2. GIS design project.

Data Type	Source	Cartographic Information	Alphanumeric Information
Cartographic	IGN	Administrative units Altimetry Hydrography Population centres Transport system Natural areas protected	Area Altitude Order Type Type Type
	SITEX	<i>Dehesas</i> Vegetation type Bathing areas Livestock trails	Area <i>Quercus</i> Type Type
Alphanumeric	Extremadura Tourism	Georeferencing information on Google Maps	Type of accommodation Address Municipality Accommodation places

2.3. Method of Analysis

The analysis methodology proposed consists of 6 stages as shown in Figure 2.

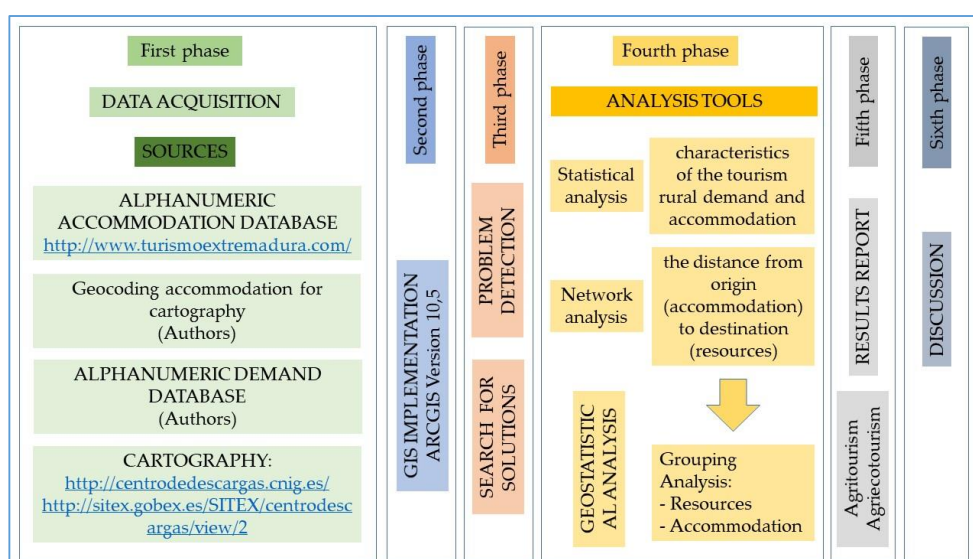


Figure 2. Methodological scheme.

The first stage consists of the acquiring and compiling of both alphanumeric and cartographic data from institutional servers of geographical information. The data corresponding to the accommodation available come from the institutional portal of the Regional Government of Extremadura (<https://turismoextremadura.com/>), although it has been necessary to geolocate them, while the cartographic information comes from the National Geographical Institute (<http://centrodedescargas.cnig.es/CentroDescargas/>) and the Regional Government of Extremadura (<http://sitex.gobex.es/SITEX/centrodedescargas/view/2>).

The second stage concentrated on the implementation of the information in a Geographical Information System based on the ArcGIS 10.5 software (Figure 3). By using this tool we have pinpointed the areas with the greatest possibilities of developing agritourism and agriecotourism, taking as a reference the presence of dehesas of holm oaks and cork oaks and also of a protected natural area. As a complement the livestock trails and the bathing areas, which basically refer to natural swimming pools, have been added. From this starting point we decided to perform a spatial analysis designed to determine the closest accommodation establishments to said areas with the aim of determining similar areas by means of geostatistical criteria on which a tourist product adapted to the vocation of the territory can be implemented.

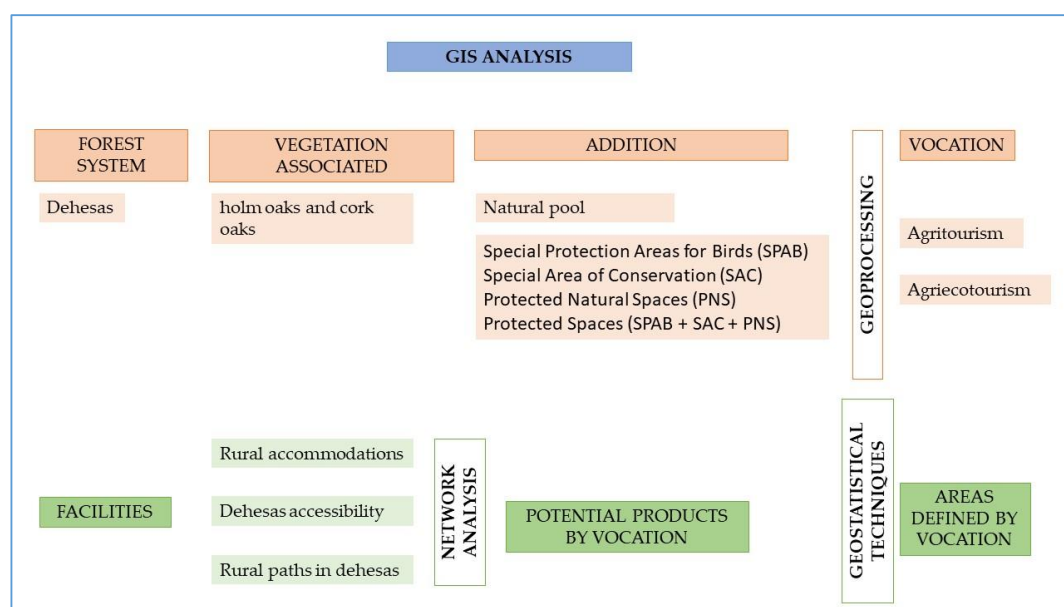


Figure 3. GIS analysis.

The third stage, which is based on the GIS project carried out, has served to detect the main problems of the offer of accommodation and the search for possible solutions. To do so we resorted to an analysis of the level of occupancy during the months of the highest tourist demand (April, August, October, and December), representing also in this way the seasons of the year. Moreover we have attempted to find solutions taking as a reference the great attraction of large areas of dehesa, especially for practising agritourism and agriecotourism.

The fourth stage involves the application of two clearly differentiated analytical techniques. On the one hand we decided to resort to univariate statistical analyses such as the distribution of frequencies or contingency tables. On the other hand we resorted to various spatial analyses carried out with the GIS software, among which stand out the analysis of networks, the main function of which has been the determination of the distances or to be more precise travel time from the accommodation to the dehesas. Moreover, spatial statistics have been used with the objective of identifying accommodation groups with similar characteristics.

The fifth stage shows the results obtained and finally in the sixth stage a discussion is expounded of the essential results of the research.

2.4. Techniques of Analysis

The main analytical technique used in the research was the analysis of groups complemented with descriptive statistics and the proximity analysis performed on various maps. This type of technique, which is included in the ArcGIS software (version 10.5; <https://www.esri.com/es-es/home>), is part of the specific module of spatial statistics in charge of creating spatial groupings of a series of data represented in map form.

The main objective of the analysis of groups is the creation and location of groups with homogeneous characteristics in the quantitative variables associated with the geometries used. In our case the 797 rural accommodation establishments and the distance at which they stand from four elements which we considered to be essential were taken as spatial elements. These are holm oak and cork oak dehesas, this type of forest which is also part of a natural protected area, bathing areas, and finally livestock trails which allow free passage as they are public thoroughfares.

The use of only four variables is due to the fact that this type of technique is more precise and gives better results when the number of quantitative attributes is smaller [52–54].

The distances selected were the nearest (1, 3, and 5 km); the furthest away were discarded. This delimitation is due to the fact that a radius of 5 km from the tourist attractions indicated covers a large percentage of the available accommodation and above all to the fact that as distance increases the influence of the attraction decreases, following the typical behaviour of inverse distance and even of the square of inverse distance [47].

The operation of this technique is complex and consists of seeking natural groupings in the selected variables. In other words, it explores similar values among all the components of the group and at the same time maximum differentiation from the other groups. This system thus seeks internal similarities and external imbalances, establishing a clear distinction between the groups generated [55,56].

The analysis of groups allows the use of spatial restrictions such as the Delaunay triangulation or the use of a number of nearby neighbours in the case of geometries without spatial continuity, as occurs with the accommodation as it is of the point and not polygon type. However, we did not resort to them owing to the considerable distance from the entities [57]. Indeed, when the distance taking into account 8 neighbours was calculated we found that the results were very enlightening. The minimum distance is 139 m and the maximum 41.3 km, which gives an average of 8.8 km. These results show that if a spatial restriction based on the criteria of proximity had been chosen we would have forced the relations which would have led to biased results.

In a highly synthetic manner the analysis of groups involves the calculation of a determination coefficient for each variable introduced (R^2), which shows the value it maintains after the grouping carried out and at the same time measures the degree of efficiency of the groups. Both parameters depend on the use of a spatial constraint and if appropriate of whatever type or on the omission of this restriction. For this reason it is necessary to determine the optimum groupings, to which end we resorted to the F-Statistics index [58,59], which has been much used in the geostatistical literature for decades.

The number of optimum groups is determined by the following equation:

$$R^2 = \frac{(TSS - ESS)}{TSS} \quad (1)$$

in which TSS is the sum total of the squares obtained for the variable considered and reflects the differences between the groups; while ESS is the explained sum of the squares and indicates the level of similarity within each group.

Theorem 1. *Calculating the determination coefficient.*

The TSS and ESS parameters are calculated by means of the following formula:

$$TTS = \sum_{i=1}^{n_c} \sum_{j=1}^{n_i} \sum_{v=1}^{n_v} \left(V_{ik}^k - \bar{V}^k \right)^2 \quad (2)$$

$$ESS = \sum_{i=1}^{n_c} \sum_{j=1}^{n_i} \sum_{v=1}^{n_v} \left(V_{ij}^k - \bar{V}_i^k \right)^2 \quad (3)$$

in which n is the number of characteristics; n_i the number of characteristics in Group i ; n_c the number of categories or groups; n_{vi} the number of variables used; V_{ik}^k the value acquired by the k -th value in the j -th characteristic within the i -th group; \bar{V}^k the average of the k -th variable; and \bar{V}_i^k the average value of the k -th variable in Group i .

Theorem 2. Calculating the TTS and ESS.

According to that expounded, the grouping analysis technique has been used considering the parameters reflected in Table 3:

Table 3. Parameters used in the analysis of groups.

Parameter Name	Input Value
Features	Rural accommodation
Analysis Fields	Distances to: Bathing areas (natural swimming pools) <i>Dehesas</i> of holm oaks and cork oaks <i>Dehesas</i> of holm oaks and cork oaks in protected natural spaces Livestock trails in <i>dehesas</i>
Spatial Constraints	No spatial constraint
Distance Method	Euclidean

3. Results

3.1. The Accommodation Available

3.1.1. Problems

The supply of rural accommodation faces numerous problems characteristic of this type of establishments in inland areas. These include the low level of occupancy for a large part of the year owing to its marked seasonal nature, which is further aggravated by a short average stay (Table 4) according to the National Institute of Statistics for 2017 [40]. This shows the imbalances between supply and demand [45]. This affirmation can be confirmed if it is taken into account that accommodation has been established in places lacking the attractions required by the demand, especially during summer if areas suitable for bathing are lacking [23].

The level of occupancy is very low in winter, especially in January and February in which 10% is barely achieved in the best of cases. On the contrary, in summer (July and August) and in April (during the Easter holidays) is when the highest level of occupancy is achieved. The figures range from 34% to 24.8% in the case of the province of Cáceres, although those for the province of Badajoz are appreciably lower. This shows that there is a certain imbalance between the supply of and demand for rural accommodation, this circumstance does not affect all of the territory of Extremadura in the same way [60].

The most successful areas are concentrated in the north of the province of Cáceres (La Vera, the Jerte Valley, the Ambroz Valley, Las Hurdes, and the Sierra de Gata) and it is here that the level of occupancy per bed for the third quarter of the year is 35.5%; it falls to 22% for the year as a whole. In contrast, other areas such as that of the Villuercas-Ibores-Jara Geopark have an annual average of

13.8%, which is similar to that of the Monfragüe Biosphere Reserve at 14.4% [60]. A clear difference can therefore be appreciated between different areas of Extremadura, and this circumstance must of necessity involve the making of decisions with a view to improving these low levels of occupation. In order to do so it is necessary to create specific tourist products which concentrate on the most significant attractions of each territory.

Table 4. Tourist indicators: seasonal nature, occupancy, and average stay (2017).

Months	Overnight Stays		Occupancy (%)		Weekend Occupancy (%)		Average Stay (Days)	
	Badajoz prov.	Cáceres prov.	Badajoz prov.	Cáceres prov.	Badajoz prov.	Cáceres prov.	Badajoz prov.	Cáceres prov.
January	2366	14,377	5.6	8.9	12.7	21.4	1.7	2.1
February	3789	17,239	10.0	10.8	22.1	27.4	1.9	2.0
March	4469	25,396	10.6	14.0	25.1	35.6	1.8	1.9
April	8165	53,347	19.9	28.9	34.8	47.0	2.2	2.5
May	4626	24,642	11.1	13.3	24.7	28.8	1.8	2.2
June	5173	23,762	12.8	13.9	27.4	28.9	1.9	2.1
July	8915	44,749	21.2	24.8	39.7	39.6	2.0	2.5
August	10,703	64,173	26.6	34.1	39.4	45.5	2.5	2.8
September	5964	34,316	15.0	19.5	27.1	35.9	1.9	2.5
October	6351	23,997	15.4	13.7	35.3	37.1	2.0	2.1
November	3501	19,048	9.4	11.1	25.0	26.3	1.7	2.0
December	6429	30,344	16.8	17.4	33.4	27.9	2.2	2.4
Yearly	70,452	375,390	14.5	17.7	28.8	33.7	2.0	2.3

A very similar situation is detected when the level of occupancy recorded at the weekend is analysed, although the figures are higher. To be precise, the National Institute of Statistics calculates at 45% the average level of occupation for the month of August in the whole of the autonomous region [40], although there is great monthly and territorial variation.

The problem of the low levels of occupancy is compounded by its strong seasonal nature as stays are concentrated in the months of April, July, and August in contrast to the rest of the year. Furthermore, the average overnight stay is less than 3 days even during August.

Both circumstances reflect a serious structural problem which can be corrected at least in part by resorting to the huge tourist potential of the *dehesas*, which are ideal for setting up initiatives linked to agritourism and agrietourism when they coincide with the wide network of protected natural spaces of Extremadura.

3.1.2. Location

The rural accommodation available in Extremadura is concentrated in the north of the province of Cáceres to coincide with the highest relief where numerous mountain streams run [55,61]. On these watercourses natural swimming pools are installed which are the main attraction for tourists in the summer period. They are therefore the favourites of the rural tourist as is reflected by the large number of visitors and overnight stays in the northern valleys of Extremadura [60]. Consequently these territories have the best tourist indicators of supply and demand owing to the fact that the bathing season (June to September) accounts for 45% of the overnight stays [40].

However, close observation of the location (Figure 4) reveals the existence of numerous rural accommodation establishments which lack natural bathing areas in their vicinity. As a result they are less attractive to tourists during the months of the greatest influx of visitors. Indeed it was confirmed that the level of occupancy per bed is appreciably less than the average for the northern areas. As an example it can be mentioned that according to the Extremadura Tourism Observatory [60], in 2017 the districts of La Vera and the Jerte Valley had a level of occupancy of 23.9% during the third quarter of the year, i.e., the hottest months. In contrast, other areas such as that of the Villuercas-Ibores-Jara Geopark only account for 12.9% of the beds during that quarter. This different behaviour reflects the presence or absence of one of the main tourist attractions, the presence of these bathing areas,

which also coincide with upland areas which partly mitigate the very hot summer temperatures of Extremadura.

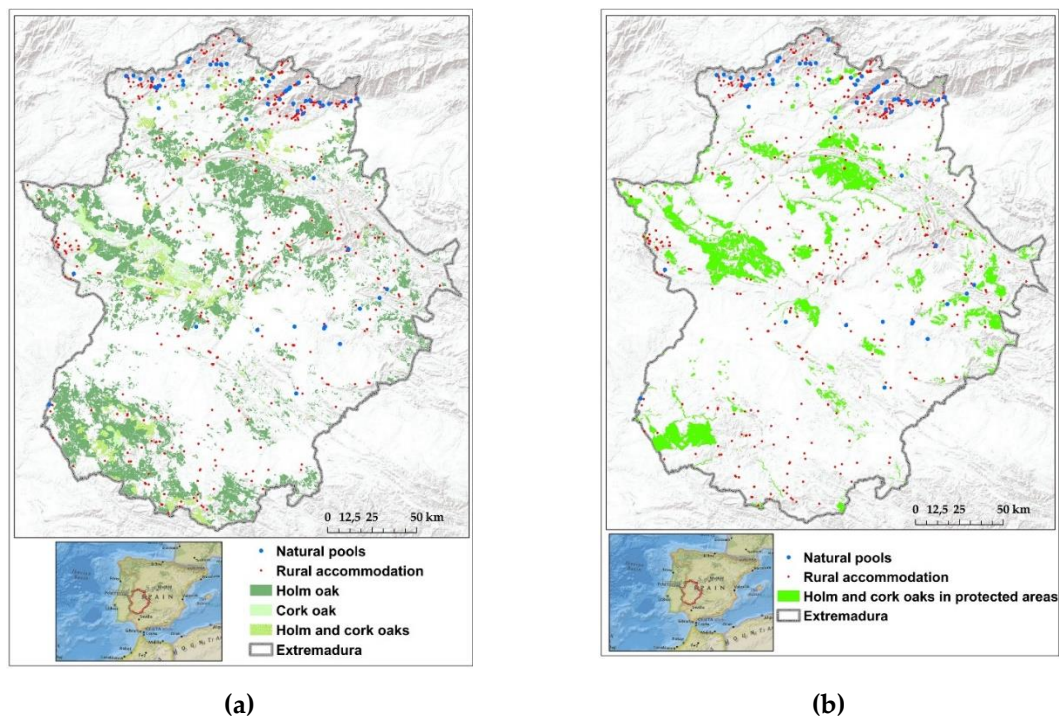


Figure 4. Location of *dehesas* of holm oaks and cork oaks (a) and protected natural spaces on *dehesas* (b).

Despite the fact that they are not sufficiently attractive during the summer months, part of the accommodation is located in the vicinity of other spaces that may be of great interest to agritourism and agriecotourism from autumn to spring. The first of these consists of those establishments near to *dehesas* of holm oaks and cork oaks on which the tourist product of the *dehesa* can be highlighted together with the way of life and exploitation of these natural spaces. The second would offer at the same time an ecotourism product making use of the wildlife of these areas as they are the habitat of numerous protected birds (eagles, vultures, etc.) and wild mammals (wild boar, deer, etc.).

The analysis of the distances between each accommodation establishment and various kinds of resources provides a complementary vision of some interest (Table 5). Indeed establishments located in the vicinity of natural bathing areas have fewer beds than those in the vicinity of other areas. By taking into account a radius of 5 km it can be found that there are only 288 rural accommodation establishments offering 3313 beds near natural swimming pools. In contrast these figures rise to 392 establishments and 4145 beds when these are located near *dehesas* of holm oaks and cork oaks in protected natural spaces which are ideal for agriecotourism. Moreover, there are as many as 500 accommodation establishments and 5218 beds in areas of *dehesa* with a tree cover of holm oaks and cork oaks. This distribution is complemented with the presence of livestock trails in the above areas which encourage mobility through the holm oak and cork oak groves. To be precise, in a radius of up to 5 kilometres we find 342 rural accommodation establishments providing 3529 beds.

These data stress the essential role that may be played by *dehesas* in improving the tourist development of these spaces, helping to increase overnight stays and thus facing up to the structural problems of the rural accommodation sector in Extremadura.

Table 5. Supply of rural establishments according to distances to attractions.

Distance	Bathing Areas		<i>Dehesas</i> of Holm Oaks and Cork Oaks		<i>Dehesas</i> of Holm Oaks and Cork Oaks in Protected Natural Spaces		Livestock Trails in <i>Dehesas</i>	
	Accommodation	Accommodation Places	Accommodation	Accommodation Places	Accommodation	Accommodation Places	Accommodation	Accommodation Places
1 km	118	1.386	257	2.581	97	934	83	882
3 km	210	2.484	437	4.445	262	2.542	235	2.342
5 km	288	3.313	500	5.218	392	4.145	342	3.529
10 km	403	4.403	708	7.558	628	6.780	563	6.070
15 km	436	4.731	787	8.352	775	8.236	719	7.690
All	797	8.485	797	8.485	797	8.485	797	8.485

The graphic perspective of the data (Figure 5) shows how a large percentage of the beds of rural accommodation are not located in the areas most desired by tourists, i.e., those near natural bathing areas. What is more, as the distance between the establishments and the tourist attractions considered increases this offer is the one with a lower accommodation capacity.

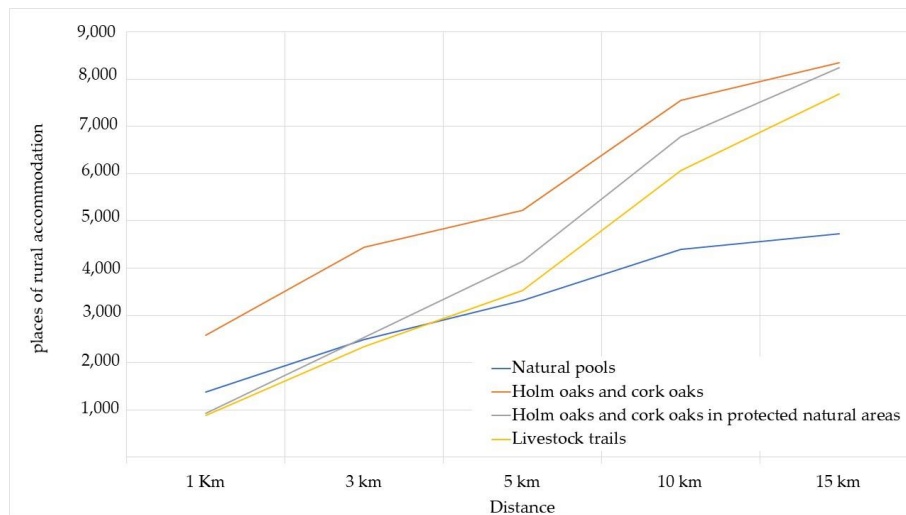


Figure 5. Rural accommodation beds available at multiple distances from tourist attractions.

Nevertheless, considerable changes are detected when the situation is compared with that of areas having a specific vocation for agritourism and agriecotourism according to whether these are *dehesas* or the latter with the addition of protected natural areas. In both cases it is noteworthy that in a radius of up to 5 km the number of beds offered is much higher, despite the fact that in general these areas are not those most favoured by tourists.

If we take as a reference a distance of 3 km around the *dehesas* of holm oaks and cork oaks, the number of rural beds thus concentrated is 52.4%; this figure falls to 30% if protected natural spaces are included and even to 27.6% if we consider livestock trails crossing the same. These percentages rise to 61.5%, 48.9%, and 41.6% respectively if a radius of 5 kilometres is used.

It can be inferred from this situation that it is necessary to act by designing specific tourist products in order to highlight *dehesas*, which would considerably improve the tourist indicators of a large proportion of the rural tourism establishments of Extremadura.

3.2. The Tourist Vocation of Dehesas and Joining the Offer

Dehesas have a series of characteristics which give them great potential as a tourist attraction which can be highlighted from very varied perspectives. They synthesise a unusual landscape subject to extensive agricultural and stockbreeding exploitation which generates quality products from pigs, cattle, and sheep. Furthermore they support a wildlife which allows its observation and the development of game hunting. In other words these spaces are of great value to the tourist provided that tourist products adapted to the different tastes of visitors are created. In some cases moreover they are close to bathing areas.

This combination of attractions strengthens the idea of the huge tourist potential, as if a suitable tourist product is designed it is possible that visitors will be attracted throughout the year at least in certain specific areas. These are areas in which the dehesa, protected natural spaces, and bathing areas coincide. Nevertheless, as has been expounded the areas with the biggest problems owing to the low occupancy recorded by the rural accommodation available are located in areas far from those legally established for bathing. For this reason the making use of dehesas for setting up agritourism and agriecotourism activities is of great interest as numerous spaces exist which fulfil the necessary requirements for attracting potential tourists. These resources range from the large bodies of centenary

holm oaks and cork oaks, under which feed animals such as the Iberian pig and the retinta calves which are both of high gastronomic quality, to wild areas in which are frequently found species such as the wild boar, red deer, and a multitude of birds which will delight all nature lovers.

However, in Extremadura rural accommodation establishments exploiting agritourism scarcely exist and when they do they are never found in large spaces such as dehesas but rather on small family farms of just a few hectares. The situation is a similar one in the case of agriecotourism activities, while the areas suitable for summer tourism because they include places to bathe do not offer agritourism activities as a complement. This scenario raises the need for the generating of specific products in delimited areas which follow similar patterns.

In short, it is evident that if an attraction exists it must be highlighted in order to encourage the socio-economic development of the surrounding area, making use of the synergies between agriculture, stockbreeding, and the environment characteristic of these spaces. Despite the fact that the options for developing tourist products are very varied, we understand that the two best options must be agritourism and agriecotourism owing to their level of social involvement and their sustainability criteria.

In order to determine which rural establishments are suitable for setting in motion this type of products, supported by the synergies present in the territory where large dehesa estates are located, we decided to carrying out a grouping analysis.

The variables used concentrated on the spatial dimension; for each accommodation establishment we determined the Euclidian distance from them to dehesas of holm oaks and cork oaks and also to protected natural spaces coinciding with these same dehesas, to natural swimming pools, and to livestock trails. The overall results of each variable show the relationship between the variables and the accommodation establishments (Table 6).

Table 6. Overall variable statistics.

Distance from Rural Accommodation to:	Mean	Std. Dev.	Min	Max	R ²
Protected natural areas in <i>dehesas</i>	0.6989	1.3004	0	5	0.88
Livestock trails	1.4479	1.9706	0	5	0.75
Bathing areas	1.0778	1.6709	0	5	0.69
<i>Dehesas</i> of holm oaks and cork oaks	1.5082	1.8335	0	5	0.60
Accommodation = 797; Accommodation places = 8485; Std. Distance = 3.4246; SSD = 861.2832					

The application of the grouping technique to the four variables selected gives overall satisfactory results as can be seen from the determination coefficient (R^2) obtained in each one of them. The close relationship existing in accommodation establishments near protected natural areas on dehesas of holm oaks and cork oaks (0.88) stands out. The result obtained in the case of livestock trails located in the above areas (0.75) is also significant. Nevertheless, both the distance to bathing areas and that to dehesas of holm oaks and cork oaks present lower figures of 0.69 and 0.60 respectively. From this it can be inferred that the overall results for rural accommodation establishments of Extremadura show a higher correlation in the case of dehesas which also include livestock trails and which are part of protected natural areas. From this it can be inferred that there is considerable potential for the setting up of tourist products to allow agriecotourism and agritourism. In the first case we would put our faith in establishments close to protected natural areas located on dehesas, and in the second in including accommodation near livestock trails which allow free passage through the farms.

The configuration of 5 different groupings stands out. The detailed analysis of the representativeness of each variable in said groups (Table 7) shows that the protected natural areas on dehesas variable makes a greater contribution than the remainder in Group 3. In contrast, the livestock trails on dehesas of holm oaks and cork oaks variable reaches its maximum representativeness in Groups 3 and 5 followed by Groups 1 and 4. For its part, the bathing area variable represents Groups 2 and 3 and reaches its minimum representation in group 4. Finally, the dehesas of holm oaks and cork oaks variable makes a greater contribution in Groups 2, 3, and 5. These data reflect a certain

complexity in some variables as they contribute in a very similar way to different groups as in the case of the protected natural areas on *dehesas*.

Table 7. Overall variable statistics.

Variable	Group	Mean	Std. Dev.	Min	Max	Share
Protected natural areas in <i>dehesas</i>	1	0.33	0.47	0	1	0.2
	2	0.18	0.38	0	1	0.2
	3	3.38	0.79	3	5	0.4
	4	0.15	0.36	0	1	0.2
	5	0.03	0.16	0	1	0.2
	Total	0.70	1.30	0	5	1
Livestock trails	1	0.48	0.65	0	3	0.6
	2	4.42	0.91	3	5	0.4
	3	1.97	1.81	0	5	1
	4	0.25	0.64	0	3	0.6
	5	0.07	0.48	0	5	1
	Total	1.45	1.97	0	5	1
Bathing areas	1	0.43	1.03	0	3	0.6
	2	0.20	0.79	0	5	1
	3	0.78	1.47	0	5	1
	4	0.36	0.48	0	1	0.2
	5	3.93	1.00	3	5	0.4
	Total	1.08	1.67	0	5	1
<i>Dehesas</i> of holm oaks & cork oaks	1	3.84	0.99	3	5	0.4
	2	2.88	1.58	0	5	1
	3	2.65	1.77	0	5	1
	4	0.17	0.37	0	1	0.2
	5	0.23	0.87	0	5	1
	Total	1.51	1.83	0	5	1

The graphic analysis of the contribution of each variable in each group (Figure 6) is even more revealing. It is further confirmed that group 1 is made up of those rural accommodation establishments which are in the vicinity of *dehesas* of holm oaks and cork oaks. On the contrary, group 2 will be defined by those establishments which are also in areas crossed by a livestock trail. Group 3 is characterised by *dehesas* found in a protected natural space although it also has some representativeness in other variables. On the other hand, Group 4 is more complex as it is not specifically defined by any variable. Indeed it is the predominant group and is distributed all over Extremadura. In contrast, Group 5 is clearly defined by those rural accommodation establishments which are in the vicinity of bathing areas, to be precise of natural swimming pools.

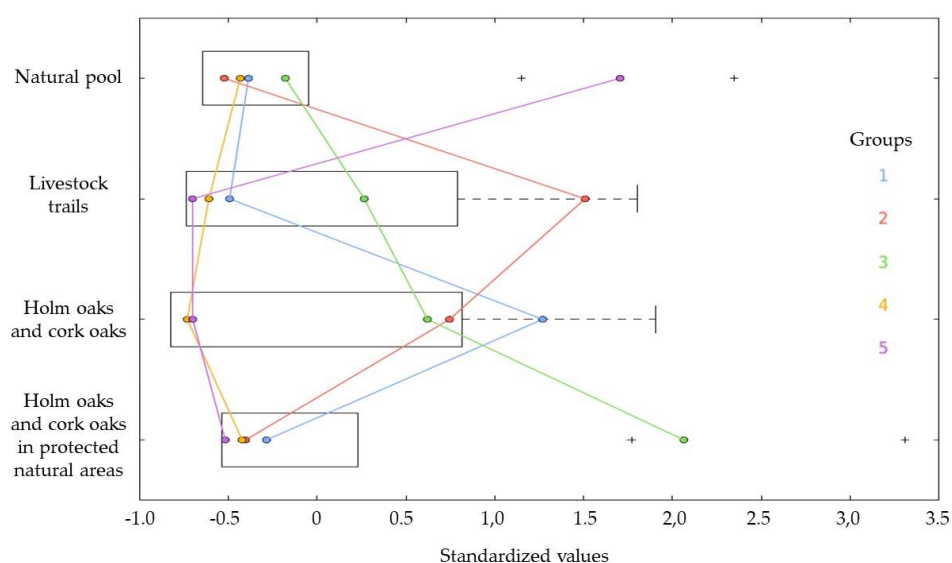


Figure 6. Parallel box plot.

3.2.1. Group 1

The contribution of the variables to Group 1 (Table 8) and their geographical distribution (Figure 7) correspond basically to the rural accommodation establishments located at a distance of between 3 and 5 km from *dehesas* of holm oaks and cork oaks. Nevertheless, they are more than 5 km from the remainder of the variables, although some of them are less than 1 km from protected areas and livestock trails; they are complemented with the presence of some bathing areas up to a distance of 3 km.

As can be appreciated, this group consisting of 67 accommodation establishments providing a total of 665 beds has the potential to promote products linked to agritourism on *dehesas* given that they are normally at a distance of less than 5 km. Moreover, as an added value some have natural swimming pools or are part of a protected natural space.

Table 8. Overall variable statistics (Group 1).

Distance from Rural Accommodation to:	Mean	Std. Dev.	Min	Max	Share
Protected natural areas in <i>dehesas</i>	0.3284	0.4696	0	1	0.2
Livestock trails	0.4776	0.6547	0	3	0.6
Bathing areas	0.4328	1.0254	0	3	0.6
<i>Dehesas</i> of holm oaks and cork oaks	3.8358	0.9864	3	5	0.4
Accommodation = 67; Accommodation places = 665; Std. Distance = 1.6351; SSD = 60.7590					

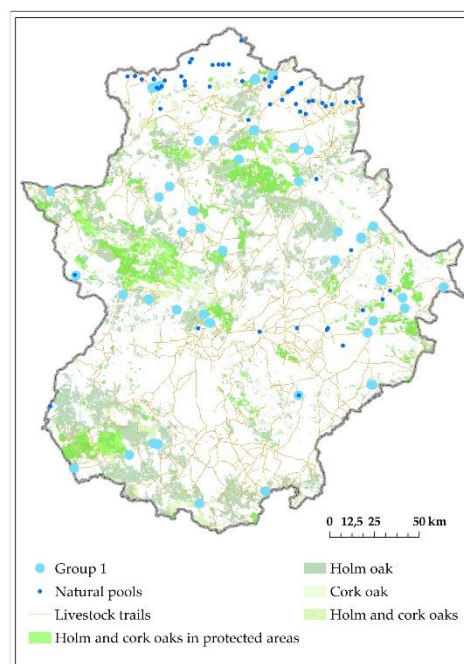


Figure 7. Group 1.

These accommodation establishments are located in various areas of the district of La Serena, the vicinity of the Monfragüe Biosphere Reserve, and the south of the Sierra de San Pedro.

3.2.2. Group 2

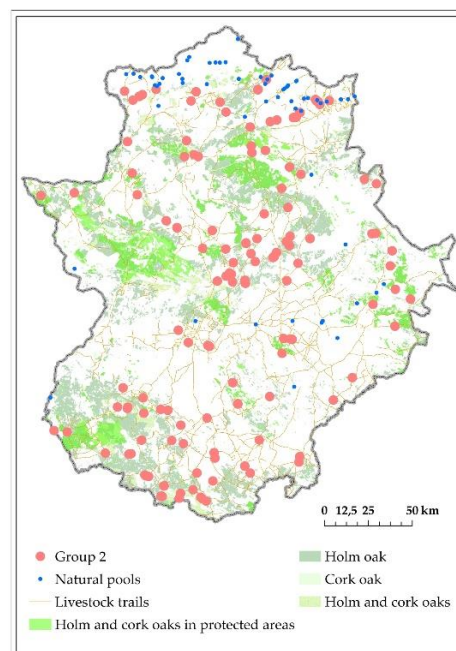
The main characteristics defining this group of rural accommodation establishments (Table 9) correspond to those near livestock trails. To be precise it corresponds to those located between 3 and 5 km from this type of trail. Moreover, most of them are in the vicinity of *dehesas* of holm oaks and cork oaks. However, very few are to be found near protected natural spaces or natural swimming pools.

Table 9. Overall variable statistics (Group 2).

Distance from Rural Accommodation to:	Mean	Std. Dev.	Min	Max	Share
Protected natural areas in <i>dehesas</i>	0.1761	0.3809	0	1	0.2
Livestock trails	4.4205	0.9073	3	5	0.4
Bathing areas	0.2045	0.7929	0	5	1.0
<i>Dehesas</i> of holm oaks and cork oaks	2.8750	1.5798	0	5	1.0
Accommodation = 176; Accommodation places = 1834; Std. Distance = 2.0230; SSD = 222.7062					

It consists of 176 accommodation establishments which have a total of 1834 beds, they mainly focus on agritourism.

They are located (Figure 8) over most of Extremadura, although greater concentrations can be found in the southwest of the province of Badajoz and in the centre of the autonomous region. There is also a significant concentration in the Tiétar Valley.

**Figure 8.** Group 2.

3.2.3. Group 3

The essential characteristics of rural accommodations establishments in Group 3 are their location in the vicinity of *dehesas* of holm oaks and cork oaks (up to 5 km) and above all that the latter are part of protected natural spaces (Table 10). Some are also found in the vicinity of bathing areas in the form of natural swimming pools and livestock trails. This is one of the groups with the greatest potential in agritourism and agriecotourism.

Table 10. Overall variable statistics (Group 3).

Distance from Rural Accommodation to:	Mean	Std. Dev.	Min	Max	Share
Protected natural areas in <i>dehesas</i>	3.3824	0.7865	3	5	0.4
Livestock trails	1.9706	1.8147	0	5	1.0
Bathing areas	0.7794	1.4687	0	5	1.0
<i>Dehesas</i> of holm oaks and cork oaks	2.6471	1.7720	0	5	1.0
Accommodation = 136; Accommodation places = 1371; Std. Distance = 3.0347; SSD = 397.1982					

They are essentially located in the province of Cáceres with well-defined groups in the vicinity of the Sierra de San Pedro and Las Villuercas. Moreover, there is another differentiated core in the Sierra de Montánchez and in some cases in the Ambroz Valley, Las Hurdes, and the Sierra de Gata to coincide with those near bathing areas (Figure 9).

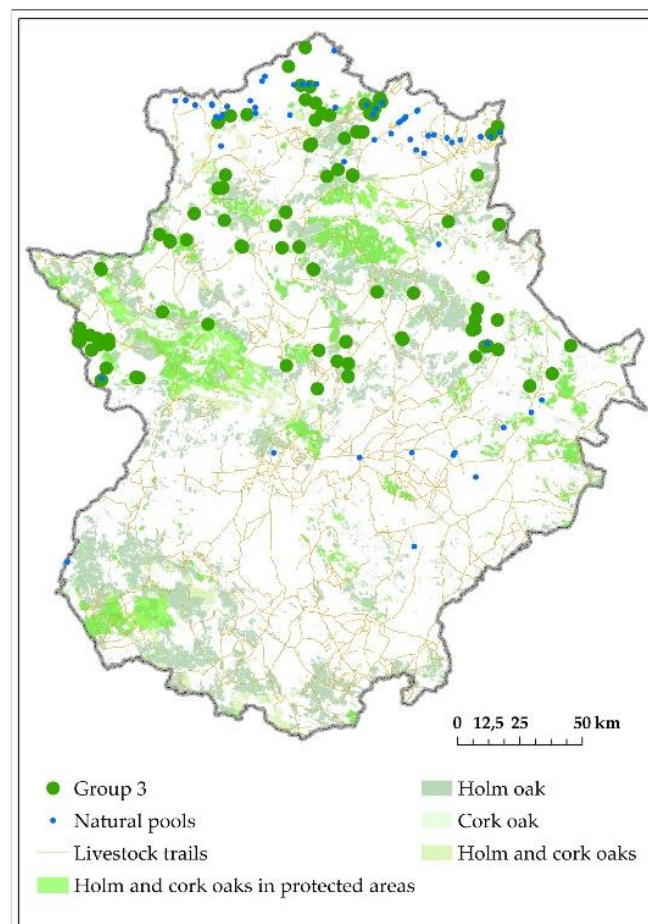


Figure 9. Group 3.

3.2.4. Group 4

The accommodation establishments in this group are not clearly defined as they are characterised by a marked duality regarding the proximity of resources (Table 11). On the one hand it discriminates against those which are near any of them but also those who lack the remainder. This is the most numerous group with over 267 rural accommodation establishments with 2940 beds.

Table 11. Overall variable statistics.

Distance from Rural Accommodation to:	Mean	Std. Dev.	Min	Max	Share
Protected natural areas in <i>dehesas</i>	0.1498	0.3569	0	1	0.2
Livestock trails	0.2472	0.6409	0	3	0.6
Bathing areas	0.3558	0.4788	0	1	0.2
<i>Dehesas</i> of holm oaks and cork oaks	0.1685	0.3743	0	1	0.2
Accommodation = 267; Accommodation places = 2940; Std. Distance = 0.9526; SSD = 81.4054					

Their territorial distribution is characterised by covering a large proportion of Extremadura although there is a marked concentration of establishments near bathing areas in the north of the

province of Cáceres. The remainder are dispersed throughout the territory in accordance with their proximity to any of the variables considered. In this case their potential is less clear as it depends to a large extent on the nearest resource (Figure 10).

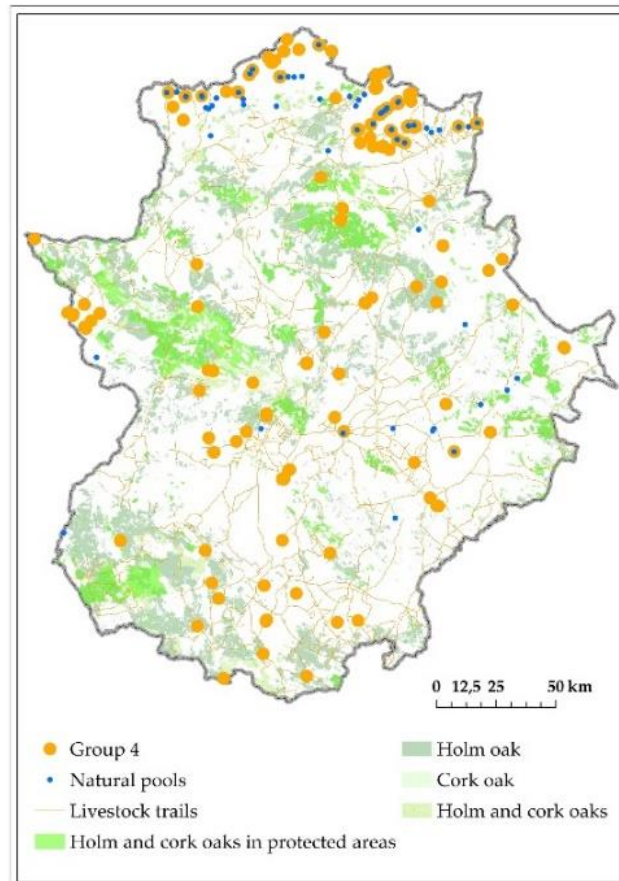


Figure 10. Group 4.

3.2.5. Group 5

Group 5 consists of the rural accommodation establishments in the vicinity of natural swimming pools (Table 12). Only a small number are near *dehesas* of holm oaks and cork oaks, protected spaces, or livestock trails. It is a very well defined group made up of 151 rural accommodation establishments with 1675 beds.

Table 12. Overall variable statistics.

Distance from Accommodation to:	Mean	Std. Dev.	Min	Max	Share
Protected natural areas in <i>dehesas</i>	0.0265	0.1606	0	1	0.2
Livestock trails	0.0662	0.4838	0	5	1.0
Bathing areas	3.9272	0.9973	3	5	0.4
<i>Dehesas</i> of holm oaks and cork oaks	0.2252	0.8702	0	5	1.0
Accommodation = 151; Accommodation places = 1675; Std. Distance = 1.4184; SSD = 99.2145					

Their territorial distribution is concentrated above all in the north of the province of Cáceres and also on some beaches and adapted bathing areas in the reservoirs of the basin of the River Guadiana (Figure 11).

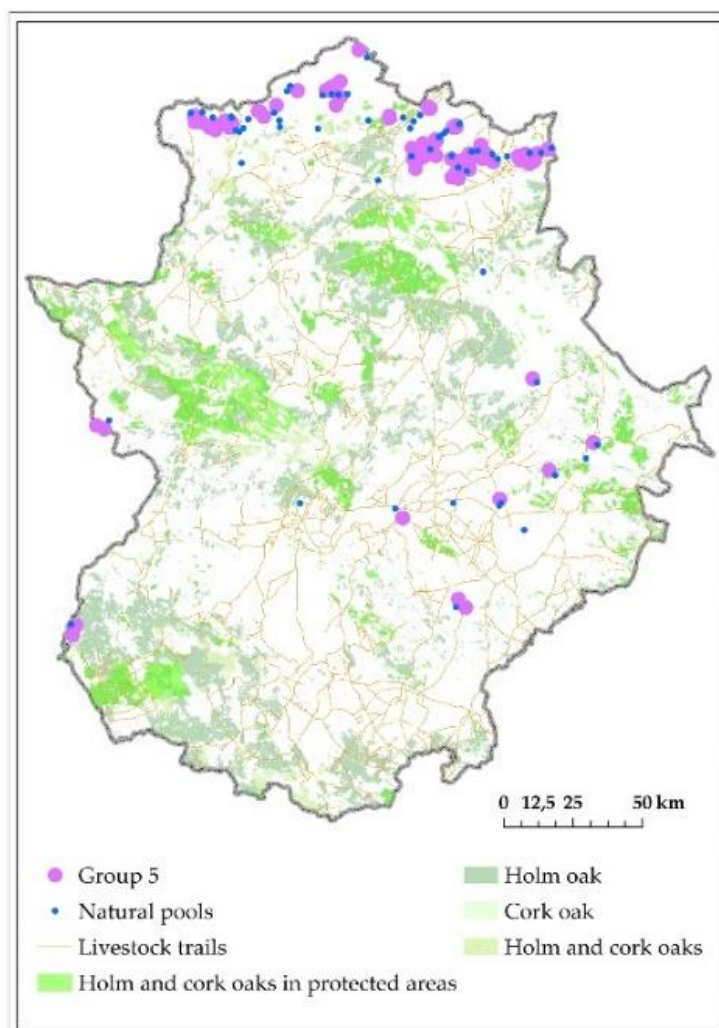


Figure 11. Group 5.

4. Discussion

The results obtained confirm the initial hypothesis according to which rural tourism may encourage the development of *dehesas* by means of generating agritourism or agriecotourism products as the potential for this exists. This implies that *dehesas* must be used as a tourist resource to complement the existing offer of rural tourism. By doing so their use will also be directed towards the service sector, exploding the myth that their main vocation is the exploiting of agricultural and stockbreeding resources. Indeed some studies corroborate the importance of agroforestry systems in the development of rural areas [62], attaching commercial importance to them which is considerable in the case of agritourism or birdwatching [63].

Although references to the potential of the *dehesas* of Extremadura for encouraging the development of tourism exist [22,32] they are still not made use of in a generalised manner. Rural accommodation establishments which have chosen to link themselves to an agritourism or agriecotourism product can scarcely be found. This situation contrasts with the results obtained in our research.

According to official sources *dehesas* occupy 24.35% of the surface area of Extremadura while holm oak and cork oak groves account for 29.89% of the former. At the same time 30.62% of the autonomous region is protected. This is the origin of the huge potential of a large proportion of the territory of Extremadura to set in motion initiatives to link the rural accommodation available with the agritourism and agriecotourism products that can be offered. In this respect it should be mentioned that 13.25% of the territory consists of *dehesas* of holm oaks and cork oaks and 10.5% of the same adds the status of

a protected natural area to the above potential. However, this huge potential is being underexploited to face the endemic problems of rural accommodation, among which the short average stay and the low levels of occupancy complicate still further a sector characterised by its strong seasonal nature.

If the occupancy percentages of the rural accommodation establishments of different areas of Extremadura are considered, the north of the province of Cáceres stands out as it is here that higher relief coincides with the watercourses on which natural swimming pools have been created. These areas are in the best position to attract demand during the summer period [55]. Despite this, 50.5% of rural accommodation establishments are located within a radius of 10 km around the bathing areas. In contrast, 3 km from the *dehesas* of holm oaks and cork oaks is where 54.8% of the rural accommodation available can be found; this figure falls to 32.8% in the case of being part of a protected area. From these data it can be inferred that a large proportion of the accommodation is not located near the areas most in demand by rural tourists in the season of the highest level of occupancy, i.e., summer. Despite this they are very close to other attractions that can be highlighted in the area surrounding the *dehesas*.

It is clear that the solution to the low level of occupancy involves the defining of new tourist products based on the potential of the territory, in this case the *dehesas* of holm oaks and cork oaks and the protected spaces. These must include those of agritourism and agriecotourism, although the need arises for finding out which rural accommodation establishments are in the best position to set in motion specific products based on this potential.

With the aim of supporting the making of these decisions we decided to resort to a grouping analysis, the objective of which is the generating of sets of accommodation establishments with common characteristics so as to encourage the creation of spatial cluster structures. Its results were satisfactory because they allow associating each establishment (Table A1) with the best tourist product option based on proximity to the attractions. In this way it can be observed that of the 5 groups obtained 3 have sufficient characteristics in order to put into practice products based on the potential of the *dehesa* system, in some cases orientated towards agritourism (Groups 1 and 2) and in others towards agriecotourism (Group 3). In contrast Group 4 is poorly defined while Group 5 corresponds to a vocation orientated towards the recreational use of natural swimming pools during the summer, although specific periods such as Easter and certain long weekends are also very successful.

Groups 1, 2, and 3 have greater possibilities of putting into practice an exploitation of the *dehesas* other than that concentrating on the agricultural and stockbreeding sector on creating a link with tourism. These 3 groups contain a total of 379 accommodation establishments providing 3870 beds, which means that over 45% of the supply of rural accommodation can fit in with these systems. In this way it would be possible to deseasonalise rural tourism as the best time to enjoy the maximum splendour of these landscapes is from October to May. At the same time this would make it possible to increase the level of occupancy, which is very low in some cases, although it is more difficult to increase the average stay as this depends on the free time available and in many cases this activity is restricted to the weekend. These three groups provide another important advantage, i.e., the presence of livestock trails in the vicinity, which makes it easier to plan routes through these areas.

From this starting point the regional administration with competence in the subject should generate a tourist policy orientated towards the setting up of agritourism initiatives adapted to Groups 1 and 2 and agriecotourism initiatives suitable for Group 3, the main mission of which would be the generation of tourist products revolving around the *dehesa*. These should include the following:

1. Agricultural and stockbreeding production methods of the *dehesa* linked to the rearing of Iberian pigs, cattle, and sheep and even fighting bulls.
2. The natural environment of the *dehesa* and in particular the observation of flora and fauna, notably birds.
3. The traditional exploitation of the *dehesa* by means of ancestral trades such as the removing of cork, the production of charcoal, apiculture, etc.
4. Hunting
5. Gastronomy based on autochthonous products from the *dehesa* itself.

6. The vernacular architectural heritage related to agricultural and above all stockbreeding use (huts, pigsties, etc.)

Initially the establishments with the greatest advantages should be selected as a pilot experience to promote agritourism. This means those less than 5 km from the four resources analysed: *dehesas* of holm oak and cork oak groves, protected natural spaces, bathing areas, and livestock trails. 23 such establishments are linked to Group 3 and to a lesser extent to Group 1.

These results show that it is possible to exploit the endogenous potential in order to develop rural areas taking as a reference their environment, culture, and traditions, although the development of agritourism and agriecotourism products is not an easy task. It involves continuous collaboration with those responsible for policies, who sometimes lack tourist training, and above all with the owners of the accommodation establishments and of the agricultural and stockbreeding farms, who must take the first steps in shaping and designing the final products. This is the way to move forward in the future.

5. Conclusions

The carrying out of the study presented on the potential of *dehesas* in Extremadura for setting up agritourism and agriecotourism initiatives allows the following conclusions to be drawn:

1. In the first place the essential problems affecting rural accommodation establishments located in Extremadura are revealed. Among these the seasonal factor, low levels of occupancy, and a low average stay should be emphasised. In order to attempt to reduce the negative effects of the first two problems it is possible to resort to the endogenous potential of *dehesas*, which is enhanced by the proximity of rural accommodation. However, the average stay is an element with a different dynamic as it basically depends on the time available and coincides with weekends for most of the year.
2. Secondly, it can be said that Extremadura has a large surface area of *dehesas* of holm oaks and cork oaks, part of which coincides with the network of protected natural spaces which guarantees that the ecosystems are very well preserved. Moreover, *dehesas* tend to contain a network of public thoroughfares (livestock trails) which facilitate the carrying out of activities within them. This agroforestry system has enormous potential which should allow the carrying out of tertiary activities such as tourism in its multiple facets.
3. Thirdly, it is clear that the performing of a grouping analysis is a geostatistical technique which is very useful for differentiating groups of entities with homogeneous characteristics. With its application 5 groups have been obtained which are characterised by having spatial entities with the various tourist resources analysed at similar distances between each other but clearly differentiated from other groups.
4. Fourthly, it is observed that 3 groups have considerable potential for the practising of agritourism (Groups 1 and 2) and in addition for agriecotourism (Group 3). A special feature is that these groups correspond to areas in which the level of occupancy is not very high.
5. Fifthly and finally we conclude that it is vital to draw up a tourist policy designed to develop specific tourist products for these areas, in which agritourism must play an important role. The study identifies a group of accommodation establishments with great potential (Group 3) and a clear vocation for agritourism as a starting point. Likewise this category can be complemented with a varied set of offerings such as the observation of wildlife, gastronomy, the traditional way of life, etc.

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de problemas a la propuesta de soluciones basadas en criterios geoestadísticos” (Code IB 16040). This Project is funded by the Consejería de Economía e Infraestructuras de la Junta de Extremadura (the branch of the regional government that covers economy and infrastructure) and by the European Regional Development Fund (ERDF). This work was supported by Junta of Extremadura and co-financed by the European Regional Development Fund through help GR18052 (DESOSTE).

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Appendix A

Table A1. This table shows the significant results obtained by grouping analysis.

ID Accomodation *	Distance to Holm Oaks and Cork Oaks	Distance to Holm Oaks and Cork Oaks in Protected Natural Areas	Distance to Natural Pool	Distance to Livestock Trails	Group
95	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
272	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
349	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
370	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
409	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
410	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
420	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
421	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
679	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
680	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
682	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
687	from 1 km to 3 km	up to 1 km	up to 5 km	up to 1 km	1
325	from 1 km to 3 km	up to 1 km	up to 5 km	up to 5 km	1
327	from 1 km to 3 km	up to 1 km	up to 5 km	up to 5 km	1
355	from 1 km to 3 km	up to 1 km	up to 5 km	up to 5 km	1
395	from 1 km to 3 km	up to 1 km	up to 5 km	up to 5 km	1
31	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
67	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
77	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
98	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
101	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
167	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
168	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
174	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
181	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
182	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
184	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
205	from 1 km to 3 km	up to 5 km	up to 5 km	up to 1 km	1
124	from 1 km to 3 km	up to 5 km	up to 1 km	up to 5 km	1
204	from 1 km to 3 km	up to 5 km	up to 1 km	up to 5 km	1
13	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
14	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
88	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
178	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
246	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
249	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
250	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
407	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
416	from 1 km to 3 km	up to 5 km	up to 5 km	up to 5 km	1
706	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	from 1 km to 3 km	1
707	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	from 1 km to 3 km	1
704	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	up to 1 km	1
705	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	up to 1 km	1
219	from 3 km to 5 km	up to 1 km	up to 5 km	up to 5 km	1
220	from 3 km to 5 km	up to 1 km	up to 5 km	up to 5 km	1
574	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	up to 5 km	1
582	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	up to 5 km	1
586	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	up to 5 km	1
590	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	up to 5 km	1
612	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	up to 5 km	1
52	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
131	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
132	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
164	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
173	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
186	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
310	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
311	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1
313	from 3 km to 5 km	up to 5 km	up to 5 km	up to 5 km	1

Table A1. *Cont.*[illegible]

Table A1. *Cont.*[illegible]

Table A1. *Cont.*

ID Accommodation *	Distance to Holm Oaks and Cork Oaks	Distance to Holm Oaks and Cork Oaks in Protected Natural Areas	Distance to Natural Pool	Distance to Livestock Trails	Group
85	up to 1 km	up to 1 km	up to 5 km	from 3 km to 5 km	2
261	up to 1 km	up to 1 km	up to 5 km	from 3 km to 5 km	2
382	up to 1 km	up to 1 km	up to 5 km	from 3 km to 5 km	2
53	up to 1 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
63	up to 1 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
106	up to 1 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
300	up to 1 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
301	up to 1 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
0	up to 5 km	up to 1 km	up to 5 km	from 3 km to 5 km	2
46	up to 5 km	up to 5 km	from 1 km to 3 km	from 3 km to 5 km	2
508	up to 5 km	up to 5 km	from 1 km to 3 km	from 3 km to 5 km	2
510	up to 5 km	up to 5 km	from 1 km to 3 km	from 3 km to 5 km	2
525	up to 5 km	up to 5 km	from 1 km to 3 km	from 3 km to 5 km	2
474	up to 5 km	up to 5 km	up to 1 km	from 3 km to 5 km	2
511	up to 5 km	up to 5 km	up to 1 km	from 3 km to 5 km	2
515	up to 5 km	up to 5 km	up to 1 km	from 3 km to 5 km	2
519	up to 5 km	up to 5 km	up to 1 km	from 3 km to 5 km	2
21	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
76	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
83	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
87	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
116	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
118	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
120	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
121	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
142	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
143	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
146	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
147	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
148	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
149	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
150	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
432	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
433	up to 5 km	up to 5 km	up to 5 km	from 3 km to 5 km	2
693	from 1 km to 3 km	from 1 km to 3 km	up to 1 km	from 1 km to 3 km	3
222	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
223	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
227	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
229	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
255	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
283	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
286	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
336	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
343	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
344	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
346	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
359	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
362	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
363	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
364	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
366	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
367	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
368	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
391	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
414	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
422	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
423	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
251	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
252	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
292	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
294	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
383	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
384	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
429	from 1 km to 3 km	from 1 km to 3 km	from 3 km to 5 km	up to 1 km	3
319	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
419	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
424	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
425	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
426	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
427	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
459	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
461	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
462	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
465	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
221	from 1 km to 3 km	from 1 km to 3 km	from 3 km to 5 km	up to 5 km	3
201	from 1 km to 3 km	from 1 km to 3 km	up to 1 km	up to 5 km	3
203	from 1 km to 3 km	from 1 km to 3 km	up to 1 km	up to 5 km	3

Table A1. Cont.

ID Accomodation *	Distance to Holm Oaks and Cork Oaks	Distance to Holm Oaks and Cork Oaks in Protected Natural Areas	Distance to Natural Pool	Distance to Livestock Trails	Group
207	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
303	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
307	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
308	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
348	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
360	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
361	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
385	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
428	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
697	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
545	from 1 km to 3 km	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	3
560	from 1 km to 3 km	from 3 km to 5 km	from 1 km to 3 km	from 3 km to 5 km	3
565	from 1 km to 3 km	from 3 km to 5 km	from 1 km to 3 km	from 3 km to 5 km	3
646	from 1 km to 3 km	from 3 km to 5 km	from 1 km to 3 km	up to 1 km	3
546	from 1 km to 3 km	from 3 km to 5 km	up to 5 km	up to 1 km	3
549	from 1 km to 3 km	from 3 km to 5 km	up to 5 km	up to 1 km	3
683	from 1 km to 3 km	from 3 km to 5 km	up to 5 km	up to 5 km	3
627	from 3 km to 5 km	from 1 km to 3 km	from 3 km to 5 km	from 1 km to 3 km	3
672	from 3 km to 5 km	from 1 km to 3 km	up to 1 km	from 1 km to 3 km	3
673	from 3 km to 5 km	from 1 km to 3 km	up to 1 km	from 1 km to 3 km	3
675	from 3 km to 5 km	from 1 km to 3 km	up to 1 km	from 1 km to 3 km	3
202	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
262	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
412	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
413	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
621	from 3 km to 5 km	from 1 km to 3 km	from 3 km to 5 km	from 3 km to 5 km	3
624	from 3 km to 5 km	from 1 km to 3 km	from 3 km to 5 km	from 3 km to 5 km	3
265	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
337	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
212	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
218	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
235	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
236	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
242	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
287	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
306	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
323	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
326	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
636	from 3 km to 5 km	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	3
638	from 3 km to 5 km	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	3
639	from 3 km to 5 km	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	3
640	from 3 km to 5 km	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	3
645	from 3 km to 5 km	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	3
647	from 3 km to 5 km	from 3 km to 5 km	up to 1 km	from 1 km to 3 km	3
544	from 3 km to 5 km	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	3
547	from 3 km to 5 km	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	3
550	from 3 km to 5 km	from 3 km to 5 km	up to 5 km	from 1 km to 3 km	3
600	from 3 km to 5 km	from 3 km to 5 km	from 3 km to 5 km	up to 5 km	3
601	from 3 km to 5 km	from 3 km to 5 km	from 3 km to 5 km	up to 5 km	3
617	from 3 km to 5 km	from 3 km to 5 km	from 3 km to 5 km	up to 5 km	3
390	up to 1 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
415	up to 1 km	from 1 km to 3 km	up to 5 km	from 1 km to 3 km	3
226	up to 1 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
350	up to 1 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
351	up to 1 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
504	up to 1 km	from 1 km to 3 km	up to 5 km	from 3 km to 5 km	3
231	up to 1 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
302	up to 1 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
371	up to 1 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
392	up to 1 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
396	up to 1 km	from 1 km to 3 km	up to 5 km	up to 1 km	3
200	up to 1 km	from 1 km to 3 km	up to 1 km	up to 5 km	3
418	up to 1 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
635	up to 1 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
592	up to 1 km	from 3 km to 5 km	up to 5 km	from 3 km to 5 km	3
708	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	from 1 km to 3 km	3
709	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	from 1 km to 3 km	3
711	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	from 1 km to 3 km	3
712	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	from 1 km to 3 km	3
698	up to 5 km	from 1 km to 3 km	up to 1 km	from 1 km to 3 km	3
280	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	from 3 km to 5 km	3
281	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	from 3 km to 5 km	3
282	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	from 3 km to 5 km	3
275	up to 5 km	from 1 km to 3 km	from 3 km to 5 km	from 3 km to 5 km	3
739	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	3
740	up to 5 km	from 1 km to 3 km	from 1 km to 3 km	up to 5 km	3

Table A1. Cont.

ID Accommodation *	Distance to Holm Oaks and Cork Oaks	Distance to Holm Oaks and Cork Oaks in Protected Natural Areas	Distance to Natural Pool	Distance to Livestock Trails	Group
285	up to 5 km	from 1 km to 3 km	up to 1 km	up to 5 km	3
256	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
259	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
266	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
267	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
268	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
269	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
270	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
273	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
288	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
321	up to 5 km	from 1 km to 3 km	up to 5 km	up to 5 km	3
551	up to 5 km	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	3
584	up to 5 km	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	3
741	up to 5 km	from 3 km to 5 km	from 1 km to 3 km	up to 5 km	3
742	up to 5 km	from 3 km to 5 km	up to 1 km	up to 5 km	3
781	up to 5 km	from 3 km to 5 km	up to 5 km	up to 5 km	3
794	up to 5 km	from 3 km to 5 km	up to 5 km	up to 5 km	3

* The name and address of the establishment is governed by data confidentiality. The accommodations that do not appear in this table lack statistical significance.

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