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Continuity and Change in the Ricote Valley Region (Southeastern Spain): An Integrated Analysis of Socio-Demographic, Territorial and Landscape Transformations

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Abstract: Historically, the Ricote Valley Region (Region of Murcia) has based its economic development on traditional agriculture based on the exploitation of water resources for the cultivation of citrus and fruit trees. Since the middle of the last century, industrial and service development, urban attraction and agricultural policies have generated a multitude of social, population and territorial transformations in this geographical area. The Ricote Valley Region has suffered an unprecedented demographic decline, making it one of the areas with the greatest depopulation problem in SE Spain. The demographic emptying of this region brings with it other associated problems, such as the abandonment of the land and traditional farming systems, with the consequent change in land use. This work aims to analyse both the demographic transition experienced by this Murcian region, the changes in land use/land cover generated and the possible relationship between both phenomena. In order to address these objectives, the methodology and sources used have been diverse. In this regard, population dynamics have been assessed by analysing the evolution experienced by different demographic indicators whose information has been obtained from the National Institute of Statistics (NIS) and the Murcia Regional Statistics Centre (MRSC). In turn, the transformations of the territorial surface have been obtained by comparing the representation of land cover/use present in the years 1990 and 2018 by means of georeferenced spatial information elaborated by the Corine Land Cover project (CLC). The results obtained show that, despite the fact that the region as a whole has experienced a positive population evolution, three of the seven municipalities that comprise it have been suffering the most significant depopulation process in their history for decades. In addition, the analysis of changes in land cover/land use revealed that 27.5% of the territory of the region has been transformed over the last 30 years, with a significant increase in permanently irrigated land. Finally, the correlation of information derived from the two proposed objectives shows a significant relationship between demographic evolution and the degree of territorial transformation suffered by each of the municipalities studied.

Keywords: depopulation; land use; agriculture; GIS; territory

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1. Introduction

1.1. Transformations (Territorial and Socio-Demographic) and Challenges Facing Today's Society

For decades, the planet has been undergoing a multitude of economic, political, demographic and territorial transformations, among others [1–3]. The second industrial revolution was the trigger for the social and spatial metamorphosis that took place [4]. The intensity of the transformations has led to an unprecedented reorganisation of land use and land cover, an aspect that is represented in the new territorial scenario generated [5]. Although the most prominent and studied changes have taken place in urban areas, the population attraction and synergies generated by these spaces have had a direct impact on rural areas. In this respect, since the middle of the last century, the rural environment has been undergoing countless changes, which, to a large extent, remain the result of the crisis of the lifestyles of traditional agrarian economies and societies [6]. These changes include both intense depopulation processes and land cover and land use transformations generated mainly by the abandonment of traditional agriculture, the expansion and intensification of irrigated croplands and, to a lesser extent in rural areas, the propagation of artificial surfaces through anthropogenic soil sealing [7–9]. Together with climate change, these phenomena constitute one of the most important threats facing society today. This is affirmed by various organisations, including the European Committee of the Regions [10], which states that depopulation and demographic change are some of the greatest challenges facing the European Union today, and the European Environment Agency [11], which indicates that changes in land cover/land use have major environmental consequences such as greenhouse gas emissions, loss of biodiversity, alteration of water quality, increased erosion and a reduction in the quality of life of human beings. The continuous advance of these processes impedes the achievement of many of the Sustainable Development Goals (SDGs) that Spain must achieve in order to comply with the 2030 Agenda. Nevertheless, Spain is one of the European Union countries that, in recent decades, has experienced the greatest degree of land cover/land use transformations and major problems in the unequal distribution of the population [12,13]. In a way, these are two phenomena that remain interrelated. Thus, the intense demographic exodus suffered by most of Spain's rural areas has generated an important population flow towards urban areas. The high concentration of people in these urban spaces has demanded an increase in infrastructure, which has led to a greater consumption of land, especially to cover residential demand [14].

1.2. Current State of Research

The Mediterranean strip that corresponds to the Spanish coastal area (including the Balearic Islands) is one of the areas where the transformation of land use and land cover has been most notable in recent decades [15]. The tourist success and the population attraction originating from this coastline have acted as a driving force [16–18], which has led to the total built-up area after the bursting of the real estate bubble generated in the first decade of the 21st century, being so overwhelming that it accounts for almost half (47.5%) of national urban development (598,850.8 ha.). Within this space and at the regional level, the Region of Murcia is particularly noteworthy. It is the second autonomous community (after Navarre) that has experienced the highest rate of increase in artificial surface area in recent decades [19]. Most of this development of built-up land has spread around the capital city (Murcia) and its area of influence, generating what is called the Murcia Urban Agglomeration (MUA). This metropolitan area has been and is one of the territories with the highest degree of land transformation in Spain [20]. In turn, this same coastal area (Mediterranean coast) is also one of the territories that has experienced the greatest demographic dynamics in Spain (and Europe) in recent years, and the Region of Murcia is (without taking into account the two autonomous cities of Ceuta and Melilla) the only community in Spain that has registered positive Natural Population Balance (NPB) in 2022 (Figure 1).

Moreover, if the demographic projections established by the NIS for the period 2023–2039 are fulfilled, Murcia will be the third Spanish region (after the Balearic Islands and the Valencian Community) with the greatest population growth, with an increase of nearly 270,000 inhabitants (17.2%) in just 15 years. As can be seen in Figure 2, this is a figure well above most Spanish regions and the national average.

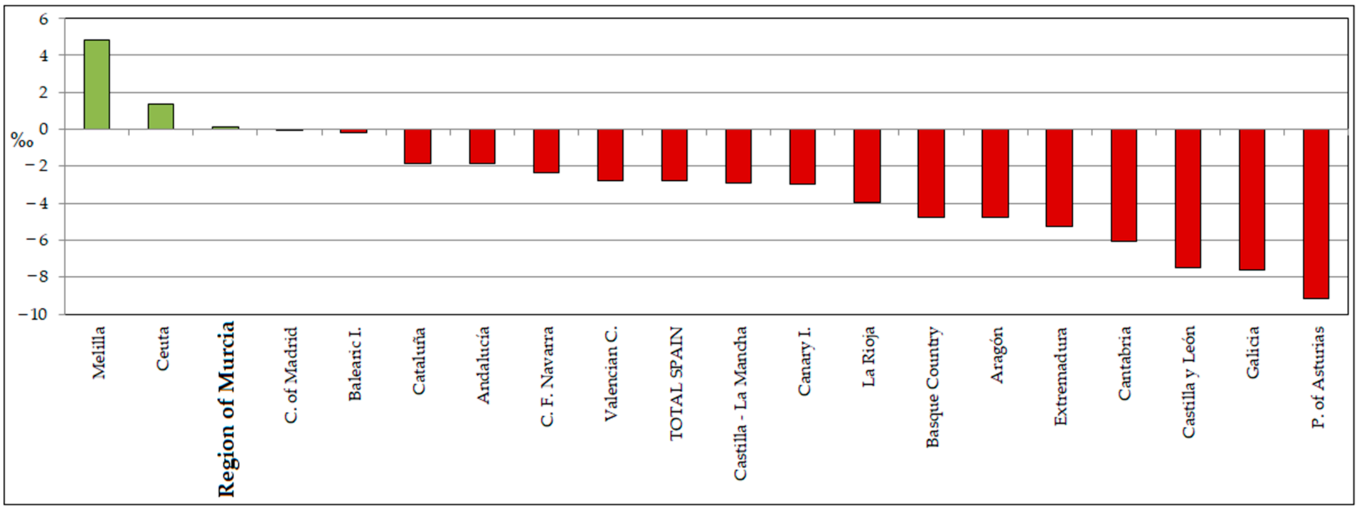

Figure 1. NPB of the population (2022). Source: NIS (Government of Spain).

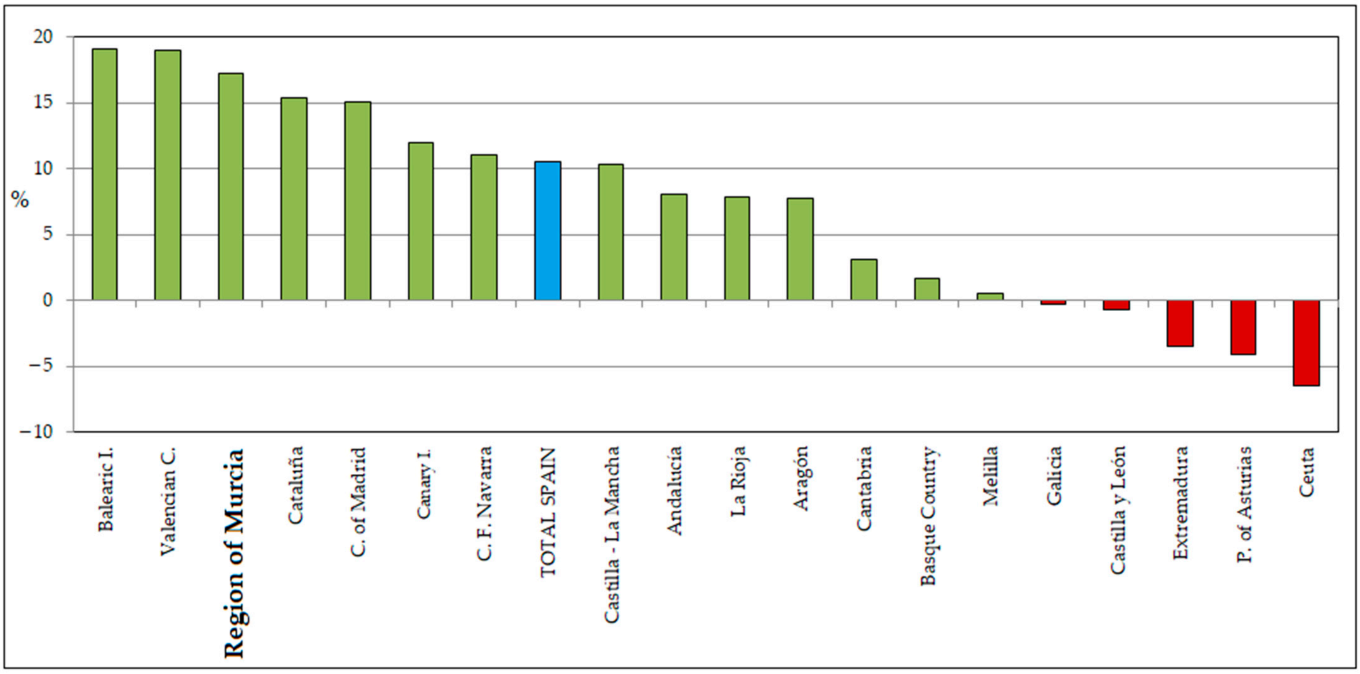

Figure 2. Demographic evolution forecast 2023–2039. Source: NIS (Government of Spain).

However, in the same way as the degree of occupation, consumption or change in land use and land cover, the demographic development experienced by the Region of Murcia is not homogeneous in all areas of its territory. In this context, the aforementioned MUA currently accounts for almost half (45%) of the regional population. On the other hand, some of the municipalities that make up the areas of the northwest or the Ricote Valley Region have been submerged in a significant depopulation process for several decades. The evolution of the population in the first of these regions (northwest) has been extensively studied for decades. In this respect, both the study carried out at the end of the 20th century [21] and the most recent [22] show the significant rural exodus suffered by this territory. With regard to the transformation of land use, as is the case with demographic dynamics, the coastal areas and the main urban areas of the Region of Murcia have been the territories with the greatest number of changes in land cover. This is established in the studies on the expansive urban dynamics and the consequent changes in land use in the MUA [23] and in the coastal municipalities around the Mar Menor [24]. However, as [25] stated, the land cover and land use transformations carried out in urban areas show many differences from those in rural areas. In this sense, while at present changes in land cover/use in urban areas are aimed at a notable increase in urbanised land, the phenomenon of depopulation and the scarce demand for new construction that characterises rural areas has led to territorial changes being directed towards the transformation of agricultural land. In this respect, there is an important transformation from traditional rain-fed to irrigated farming areas, which are more economically productive but generate significant environmental damage. As is the case with depopulation, as they state [26], the northwest region of the Region of Murcia has been experiencing these territorial changes for decades. In the northwest region, these same two processes (depopulation and changes in land cover and land use) are also occurring in the Ricote Valley Region. However, in contrast to the northwest region, research carried out on these issues in the Ricote Valley is practically non-existent. In this respect, the main objective of this research is to try to analyse both the population evolution experienced by the municipalities that make up the Ricote Valley Region since the beginning of the 20th century and the changes in land use and land cover over the last 30 years. It also explores the possible relationship between the two phenomena, the causes that have led to them and the consequences they generate.

The establishment of these objectives entails the need to answer a series of questions that justify them. Among them, it is necessary to indicate the reason why these variables have been chosen, why the study is being carried out in this region of the Region of Murcia, or what this research can contribute to the scientific literature in this line of research. In a way, these three questions are closely related to each other, which is why they converge in the development of this work. Thus, the answer to one leads to the other. In this respect, with regard to the first of the questions, it should be noted that, as indicated above, there is an important relationship between population evolution and territorial transformation. In the case of urban areas, as they are the areas with the greatest increase and concentration of population and where urban transformations have been developed in a more relevant way, they correspond to the most researched territories. On the other hand, rural areas, such as the one that is the focus of this paper, have traditionally been studied less, as they have a negative population evolution and a land use transformation with a lower degree of mediatisation (agricultural rather than urban transformations), which is why it is interesting to analyse what has happened. As for the reason for making this region of the Region of Murcia as a case study, it is because, as detailed in the following section, it is one of the areas in which the development of traditional agriculture has most notably conditioned the ways of life of the population historically. In this respect, the transformations undergone in recent decades are having a significant effect on both variables, which is why it is important to analyse them. This analysis is fundamental in order to understand what has happened, to develop the scientific literature on this aspect and to establish it as an example of a case study to be compared with other studies of similar characteristics developed in the future, which answers the last question.

2. Case Study Area

The Ricote Valley is a region located in the central area of the Region of Murcia, a Spanish autonomous community in the southeast of the country. This case study extends over 403.8 km^2 in an area that, for the most part, corresponds to the middle basin of the Segura River. This valley offers an impressive mix of natural beauty and historical significance, as this area has been inhabited since prehistoric times and has been influenced by different cultures throughout its history. It is an area of exceptional value in Europe as a whole, being an oasis in the middle of a semi-desert area. It is also one of the last places in Spain where the Moors lived and where their model of irrigated farming has remained to the present day, with the characteristic hydraulic devices for making the best use of the scarce water in the area. Throughout the valley, there is a dense blanket of various fruit trees, with a clear predominance of citrus, plum, apricot and peach trees. Other fruit trees such as fig, loquat, pear, quince and banana trees can be found along the edges of crops, roadsides and irrigation ditches, towering over palm trees that give the landscape its Moorish tinge. The presence of oleander, taray and common reed in the valley's characteristic ravines and wadis is also noteworthy.

The region is made up of seven municipalities (Abarán, Archena, Blanca, Ojós, Ricote, Villanueva del Río Segura and Ulea), which present a significant inequality in their evolution and demographic density (Figure 3).

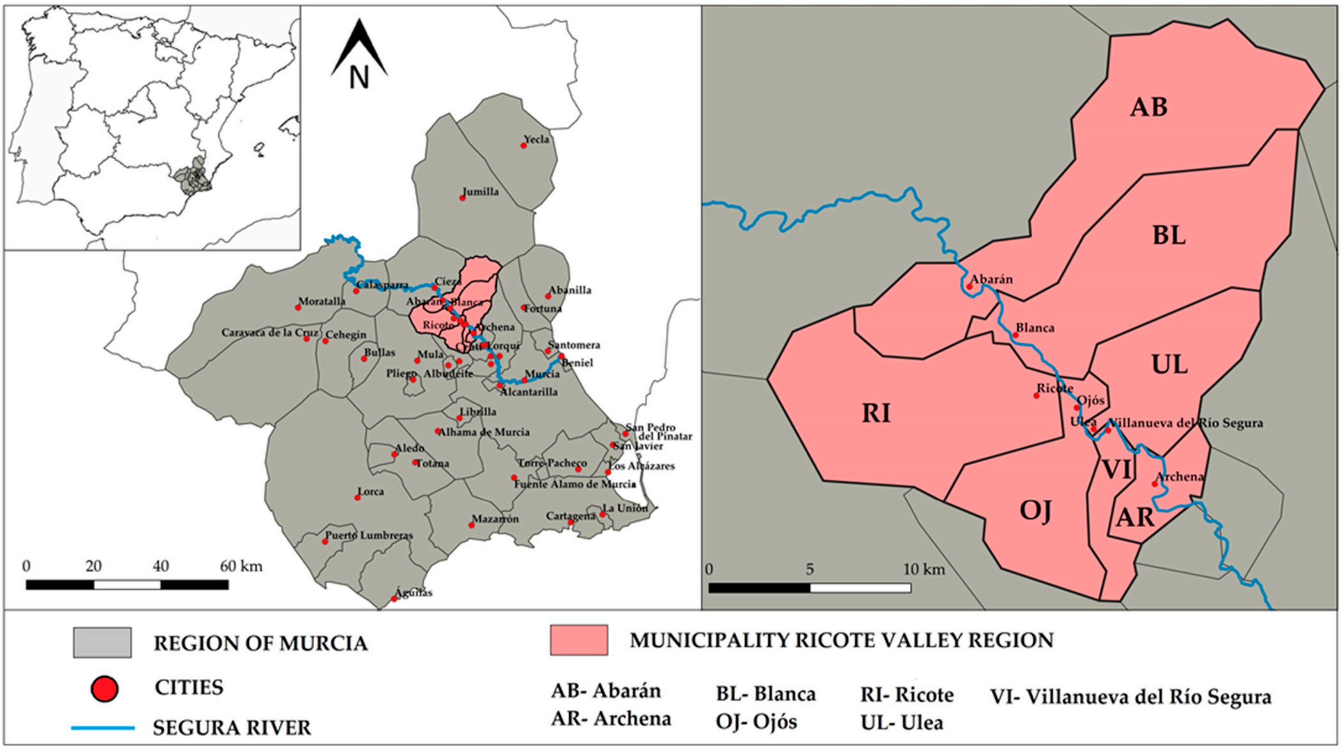

Figure 3. Location of the case study (municipalities in the Ricote Valley Region). Source: Own elaboration.

In this respect, Villanueva del Río Segura is the second locality (after Los Alcázares) with the highest percentage of population increase in the autonomous community of Murcia (140.5%) since the beginning of the 21st century. For its part, during this same period of time, Archena has registered a demographic evolution slightly above the regional average, a threshold that Blanca and Abarán have not been able to reach despite maintaining positive values. On the other hand, Ulea, Ojós and Ricote (together with Moratalla) are the territories with the greatest population loss in the Region of Murcia over the last two decades (Figure 4).

The reasons that explain the marked gap between the population evolution followed by the different municipalities lie in the proximity and agile terrestrial communication that Villanueva del Río Segura and Archena have with the MUA, the area of greatest social, demographic, economic and labour dynamics in the region [20]. On the other hand, the delay in the industrialisation process, the complex accessibility and the lack of basic services in the municipalities of Ulea, Ojós and Ricote have led to a significant population decline. This situation has meant that these latter municipalities have the lowest population densities in the region, with values that, in the best of cases (Ulea), are barely 20 inhabitants/km^2 (Figure 5). Ricote and Ojós are around the threshold established by the European Union to designate an area at significant risk of depopulation (12.5 inhabitants/km^2).

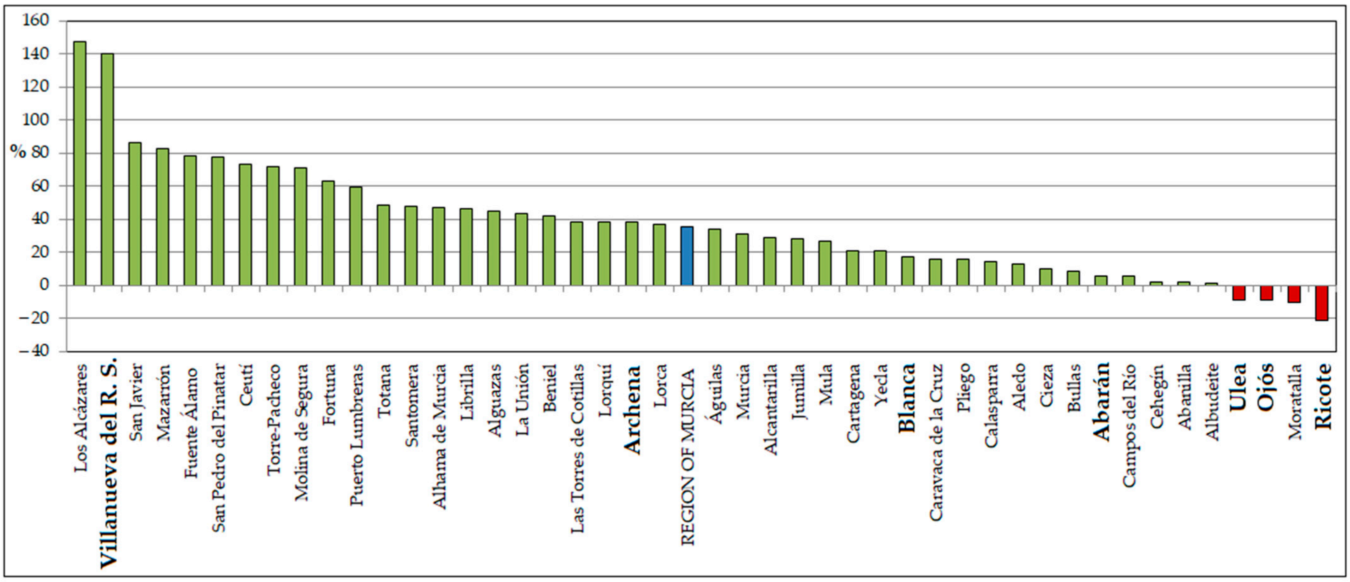

Figure 4. Evolution of the population of the municipalities of the Region of Murcia (2000–2023). Source: MRSC.

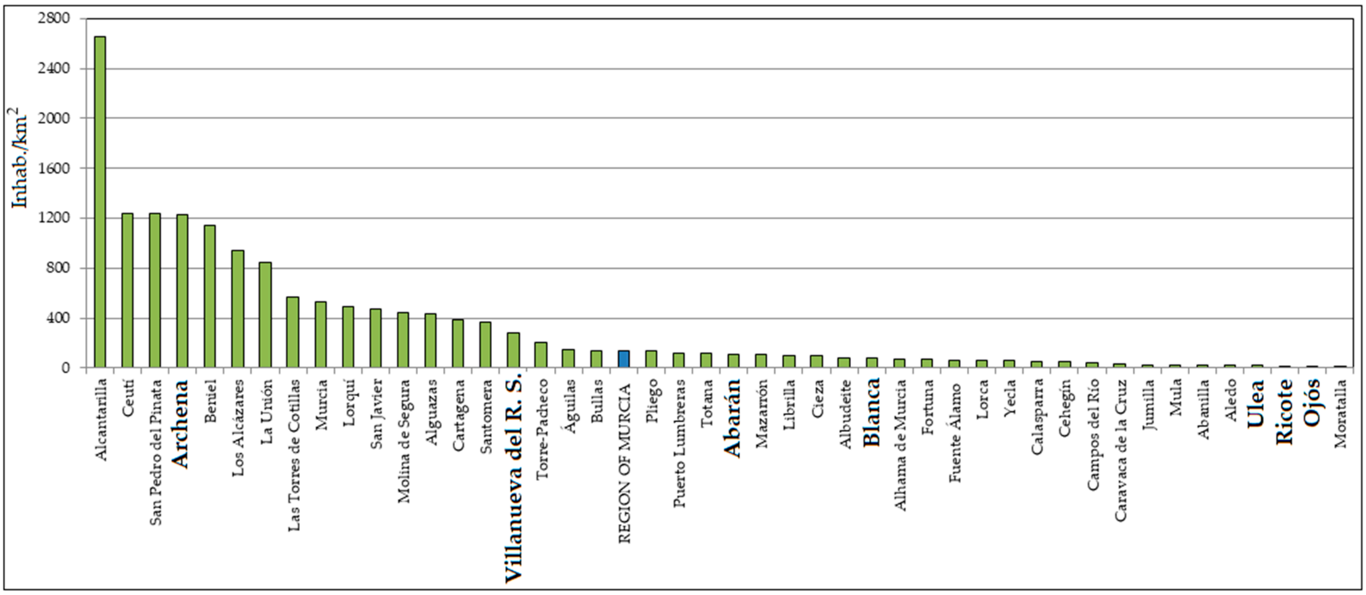

Figure 5. Population density in the municipalities in the Region of Murcia (2023). Source: MRSC.

These data justify the analysis of this case study, which has a certain singularity: due to its natural and historical peculiarities (the sensitivity of the Moorish culture can still be felt), it is home to a great diversity of landscapes, where the combination of nature and human action has given rise to cultural landscapes with outstanding heritage value [27,28]. Some of the municipalities in the valley have suffered one of the most significant population losses in the European Mediterranean area, an aspect to be taken into account as this is one of the territories that has experienced one of the highest demographic growth rates on the continent. Moreover, due to its particularities (low population density, the high significance of agricultural activity, low-income levels, geographical isolation or poor territorial structuring, among others), it is one of the rural areas that Law 45/2007, of 13 December, for the Sustainable Development of the Rural Environment, considers to be most affected by depopulation and, therefore, pending revitalisation. In addition to these facts, there is an important process of territorial transformation, the study of which is the focus of this study.

3. Database and Methods

The stated objectives have been approached using different methodologies and different data sources. In this sense, demographic data have been obtained from official databases at national (National Institute of Statistics) and regional level (Regional Statistics Centre of Murcia). The spatio-temporal analysis of changes in land cover and land use was carried out by processing georeferenced information from CLC. This is a project developed by the European Environment Agency (EEA) that disseminates territorial data obtained by Landsat and SPOT satellites. Currently, the images obtained by these means provide a high level of precision, which allows studies on the dynamics of the Earth's surface to be undertaken with a high degree of reliability. Together with CLC, there are a multitude of data sources (Copernicus or the Spanish Land Occupation Information System "SIOSE", among others) that offer detailed spatial information. However, the reasons that justify the use of the data provided by CLC in this work lie both in the homogeneity of the data and the wide range of land categories represented, as well as in the broad temporal phase it offers, with data from 1990 onwards (SIOSE publishes data from 2005, for example). In this way, the good availability of time series published by CLC (1990, 2000, 2006, 2012 and 2018) facilitates the performance of an infinite number of analyses of changes in land cover and land use in any territorial area.

In order to assess a longer time period and, therefore, the most representative changes, the analysis contrasts the territorial dynamics experienced by the two available time extremes (1990 and 2018). In this regard, as shown in the flow diagram corresponding to Figure 6, the data for these two time points has been processed using GIS software (Qgis 3.6.2). Thus, the study area analysed has been delimited (the municipalities of the Ricote Valley Region) in order to be able to intersect the vector information obtained from CLC in the two times analysed.

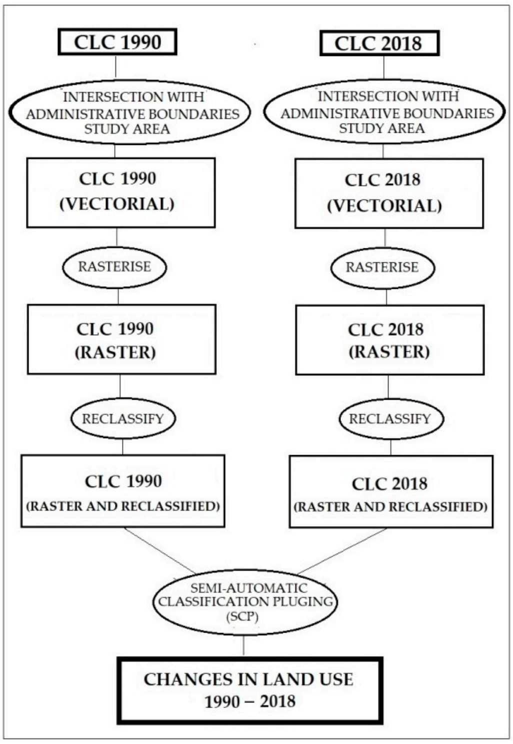

Figure 6. Methodology for the treatment of spatial data (flow diagram). Source: Own elaboration, authors.

This delimitation has been carried out using the spatial component information of the administrative boundaries corresponding to the municipalities that make up the case study obtained from the Download Centre of the National Institute of Spain. In order to facilitate knowledge of the origin and typology of the large amount of data and sources of information used in this study, Table 1 summarises the databases, the organisation that produces them, their typology, attributes, scale and method of collection.

Table 1. Database information and typology used.

Database	Body That Prepares It	Attribute Type	Scale of Information	Method of Obtaining Information
NIS	Ministry of Economy and Finance. Spanish Government.	Statistical (numerical) information on population trends and other demographic indicators.	Autonomous Communities of Spain.	Information obtained directly.
MRSC	Regional Ministry of Economy, Finance, European Funds and Digital Transformation. Autonomous Community of the Region of Murcia.	Statistical (numerical) information on population trends and other demographic indicators.	Municipalities of the Region of Murcia.	Information obtained directly.
CLC	European Environment Agency (EEA)	Georeferenced quantitative and spatial mapping information on land cover/land use in vector format (.shp).	Information at the scale of the entire European territory, from which only the territorial area of interest for this case study (municipalities that make up the Ricote Valley Region) has been extracted.	Georeferenced quantitative and spatial mapping information in vector format obtained from this source has been processed using a series of procedures.
Download Centre of the National Geographic Institute of Spain	Ministerio de Transportes y Movilidad Sostenible. Gobierno de España.	Georeferenced spatial mapping information on administrative boundaries in vector format (.shp).	Information at municipal level for the whole of Spain, from which only that corresponding to the case study analysed (municipalities that make up the Ricote Valley Region) has been extracted and used.	The quantitative and spatial mapping information geo-referenced in vector format has been treated in order to be used as an essential component in the processing of land cover/land use information from CLC.

Source: Own elaboration.

The vector information from CLC has been rasterised to obtain a grid of regular cells (pixels) of a set size (5 × 5 metres, 25 m^2) that fragments the study area analysed. Although the processing of vector data has a relatively higher level of precision than raster data, the latter format was chosen because, as stated by [29], when calculating land surface mutations between uses and expressing them through cross-tabulation, the use of raster data is much more versatile than vector data. Furthermore, authors such as [30] state that the use of the raster data processing plug-in "Semi-Automatic Classification Plugin (SCP)" described below is one of the most appropriate methodologies for analysing land use changes. In this sense, it is considered that the results obtained from the treatment of variables in vector format, by requiring various geo-processes with an infinite number of polygons of different typologies, can generate problems and geometry errors that affect the final data. Furthermore, in the case in question, by using a certainly high level of detail (25 m^2), the precision of the values obtained in raster format does not differ too much from if they had been obtained in vector format.

Once the raster data have been obtained, the set of land use categories existing in the municipalities under study is reclassified into seven general land coverages: artificial (1), rainfed arable land (2), permanent irrigation (3), temporary irrigation (permanent crops) (4), other agricultural (meadows and heterogeneous agricultural areas) (5), forest (6) and bodies of water (7). In order to be able to make the change matrix, the data (raster and reclassified) is crossed using the Qgis add-on mentioned above (SCP). This tool allows us to know the number of pixels that have changed and from which land use they have mutated. In this way, knowing the number of pixels and their surface area (pre-established size, 25 m^2), we obtain quantitative information that can be complemented with the graphic (cartographic) information also provided by the programme.

After obtaining the area of territorial change, the cross-plotting matrix allows the transitions experienced from one use to another between two time points (in pairs) to be captured in an ideal way. This method, devised by [31], has subsequently been used by many researchers with similar interests to the present study. Thus, [32] has used it to study land use changes in the community of Madrid or [13] to analyse territorial transformations and the diffusion of artificial surfaces in the MUA.

This data matrix shows the changes, persistence, losses and gains obtained by each land cover and land use. For this purpose, as can be seen in Table 2, the land cover during the first period (1990) is represented in rows and those of the second period (2018) in columns. P11, P22 and P33, on the diagonal, indicate the proportion of persistence of categories 1, 2 and 3. P21 shows the proportion of land use that changes from category 2 to category 1, as do the rest of the cells that do not correspond to the diagonal mentioned above. In addition, losses are expressed as the difference between the 1990 total and the persistence of each category. Gains are expressed as the difference between the 2018 total and the persistence of each category.

Table 2. Cross-tabulation matrix.

		2018				**LOSSES**	
		Category 1	**Category 2**	**Category 3**	**TOTAL 1990**	**km^2**	**%**
1990	**Category 1**	P11	P12	P13	P1+	P1+ – P11	P1+ – P11
	Category 2	P21	P22	P23	P2+	P1+ – P22	P1+ – P22
	Category 3	P31	P32	P33	P3+	P3+ – P33	P3+ – P33
	TOTAL 2018	P + 1	P + 2	P + 3			
GAINS	**km^2**	P + 1–P11	P + 2–P22	P + 3–P33			
	%	P + 1–P11	P + 2–P22	P + 3–P33			

Source: [31].

This methodology constitutes a powerful analytical tool by means of which it is possible to understand and study the transformations experienced by the Earth's surface at two points in time, thus generating highly relevant information when explaining the reasons for any event that has occurred, undertaking effective land-use planning policies or implementing future urban developments.

4. Results

4.1. Population Dynamics

When trying to evaluate the population dynamics experienced by a territory, in addition to the detailed analysis of the last few decades, it is necessary to go further back in time. Thus, the main demographic indicators show that the Ricote Valley Region (as a whole) has followed a positive population trend since the beginning of the 20th century. This territory has doubled its population, from 18,301 inhabitants in 1900 to 46,254 inhabitants in 2023. This increase in population has had repercussions on the pressure exerted on the area, with a considerable increase in population density, which has gone from 45.3 inhabitants/km^2 to 114.6 inhabitants/km^2 (Figure 7).

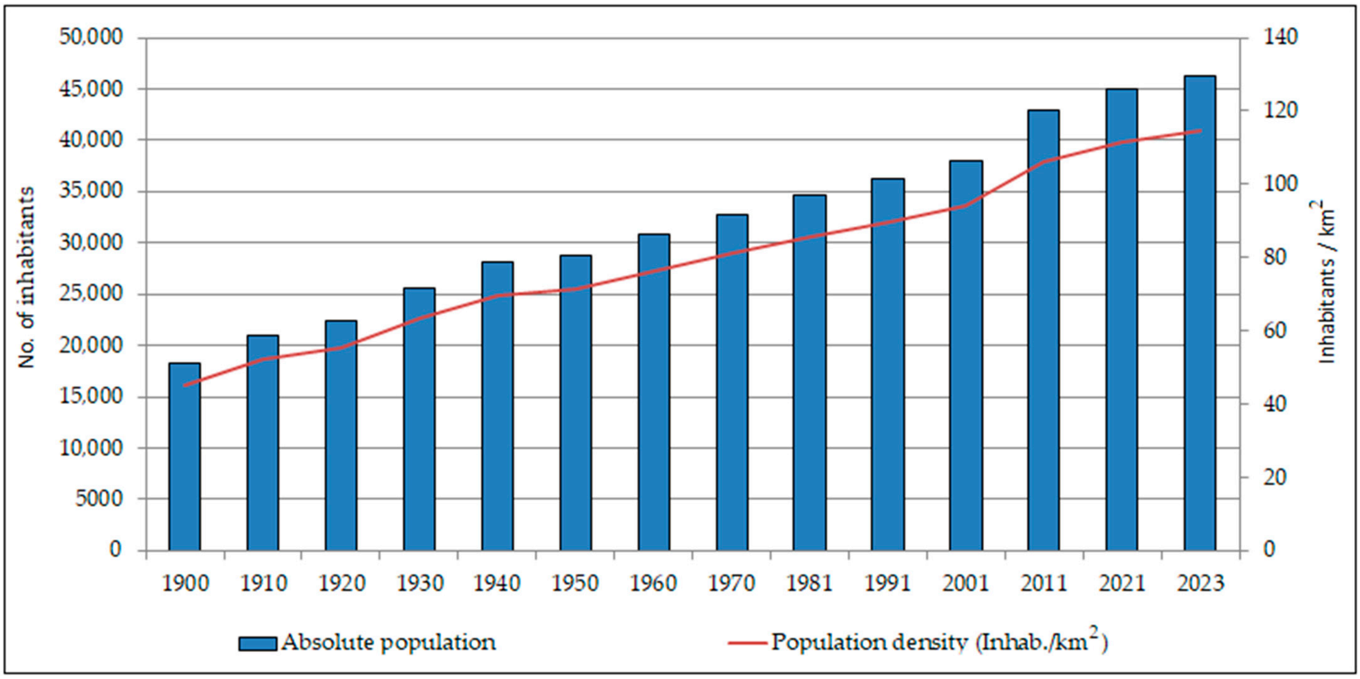

Figure 7. Absolute evolution and population density in the Ricote Valley Region (1900–2023). Source: MRSC.

Although the data shown and analysed shows an evident positive population evolution, as already mentioned in the introductory section, there is an important difference between the municipalities that make up the region. In this respect, there is a group of localities that has steadily and intensely increased its population census and another that has lost most of its residents. Abarán, Archena, Blanca and Villanueva del Río Segura are the municipalities that have experienced a positive demographic evolution, stimulating the population development of the region as a whole. The reason behind this increase in population is based on their accessibility to fast roads (such as the A–30 motorway), which allows them to have good communication with the regional capital (the city of Murcia), the agricultural development acquired thanks to the presence of water provided by the Segura River (mostly from the Tajo–Segura Transfer) or the relevance acquired by the local industry (based on the processing of agricultural products) and inland tourism. In addition to this, the expansion experienced towards the north by the economic and functional area of the MUA has reached municipalities such as Archena or Villanueva del Río Segura, turning them into satellite development spaces and dormitory areas orbiting around the main municipality (Murcia). These two municipalities are the ones that have acquired the greatest population development, with Archena going from 4590 inhabitants in 1990 to 19,500 in 2021 (338%) and Villanueva del Río Segura from 963 in 1990 to 3268 in 2021 (291%). For its part, Abarán has gone from 3834 inhabitants in 1990 to more than 13,000 in 2021 (238%), with Blanca's development being somewhat more contained (75%). The population evolution followed by these municipalities has been higher than that observed both for the region as a whole and for the Region of Murcia. However, if we analyse the evolution between different points in time, we can see that this has not always been the case in all localities. The population growth carried out from 1960 to the present day by the Region of Murcia, and the Ricote Valley Region as a whole has been higher than that of the municipalities of Abarán and Blanca, being surpassed by Archena and Villanueva del Río Segura. Demographic development between 1900 and 1960 shows that these four municipalities grew at a faster rate than the Region of Murcia, and only Blanca is below the development of the Ricote Valley Region (Figure 8).

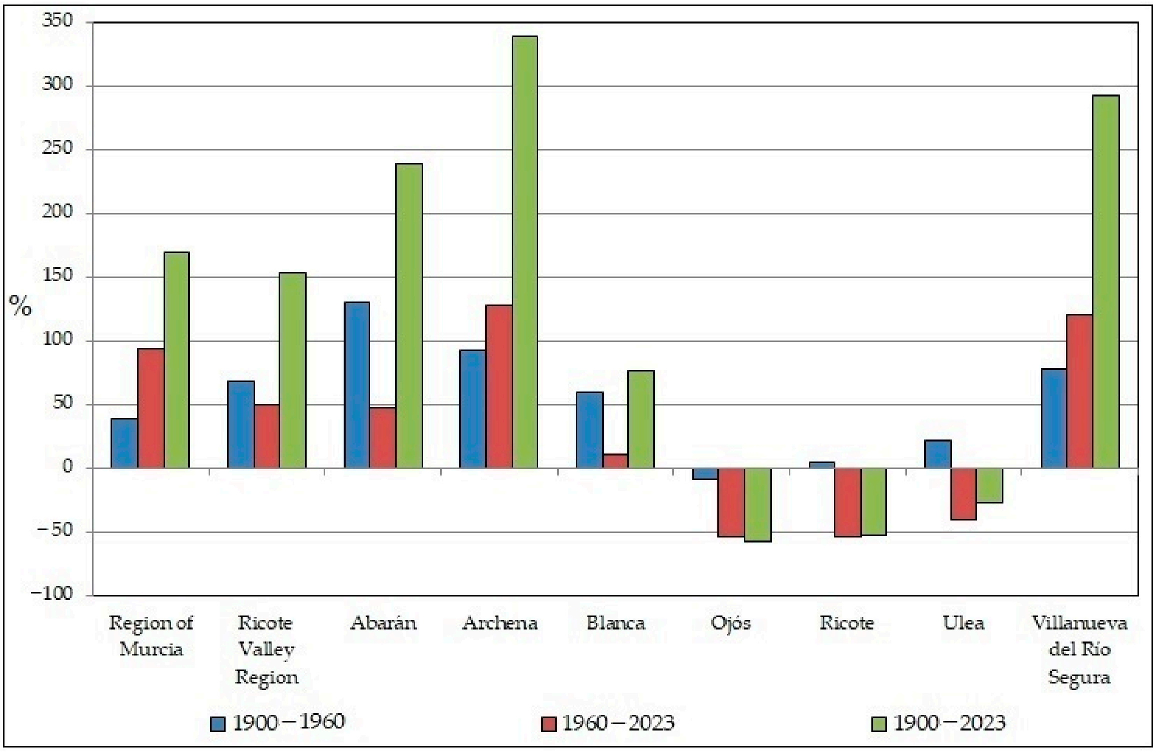

Figure 8. Evolution of the population in the areas analysed at different points in time. Source: MRSC.

In the case of the municipalities that have lost population due to the aforementioned causes, it can be observed that in 1900 and 1960, Ulea and Ricote show a positive evolution, while Ojós lost a lower population figure than that registered between 1960 and 2023. In this last period of time, the decrease in the demographic figure of Ojós exceeds 50%, as does that of Ricote. For its part, Ulea shows a more contained population decline over the last 6 decades (40%). This smaller percentage loss of population means that the negative demographic evolution revealed by the complete series (1990–2023) is less pronounced (27%) than that shown by Ojós (57%) and Ricote (52%). Nevertheless, these are the municipalities with the smallest demographic census in the Region of Murcia at present, with 1265 inhabitants in Ricote, 866 inhabitants in Ulea and 495 inhabitants in Ojós.

These demographic dynamics are generated by the total population balance or population growth between two specific points in time. This total population balance derives from the balance between the NPB (the difference between births and deaths) and the Net Migration Rate (NMR) (the difference between immigration and emigration). In this respect, both indicators are fundamental aspects that condition the demographic evolution of a place. In this case, both indicators show positive values in all the years shown in Figure 9 (last two decades), except for the migratory balance in 2011. With regard to NPB, the Ricote Valley Region reveals a balance between births and deaths lower than the regional average in all the years studied, with a negative value in 2021. On the other hand, the NMR of the Region of Murcia is higher than that of the Ricote Valley Region in the years 2001, 2006 and 2011, and lower in 2016 and 2021. This migratory balance was negative in 2011 in the Ricote Valley Region and in 2016 in the regional register. This is due to the significant return flow of foreign population (mainly Latin American) who, after arriving in Spain during the economic boom years (first decade of the 21st century), return to their countries of origin as a result of the financial recession [33]. During the aforementioned period of economic splendour, an NMR of 23.7‰ was recorded in 2001 and 15‰ in 2006.

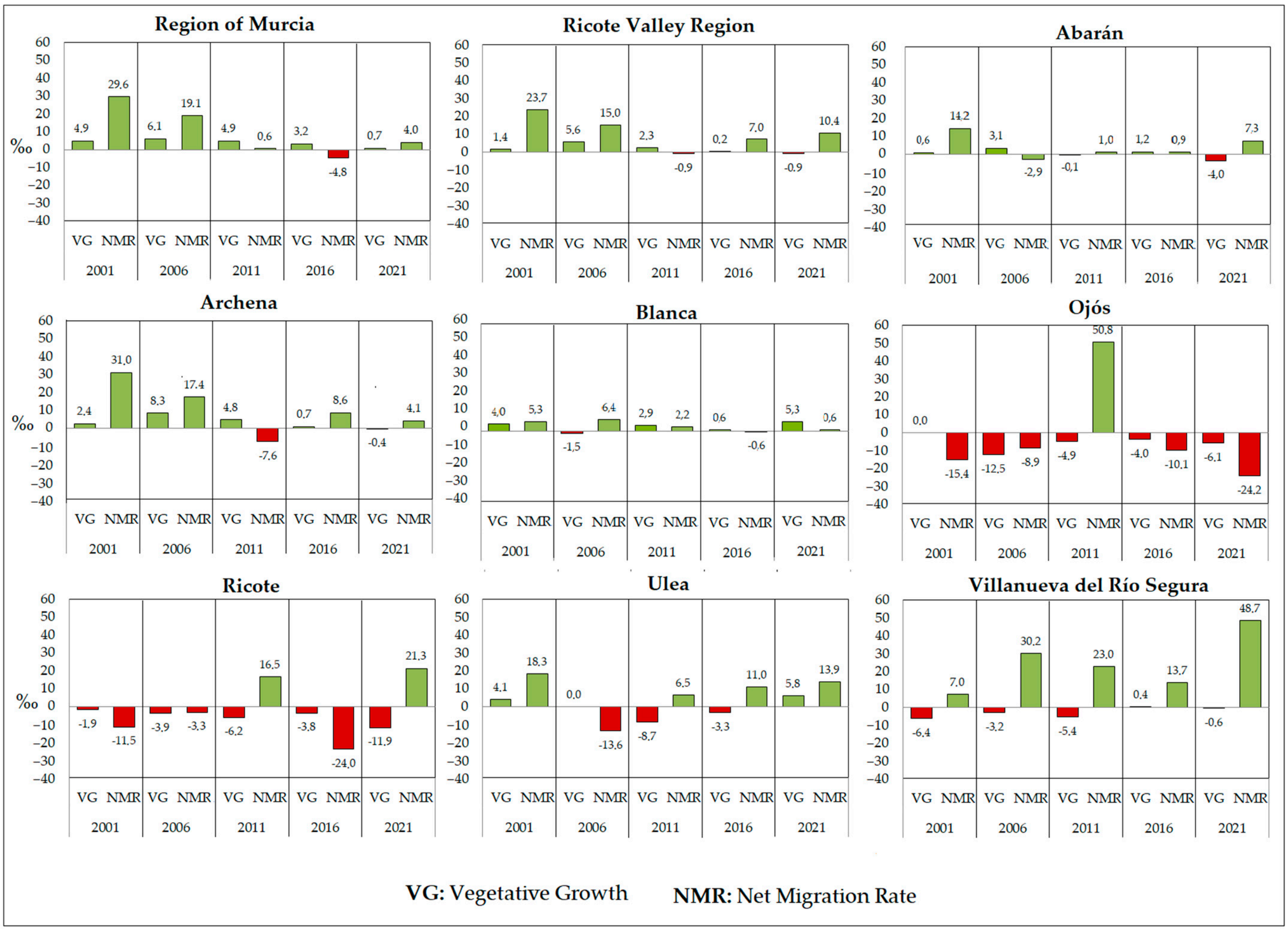

Figure 9. Evolution of NPB and NMR in the analysed areas at different points in time. Source: MRSC.

At the municipal level, the localities that have increased their population show both a favourable NPB and a favourable NMR in most of the years studied. Thus, Abarán only shows negative values in the NPB of 2021, Archena in the NMR of 2011 and in the NPB of 2021, Blanca in the NPB of 2006 and in the NMR of 2016, and Villanueva del Río Segura in the NPB of 2001, 2006 and 2011. This last locality, despite registering negative natural growth in this first decade of the 21st century, also shows a migratory balance that reaches the highest values in 2006 (30.2‰) and 2021 (48.7‰). On the contrary, the municipalities that lose population in the time series analysed present a greater predominance of negative values than positive ones, both in terms of NPB and NMR. Thus, Ojós only shows a positive value in the NMR of 2011, registering the highest NMR of all the municipalities and time periods studied (50.8‰). Ricote only shows positive values in the NMR of 2011 and 2021. On the other hand, Ulea is the municipality with the best depopulation indicators, showing negative evolutions only in the NMR of 2006 and in the NPB of 2011 and 2016.

4.2. Change in Land Use

4.2.1. Evolution of Land Cover and Land Use Between 1990 and 2018 in the Municipalities of the Ricote Valley Region

The socio-economic and demographic changes that have taken place over the last half-century have had a substantial impact on the territorial surface, as is logical [34]. As in many parts of the world, the effects of these transformations have been felt in the municipalities that make up the Ricote Valley Region. On a global scale, urban areas have been the spaces that have undergone the most intense changes [35]. In this regard, since the middle of the last century, the proliferation of the urban fabric has acted as one of the most relevant factors in the processes of change occurring on the Earth's surface [36]. The artificialisation of natural land covers is one of the main problems resulting from intense territorial development and consequent land consumption [37]. In this case, although artificial land has also increased, it is not the most developed land cover. In this sense, in 1990, all the municipalities that make up this region accounted for a total of 4.6 km^2 of artificial land. Among them, only Abarán, Archena and Blanca registered more than 1 km^2 of this type of land. On the other hand, in the same year (1990), Villanueva del Río Segura barely registered 11,900 m^2 of this type of land. However, the significant population increase experienced by this municipality has led to an unprecedented development of artificial land, approaching 735,000 m^2 in 2018. This development is due to the urbanisation of "La Morra", next to the urban nucleus of Archena and destined for the accommodation of new British residents (Figure 10).

Figure 10. Urbanisation "La Morra" (Villanueva del Río Segura). Source: Own elaboration, authors.

In order to carry out this urbanisation (Spa Valley), the rich traditional orchard area typical of this region was eliminated and replaced by large blocks of buildings. The General Municipal Development Plan presented by the Villanueva del Río Segura Town Council declared 95% of the municipality's land to be developable. This is one of the greatest examples of the disproportionate expectations of land for development, which in the municipalities of the Ricote Valley Region foresaw the construction of more than 50,000 houses in 2006 [38,39]. As these are small urban centres with little land for industrial or commercial use, most of the artificial land corresponds to the residential area located at the urban centres (Table 3).

In contrast to urban areas, the development and exploitation of traditional agriculture in the Ricote Valley Region has meant that the effects of migratory flows and socio-economic transformations have had a significant impact on the areas under cultivation. In this sense, the different types of agricultural land cover and land use examined have evolved unevenly during the series analysed. Crops under temporary irrigation, mainly permanent crops (orchards, vineyards or olive groves), have historically occupied the most surface area in the Ricote Valley Region. As can be seen in Figure 11, most of the 136.7 km^2 (33.8% of the area of the region) of this type of soil in 1990 is concentrated in the municipalities of Blanca, Ricote and Abarán. It is also the land cover with the greatest representation in Archena and Villanueva del Río Segura, where it occupies nearly 80% and 70% of the municipal extension, respectively.

Table 3. Distribution of land cover and land use in the municipalities of the Ricote Valley Region (1990).

	Surface 1990 (km^2)							
	Abarán	**Archena**	**Blanca**	**Ojós**	**Ricote**	**Ulea**	**Villanueva del R. S.**	**Ricote Valley R.**
Artificial	1.1	2.0	1.0	0.1	0.3	0.1	0.0	4.6
Rainfed Arable Land	1.5	0.2	3.6	2.1	0.4	0.3	2.2	10.2
Permanent Irrigation	0.0	0.0	0.0	0.3	0.0	0.0	0.4	0.8
Temporary Irrigation (Permanent Crops)	29.3	12.9	39.3	5.2	31.2	10.0	8.8	136.7
Other Agricultural	28.5	0.0	3.4	18.1	3.9	6.8	0.8	61.5
Forest	54.5	1.3	39.4	19.9	51.0	22.7	0.9	189.7
Bodies of Water	0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.6
Total	115.0	16.4	87.1	45.7	86.8	40.0	13.1	404.2

Source: Own elaboration with data obtained from CLC.

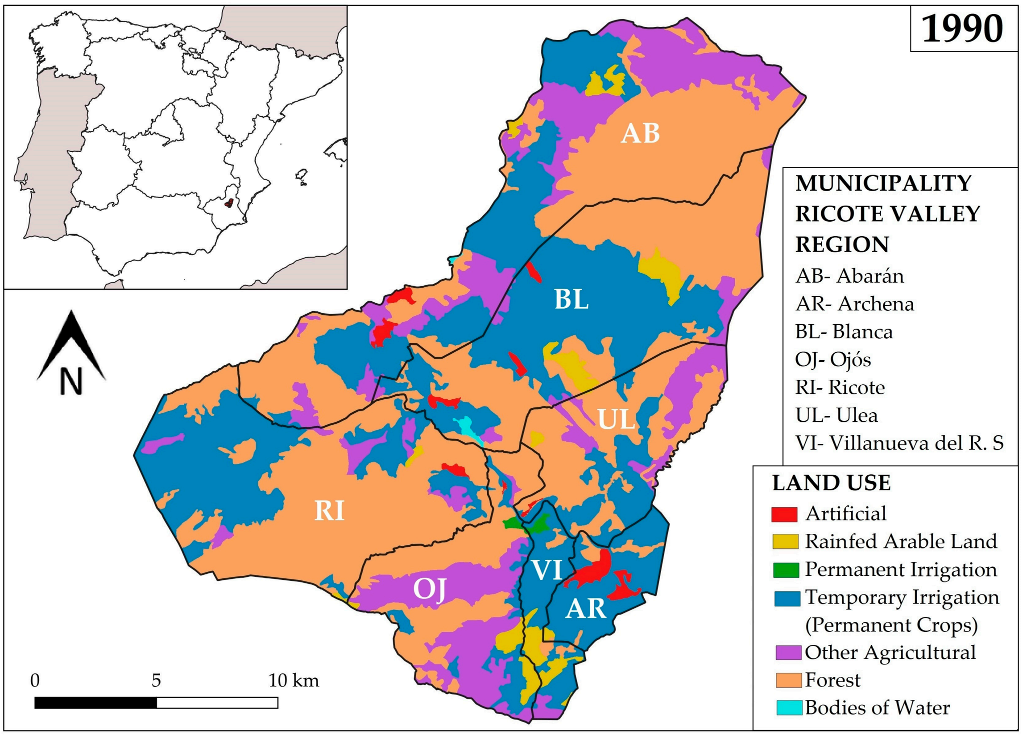

Figure 11. Cartography of land cover and land use distribution in the municipalities of the Ricote Valley Region (1990). Source: Own elaboration with data obtained from CLC.

Between 1990 and 2018, temporarily irrigated agricultural land has been the most reduced in the Ricote Valley Region (losing more than 9 km^2). This decrease can be seen in the municipalities of Blanca (1.2 km^2), Ricote (about 5 km^2), Abarán (6.3 km^2) and above all, Archena (7.3 km^2). On the other hand, it has increased in the municipalities of Ojós (6.7 km^2), Ulea (3.2 km^2) and Villanueva (0.8 km^2). Although in the latter locality, the development of the absolute surface area has been very notable, the reduced municipal extension means that it represents 73.4% of the entire surface area of the municipality at present (Figure 12). To a lesser extent than temporarily irrigated agricultural land, rainfed arable land has also reduced its surface area from 10.2 km^2 in 1990 to 8.9 km^2 in 2018. The decrease in this type of agricultural land has been mainly due to the transformation of crops in Blanca and Villanueva del Río Segura, municipalities where it has decreased by around 2 km^2, respectively. However, dry farming has increased in Abarán, from 1.5 km^2 in 1990 to 4.3 km^2 in 2018.

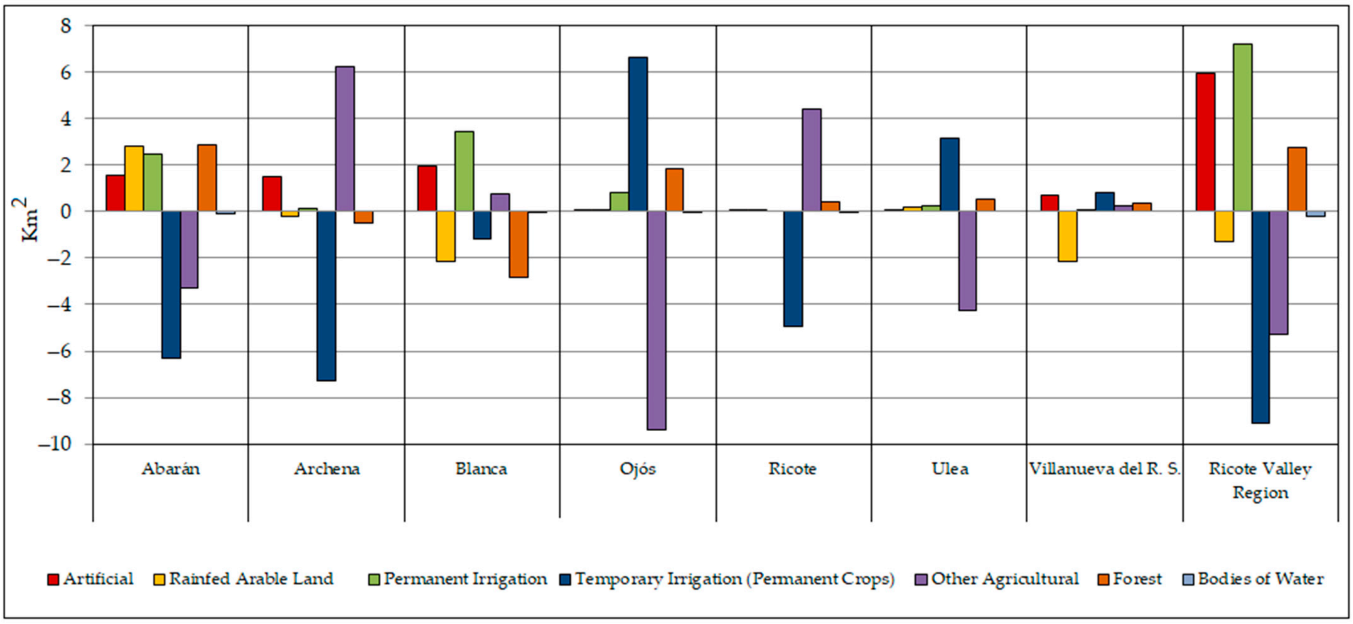

Figure 12. Evolution of land cover and land use in the Ricote Valley Region municipalities (1990–2018). Source: Own elaboration with data obtained from CLC.

On the other hand, what has been considered as soils with other agricultural uses (meadows and heterogeneous agricultural areas) have also decreased considerably. This is the second category of arable land (of those established) with the greatest representation in the Ricote Valley Region on the dates analysed (Table 4). Thus, despite losing 5.3 km^2 during the series, in 2018, it still represents about 14% of the area of the region (56.2 km^2). The reason that explains a large part of the losses suffered by the agricultural land covers and land uses that have reduced their representation (dry land, temporarily irrigated land and those considered as other agricultural soils) is the transformation to other types of crops under permanent irrigation.

Table 4. Distribution of land cover and land use in the municipalities of the Ricote Valley Region (2018).

	Surface 2018 (km^2)							
	Abarán	**Archena**	**Blanca**	**Ojós**	**Ricote**	**Ulea**	**Villanueva del R. S.**	**Ricote Valley R.**
Artificial	2.7	3.5	3.0	0.1	0.4	0.2	0.7	10.5
Rainfed Arable Land	4.3	0.0	1.5	2.1	0.5	0.5	0.0	8.9
Permanent Irrigation	2.5	0.1	3.5	1.1	0.0	0.3	0.5	7.9
Temporary Irrigation (Permanent Crops)	23.0	5.6	38.1	11.9	26.2	13.2	9.6	127.6
Other Agricultural	25.2	6.3	4.1	8.7	8.3	2.6	1.1	56.2
Forest	57.4	0.8	36.6	21.8	51.4	23.3	1.2	192.5
Bodies of Water	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4
Total	115.0	16.4	87.1	45.7	86.8	40.0	13.1	404.2

Source: Own elaboration with data obtained from CLC.

Although these transitions will be analysed in more detail using the cross-tabulation matrix and soil loss and gain mapping below, the overall data reveal that temporarily irrigated agricultural soils have been the general soil category that has increased the most over the last 30 years. It has grown from just 0.8 km^2 in 1990 to 7.9 km^2 in 2018 (Figure 13). During the series examined, permanently irrigated arable land has undergone a positive evolution in all the municipalities that make up the region studied, with the development acquired in Blanca (3.5 km^2) and Abarán (2.5 km^2) being particularly relevant. However, despite this development and the presence of water provided by the Segura River as it passes through the Ricote Valley Region, it should not be forgotten that this is a resource whose exploitation is limited in Southeastern Spain, so permanently irrigated land is the general category that currently occupies the smallest surface area (2% of the district), not including water bodies.

(**a**) (**b**)

Figure 13. Transformation from traditional irrigation (**a**) to current intensive irrigation (**b**). Source: Own elaboration, authors.

In contrast to the permanently irrigated agricultural areas, forested areas are historically the most important land cover in the Ricote Valley Region. This reality can be seen in Figure 14, which shows that forest use covers 47.6% (192.5 km^2) of the entire region. This land category has increased its surface area by 2.8 km^2 between 1990 and 2018. The expansion of forest areas has occurred especially in Abarán (2.9 km^2) and Ojós (1.9 km^2).

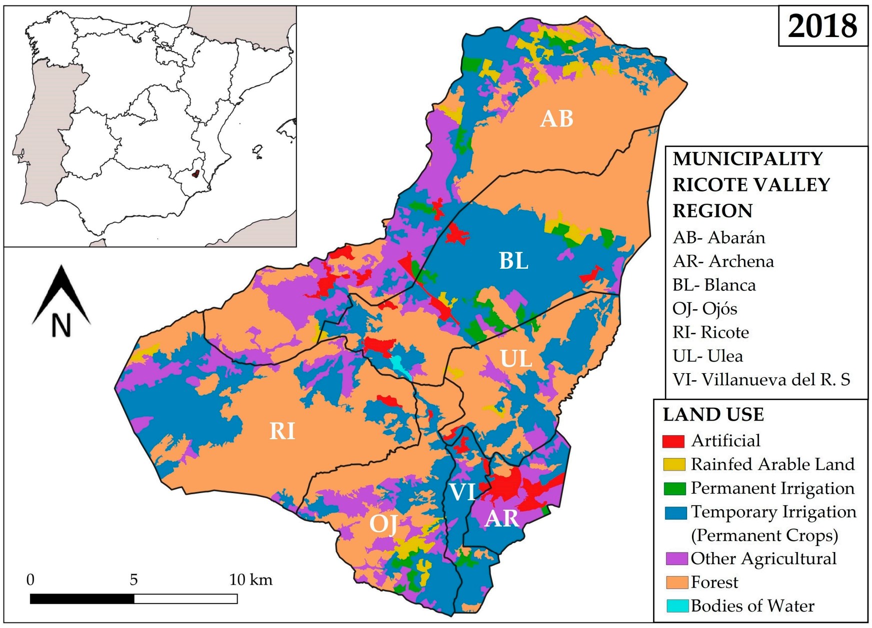

Figure 14. Cartography of land cover and land use distribution in the municipalities of the Ricote Valley Region (1990). Source: Own elaboration with data obtained from CLC.

In Blanca (2.8 km^2), there has been clearance and cultivation of areas adjacent to poorly marked or unmarked forest areas, as well as the construction in a forest area of a photovoltaic plant occupying approximately 14 hectares and an industrial estate next to the main road N–301 and the secondary road N–344, in the hamlet of La Estación (Figure 15). In the case of Abarán, there has also been the clearing of areas adjacent to undefined forest areas, as well as the construction of an industrial estate next to the N–301 and in the hamlet of La Hoya del Campo. The town of Archena (0.5 km^2) has also reduced forest land over the last 30 years.

(**a**) (**b**)

Figure 15. Photovoltaic plant (**a**); industrial estate (**b**) in the Ricote Valley Region. Source: Own elaboration, authors.

Finally, if the course of the Segura River is not considered, water bodies are not very well represented in the Ricote Valley Region, being limited almost exclusively to the reservoir of the Azud de Ojós dam, located in the southern area of the municipality of Blanca. In addition, there is a slight decrease in their surface area between 1990 (0.6 km^2) and 2018 (0.4 km^2), which may be influenced by several factors, including the time of year in which the data were taken and the worsening of the drought generated by the decrease in precipitation in Southwestern Europe during the last decades [40–42].

4.2.2. Transitions and Territorial Dynamics of Land Cover and Land Use in the Ricote Valley Region (1990–2018)

Once the trends and evolution experienced by each of the land uses and land cover categories established in the study area between 1990 and 2018 have been analysed, the transitions or changes that have occurred between them in both time periods are evaluated. To this end, the examination of the data set out in the following cross-tabulation matrix (Table 5) provides information on the spatio-temporal changes and exchanges that have taken place and the surface area that has persisted without transformation, as well as the losses and gains in the territorial surface area obtained by each land category.

Firstly, as is logical, artificial cover has not suffered losses since when soil is built on or anthropogenically sealed with cement or concrete, it is very difficult for it to mutate back to natural use. On the other hand, as has been indicated throughout this paper, most of the territorial transformations generated on the planet have been caused by the proliferation of artificial soil. Although this pattern is not the most representative of the case in question, as this is a purely rural area whose territorial and socio-economic relevance is based on the exploitation of arable land, the artificial surface area has increased by 5.9 km^2. This area that has been transformed into artificial cover belonged in 1990 to temporarily irrigated cropland (4.7 km^2), forested areas (0.6 km^2), grassland/heterogeneous crops (0.4 km^2) and permanently irrigated agricultural land (0.3 km^2).

Table 5. Cross-tabulation matrix of land uses and land covers in the Ricote Valley Region between 1990 and 2018 (km^2).

		2018								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Losses**
1990	**1**	4.6	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0
	2	0.0	1.3	1.8	4.0	2.4	0.7	0.0	10.2	8.9
	3	0.3	0.0	0.0	0.4	0.0	0.0	0.0	0.8	0.8
	4	4.7	1.9	3.2	94.4	28.3	4.1	0.0	136.7	42.3
	5	0.4	4.4	2.1	21.8	18.9	14.0	0.0	61.5	42.6
	6	0.6	1.2	0.9	6.9	6.6	173.5	0.0	189.7	16.2
	7	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.6	0.2
	Total	10.5	8.9	7.9	127.6	56.2	192.5	0.4	404.2	111.0
	Gains	5.9	7.6	7.9	33.2	37.3	19.0	0.0	111.0	

Source: Own elaboration with data obtained from CLC. Note: artificial (1), rainfed arable land (2), permanent irrigation (3), temporary irrigation (permanent crops) (4), other agricultural (grasslands and heterogeneous agricultural areas) (5), forest (6) and bodies of water (7).

Rainfed agricultural land has lost 8.9 km^2, an area that has been transformed into various types of land use and land cover. These include 4 km^2 of temporarily irrigated crops, 2.4 km^2 of land cover considered as other agricultural uses, or 1.8 km^2 of permanently irrigated agricultural land. As can be seen in the cartography referring to Figure 16, most of the disappearance of rainfed arable land has occurred in the southern quadrant of the Ricote Valley Region, between the municipalities of Villanueva del Río Segura (2.2 km^2) and Ojós (1.9 km^2), in Abarán (1.4 km^2) and, above all, in Blanca (2.7 km^2). As for the gains experienced by the area of rainfed crops, it is worth mentioning that they have been lower than the losses (7.6 km^2) and that they have been based especially on the transformation of land, which in 1990 corresponded to areas of meadow and heterogeneous agricultural areas. These cattle ranches are distributed more evenly throughout the study area, with a more notable presence in the municipalities of Abarán (4.3 km^2) and Ojós (1.9 km^2).

In the case of the land use that has increased the most in the time period studied (permanently irrigated cropping), it has lost only 0.8 km^2 and gained 7.9 km^2. The losses have been based on the transformation of land for artificial development and temporarily irrigated crops. These losses have occurred almost exclusively in Villanueva del Río Segura and Ojós. On the other hand, the important increase in surface area experienced by this land use comes from temporary irrigated crops (3.2 km^2), other agricultural uses (2.1 km^2), dry land (1.8 km^2) and forestry areas (0.9 km^2). This development has occurred especially in Blanca (3.5 km^2), Abarán (2.5 km^2), Ojós (1.1 km^2) and Villanueva del Río Segura (0.5 km^2).

On the other hand, the land use that has decreased the most (temporarily irrigated crops) has lost 42.3 km^2 and gained 33.2 km^2. The losses are distributed throughout all the municipalities, with special relevance in Abarán (19.9 km^2), Archena (7.8 km^2), Ricote (7.1 km^2) and Blanca (5.4 km^2). This typology has ceded land to all the land covers present in the study area (except for water bodies, as is logical), with the transformation in favour of meadows and heterogeneous agricultural areas being particularly important (28.3 km^2). Similarly, this land use has also made the greatest contribution to the growth of temporarily irrigated agricultural areas, with 21.8 km^2. As shown in Figure 17, these gains have been most representative in the municipalities of Abarán (10.6 km^2), Ojós (7.7 km^2), Ulea (5.8 km^2) or Villanueva del Río Segura (2.2 km^2).

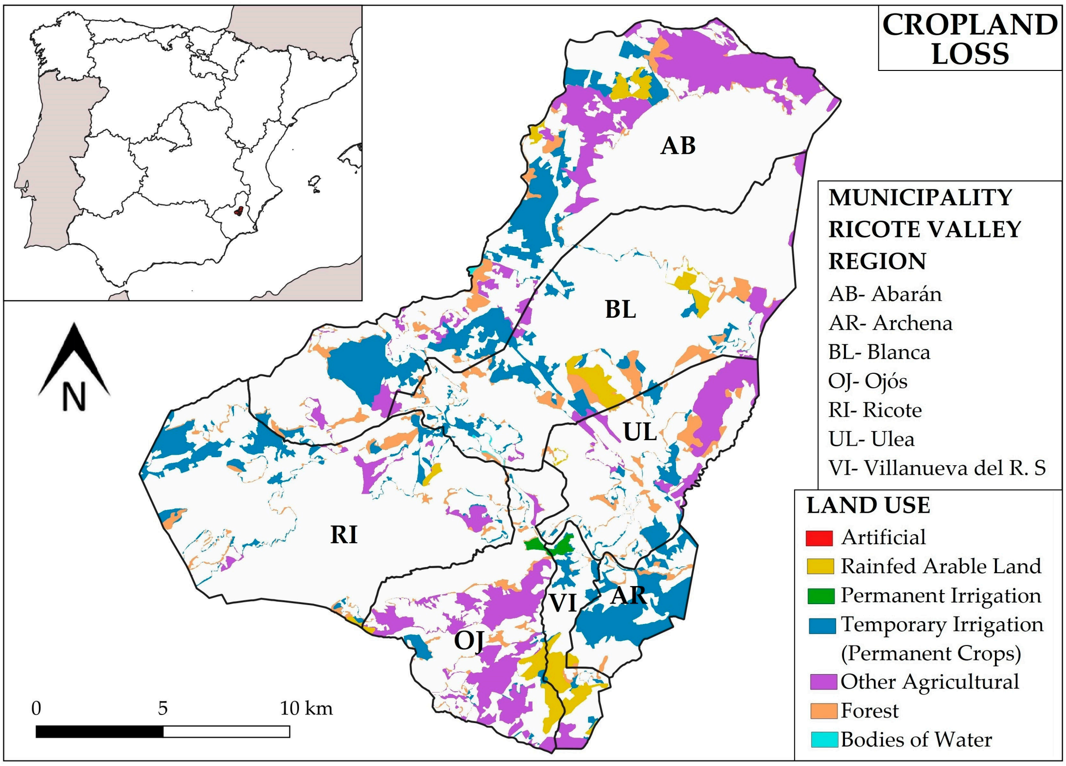

Figure 16. Mapping of land cover and land use losses in the municipalities of the Ricote Valley Region (1990–2018). Source: Own elaboration with data obtained from CLC.

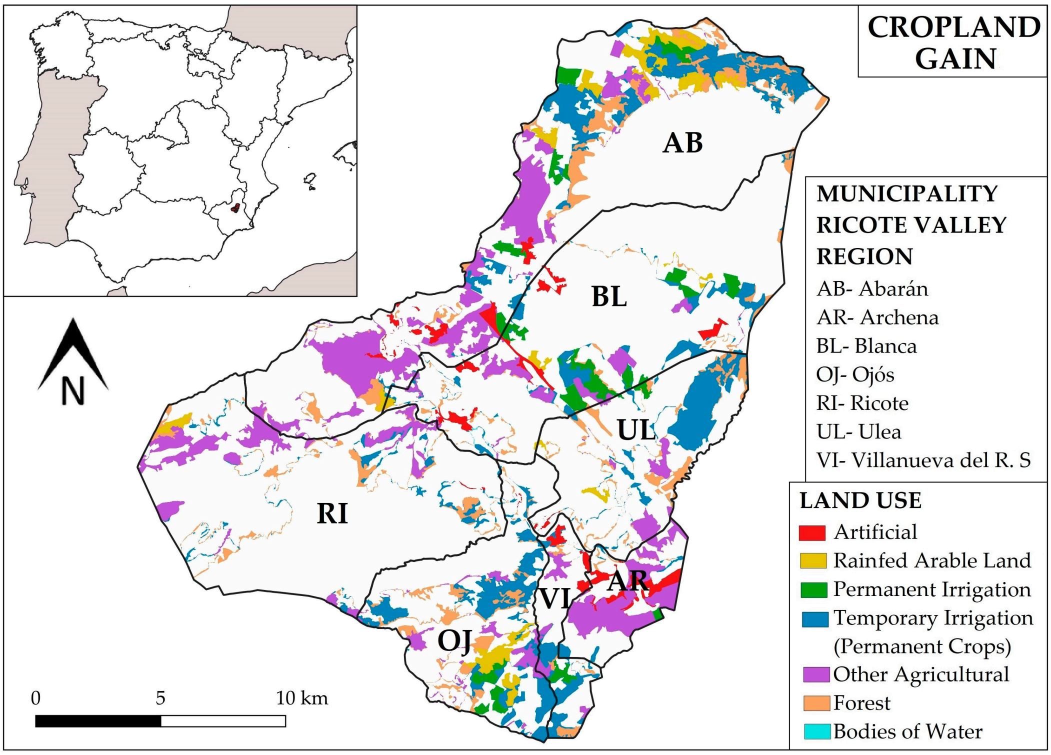

Figure 17. Mapping of land cover and land use losses in the municipalities of the Ricote Valley Region (1990–2018). Source: Own elaboration with data obtained from CLC.

The soil typology, which includes meadows and heterogeneous cultivated areas (considered as other agricultural soils), has been the one that has registered the greatest degree of exchange, with a loss of 42.6 km^2 and a gain of 37.3 km^2. Losses have occurred in all municipalities except Archena, where, in 1990, this type of soil typology was not recorded. Abarán is the municipality in which most of this land cover has been transformed, with the loss of nearly 20 km^2. With regard to the uses that have given up land, the most important are temporary irrigated crops (21.8 km^2) and forest areas (14 km^2). The reason for much of this last change was the abandonment of crop fields and the natural expansion of scrubland and shrub formations. In turn, gains have occurred in all the municipalities, being especially relevant in Abarán (16.6 km^2), Ricote (6.5 km^2) and Archena (6.3 km^2). These are based on the transformation of land, which in 1990 corresponded to temporarily irrigated crops (28.3 km^2), forest areas (6.6 km^2) and rainfed agriculture (2.4 km^2).

As analysed above, forest areas have also increased, gaining 19 km^2 and losing 16.2 km^2. The losses are distributed especially among the municipalities located in the northern half and are due to territorial transformations that have resulted in all remaining land uses, among which temporary irrigated crops (6.9 km^2) and surfaces considered as other agricultural areas (6.6 km^2) stand out. On the other hand, gains are caused by the repopulation of woodland and the expansion of abandoned areas, where, in 1990, there were mainly meadows and heterogeneous crops (14 km^2) or temporarily irrigated agricultural areas (4.1 km^2), the municipality with the greatest gain in forested areas being Abarán (7.3 km^2). Finally, water bodies have not gained surface area, but they have lost extension (0.2 km^2) in favour of forested areas and crops due to the causes already mentioned.

With all this analysed, it can be established that the percentage of territorial transformation experienced by the Ricote Valley Region as a whole between 1990 and 2018 has been quite high. In this sense, more than a quarter of its extension (27.5%) has changed land cover or land use during this period (Figure 18).

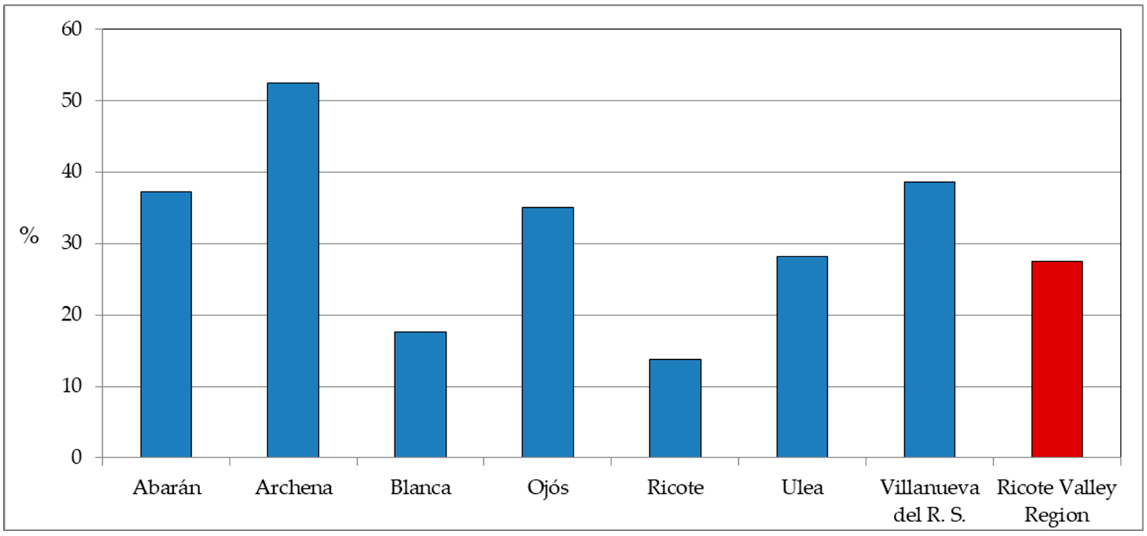

Figure 18. Percentage of land change or transformation between 1990 and 2018 in the municipalities of the Ricote Valley Region (1990–2018). Source: Own elaboration with data obtained from CLC.

Archena is the municipality with the highest percentage of change, with the transformation of more than half of the municipal land in the last 30 years (52.5%). Villanueva del Río Segura (38.6%), Abarán (37.2%) and Ojós (35.1%) all had a percentage of transformation well above the regional average. For its part, the rate of land use change in Ulea is very similar to that of the Ricote Valley Region as a whole (28.2%). Blanca (17.6 km^2) and Ricote (13.8 km^2) maintain a lower percentage of change than the average for the municipalities as a whole.

To a certain extent, the percentages of land cover and land use transformation in each municipality remain conditioned by its demographic evolution. This is shown in the correlation graph in Figure 19. It can be seen how the municipality with the highest rate of change in land use and land cover between 1990 and 2018 (Archena) is also the one with the highest percentage increase in population between 1990 and 2023. Similarly, the second and third municipalities with the highest percentage of territorial transformation are also the second and third with the highest demographic increase in the aforementioned time periods (Villanueva del Río Segura and Abarán, respectively). In addition, Ricote is the second municipality with the second largest demographic decrease in the last three decades (slightly higher than Ojós) and the one with the lowest percentage of land change.

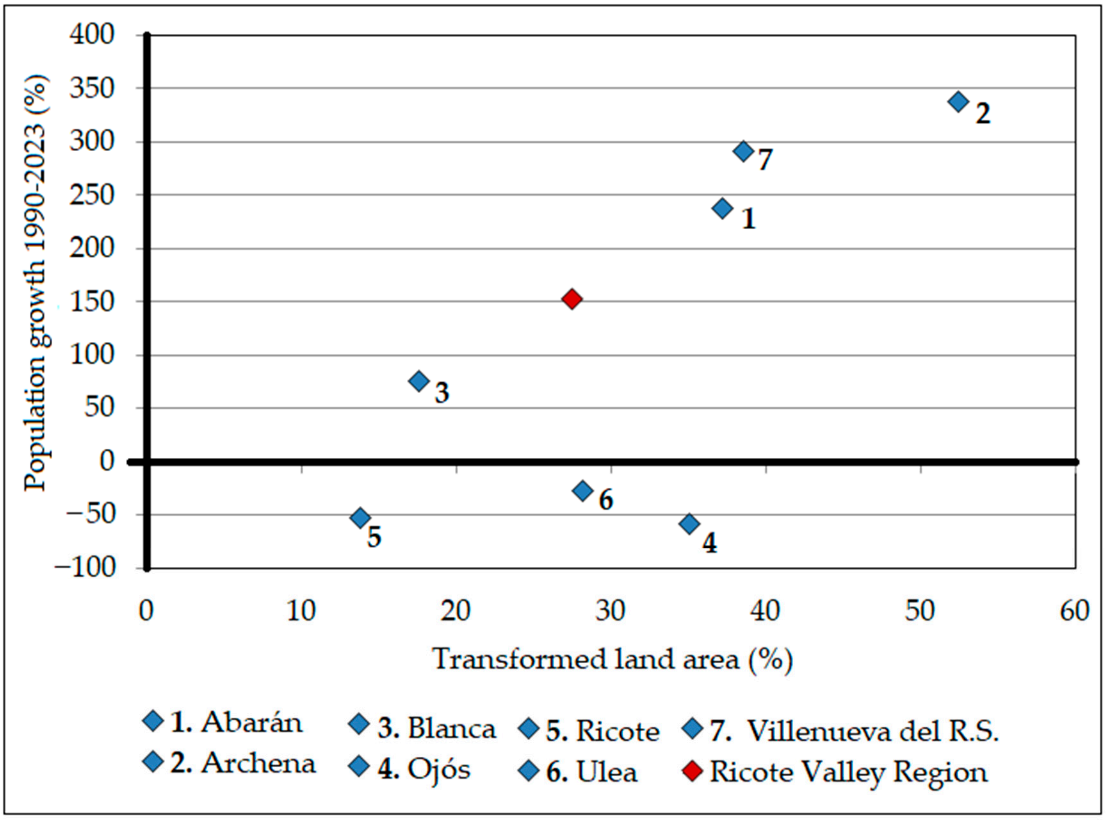

Figure 19. Correlation graph between percentage of land change or transformation (1990–2018) and population evolution (1990–2023) in the municipalities of the Ricote Valley Region. Source: Own elaboration with data obtained from Centro Regional de Estadística de Murcia and CLC.

This reality can be justified by the fact that the greater the demographic or social dynamics of a given place, the greater the possibility of territorial transformation. Thus, the arrival of new residents is conditioned by the presence of a high level of economic or employment activity, which, directly or indirectly, provokes all kinds of changes. This population attraction increases the demographic census, generating new demands and basic needs, which, in turn, have repercussions on territorial transformation [43]. On the other hand, the areas of population exclusion suffer a significant economic and social decline, which paralyses their activity, stagnating entrepreneurship and investment. Over time, this is manifested in the abandonment and reduction of territorial transformations [44].

5. Discussion

The large number of socio-demographic and territorial transformations that have taken place in recent years in different areas of the planet have increased interest in the analysis of them. The intensification of these phenomena and the consequent significant repercussions on the environment have attracted media, political and scientific attention. In this context, several studies have attempted to analyse the processes of demographic attraction and expulsion, as well as changes in land use and land cover. Due to their current relevance, most studies dedicated to assessing the unequal distribution of the population over the territory are focused on the processes of concentration of people and overpopulation in large, urbanised areas or, as in the case in point, on the accelerated depopulation and emptying of a large part of Spanish and European rural areas.

In order to analyse demographic dynamics, the official statistical databases produced by each territory (at the national or regional level) are the most extensive, accurate and optimal source of information. In this sense, the main studies that attempt to analyse the population in Spain or the Region of Murcia use these sources as the main source of acquiring population information. Thus, both the oldest studies on population dynamics in Spain, such as [45] and the most recent, such as [46], use the NIS as the main source of information. Something similar can be seen in the Region of Murcia, where the MRSC is the most reliable statistical database on demographics used by the authors. Some examples are the studies of [47,48].

Until recently, studies on the growth of cities and their disproportionate population density were the focus of the majority of the research on this subject. This is shown by studies such as those by [49], which deal with the trends and consequences generated by the concentration of population in urban areas. As [50] points out, this is a particularly relevant phenomenon in Latin America. However, according to [51–53], amongst other authors, it is also highly developed in Europe, intensifying in Spain since the boom of the real estate bubble in the early 2000s [54–57]. Nevertheless, according to [58], the major problems of territorial cohesion, ageing and the risk of the disappearance of population centres, which are located in rural areas, are significant concerns and generate an analysis of what is happening in these places. Thus, most of the studies on depopulation in Spain focus on inland areas in the northern half of the country, areas in which the dimension acquired by this appearance has mediated the phenomenon of depopulation. Some examples are the studies by [59] in Castile and Leon or [60] in Cantabria. On the other hand, there are few studies that analyse the phenomenon of depopulation in the area where the field of study dealt with in this paper is located (Southeastern Spain). One of the few (and most recent) studies is [61], which highlights the relevance of the depopulation processes recorded in certain areas of Southeastern Spain. These are areas with demographic indicators similar to those recorded in the most depopulated areas of Northern Spain and Europe (with population densities below five inhabitants/km^2). One of the regions dealt with in this last research study (northwest of the Region of Murcia) has many similarities with the Ricote Valley Region. These common characteristics include the fact that they belong to the same autonomous community, that they are two of the territories with the highest degree of rurality, and they are home to the municipalities whose depopulation process and transformation of agricultural land cover and use have undergone the most significant transformations in the Region of Murcia. In relation to this, the data dealt with in the present study, and those revealed in the study by [62] demonstrate the relevance of the land transformations that have taken place in both areas. These two studies have a similar basis of analysis, using the same time series, methodology and data source (CLC), and can, therefore, be used to make a direct comparison between the two. On the other hand, these are two territories whose agricultural exploitation has historically been different, with the Ricote Valley Region being a traditionally irrigated area and the northwest an area of rainfed crops. Furthermore, a comparison of the data analysed in both studies shows that there has been a contained development of artificial soil and a disproportionate increase in permanently irrigated agricultural land. The main differences between the two counties lie in the area under temporary irrigation. In this respect, while in the area of the northwest, there has been an increase in the land destined for this agricultural use (with less intensity than permanently irrigated land), in the Ricote Valley Region, there has been a significant decrease, namely the territorial coverage, which has ceded the greatest amount of land to other uses. The analysis and comparison of the results of all these studies show the important issues faced by today's society, which are reflected in this region. The continuous process of depopulation and the unlimited transformation of land leads to the abandonment of traditions, cultures and heritage, the substantial change in the traditional landscape and the overexploitation of resources essential for life (water and soil). These problems, which are becoming increasingly evident, require urgent intervention. The data obtained and scrutinised in this research study can be used to try to make land management and planning as optimal, rational and sustainable as possible. In this respect, the analysis of an intense process of land transformation, such as the one experienced in this case study, makes it possible to establish evaluations and, in the case of disharmonies, to try to correct them, helping and trying to involve the competent authorities in the correct preparation and execution of the new land management plans. To this end, it is essential to use databases similar to those used in this study and to integrate them, trying to achieve results that correlate with the data obtained from the variables or indicators derived from them. Thus, as already mentioned in the methodological section, CLC is one of the most interesting sources when trying to integrate or compare different databases. Most examples of the use of CLC in territorial studies are based on the development of geo-processes using multivariate analysis to try to establish the most appropriate guidelines for territorial planning or to predict future scenarios. There are several examples of this type of study, such as the one that was developed by [63]. It also deals with a space in the same region as the one analysed (MUAIn this case, the integration between demographic databases (NIS and MRSC) and land cover/land use (CLC) has been carried out by means of a correlation of statistical data, without carrying out a multivariate analysis with georeferenced population information, as there are no databases that accurately position the distribution of the population on the land surface in rural areas. In this respect, as [64] points out, performing this type of analysis by relating population location to CLC land cover/land use is not the most appropriate due to both the resolution of the latter database and the problems in establishing the different distribution of the population (highly concentrated in urban areas and highly dispersed in rural areas) over the territory. Perhaps, as indicated by [65], the use of the SIOSE land use database may give better results in this respect. In spite of this, as also indicated above, the limitation of the latter source of information lies in the limited age range of the information collected relative to CLC. In this context, in future lines of research, it is expected that this aspect will be focused on, and a combination of georeferenced territorial data from both sources will be obtained.

6. Conclusions

Nowadays, both depopulation and the territorial transformation of agricultural land in rural areas are two realities that need to be addressed. This has become clear in the analysis of the data and results obtained in this research study. To do so, it may be necessary to take a step back and reformulate the ways of life of traditional agrarian economies and societies in which land management rejected the overexploitation of resources and valued land uses that offered fundamental ecosystem services for the future of rural populations. The increase in agricultural production through the intensification of irrigation generates important economic development for the multinational companies that exploit them (agro-industries) but fails to fix the issue of population in the territory, increasing depopulation and causing important environmental problems and landscape changes. This reality can be seen in the Ricote Valley Region, a region which, despite showing an overall population growth, is undergoing a significant process of depopulation in a large portion of its municipalities, with the disappearance of population units and small hamlets. The reduced job opportunities in qualified sectors and the attraction of a wide range of social and recreational/leisure activities offered by the nearby cities have led to a significant rural exodus that is decapitalising the countryside and the villages, plunging them into constant abandonment. This situation opens a window of opportunity for large agricultural companies, which, seduced by the significant presence of water and land at low prices (for rent or purchase), plant crops with a high demand for water. In relation to this, the results obtained in this study show that over the last few decades, the Ricote Valley Region has gone through an important socio-economic transformation that has had repercussions on the change in land use, mainly those dedicated to agricultural crops. Thus, the plots of land where traditional agricultural exploitation has historically been carried out have fallen into disuse or have been abandoned as a consequence of the rural exodus. These lands, which originally corresponded to rainfed or temporarily irrigated soils, have mutated their use towards permanently irrigated farming. In this respect, the group of unirrigated, temporarily irrigated, and other traditional agricultural land uses have lost about 16 km^2 of land area, while the permanently irrigated agricultural use has increased by more than 7 km^2, being the type of land that has increased the most, ahead of artificial land (5.9 km^2). All this has meant that 27.5% of the land in the Ricote Valley Region as a whole has changed its use in the last 30 years. This socio-economic change in land use brings with it a significant transformation not only of the territory but also of the landscape, as well as a serious overexploitation of valuable natural resources such as water and soil. The results derived from this research can serve to feed the current political debate and raise awareness of the risks and threats posed by the significant territorial transformations, the emptying of villages and the indiscriminate abuse of natural resources.

To reverse this situation that has arisen, it is necessary to develop management policies that exercise control over land use planning and achieve more sustainable uses in rural areas. In order to achieve this much-desired development that meets the needs of the present without compromising the territory's capacity to satisfy future generations, it is necessary to create a "rural pact" in which the territorial protagonists involved (at European, national, regional and local level) are coordinated and involved in this change. To do this, it is necessary to understand the real dynamics and needs of the field in its multiple interactions. In addition, social organisations (non-profit organisations) have been created, made up of people who live in, know and defend these territories. One of the most similar cases is the "Consejo para la Defensa del Noroeste de la Región de Murcia" (https://stopganaderiaindustrial.org/consejo-para-la-defensa-del-noroeste-murcia/) (accessed on 29 August 2024), which defends the traditional economic activities carried out in the rural areas of the northwest region of Murcia and the bordering areas of Albacete. Finally, it should be noted that the case study in question, the Ricote Valley Region, could become a real-life laboratory for territorial analysis with a comprehensive, relational and multidimensional approach and thus try to generate an integration of the socio-spatial dialectic that generates responsible progress and is committed to the 2030 Agenda and SDGs.

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