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Analyzing with GIS and indicators the rural-urban territorial inequalities in a peripheral area of the European Union

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Short title: Analyzing territorial inequalities with GIS and indicators

Abstract

Territorial inequality between rural and urban areas has important repercussions within the social and environmental sustainability of the planet. These inequalities are extremely important in countries such as Spain, where intense urbanization processes have taken place in the last decades.

Knowing this problem is a key to design and evaluate the policies of rural or territorial development. The utilization of indicators and indexes implemented into a Geographic Information System (GIS) lets undertaking operatively the dynamic knowledge of rural-urban inequalities. In this work is presented a useful methodology to make rural audits in the peripheral areas of the European Union based in the utilization of indicators and indexes within a GIS environment. As a result, 14 indicators and 3 synthetic indexes are presented, which provide knowledge about the problems within the study area.

Keywords: Urban-rural inequality / Indicators / Synthetic Index / Factorial Analysis / León

1. Introduction

According to the definition of the Organization for Economic Co-operation and Development (OECD) the rural regions represent 92% of the territory of the European Union (EU). 19% the population from the EU lives in predominantly rural regions, but the main socioeconomic indicators, including the structural indicators, tend to remain behind with regard to the ones of the non rural areas. In the European rural areas the per capita income is approximately equivalent to two thirds of the one in urban areas; the activity rate is lower within women; service sector is less developed; levels reached in

superior education are lower; and the percentage of homes which have access to broadband Internet access is more limited (Castells y Bosch, 1999). The lack of opportunities, contacts and educational infrastructures is a particularly pressing issue for women and young people who live in rural remote areas (OECD, 2006).

The problem of inequality not only affects to the surrounding countries of the OECD, it is also a world issue. These differences are particularly evident in developing countries, which present permanent growth and vulnerability. Behind this rural-urban socioeconomic differential are some of the great problems of our planet, like big migrations, environmental degradation or wars. For instance, in the African continent the standard of living in rural areas is strongly behind the one in urban areas and these differences are growing even though political leaders and non-governmental organizations have emphasized rural development as the fundamental pillar in their strategies to generate sustainable growth and the reduction of poverty (Sahn y Stifel, 2003). In Latin America, rural-urban inequality is exceptionally high and it is growing, in general the incidence of poverty in the countryside has not decreased and the rural population has increased (De Janvry y Sadoulet, 2004). In the Asiatic continent, in countries like China the economical growth has increased the rural-urban inequality (Liu, 2006).

In Spain rural areas are very important, as they represent 90% of the territory and 20% of the population live within them if periurban areas are not included and 35% if they are (Law 45/2007). Furthermore, it is in these areas where our natural and a good part of our cultural patrimony is found so, being Spain the country with the greatest biodiversity of the European continent and housing an important part of the cultural diversity of Europe, it is highlighted the importance of Spain getting a sustainable rural development. But inequality generates important problems for the sustainability of natural resources; for instance in problems such as forest fires it has been found a significant relation between the total number of fires and indicators of rural-urban unbalance as the lost of population (Castedo-Dorado *et al.*, 2007).

Several recent studies have analyzed these unbalances, confirming that while the standards of life and the socioeconomic conditions of the rural areas have improved, important social unbalances which condition their future sustainability and generate big territorial problems are still observed (EU, 2006; OSE, 2008; OECD, 2009; Camarero, 2009). So we are faced with a complex worldwide problem which affects the

economical and territorial structure of Spain directly and indirectly, for example, through the receipt of migratory flows.

In spite of the increase of topics related to inequality in literature, and despite the interest in the importance of its quantification (Pacione, 2004; Ocaña-Riola and Sánchez-Cantalejo, 2005; Camarero, 2009), there is not enough discussion about the methods and tools (mainly indicators and indexes), the utility of their application, and the use of the Geographic Information Systems (GIS) to make them operative.

The aim of this work is to reach a first approach to the study of inequalities in the peripheral areas of the EU taking as a pilot area the province of León (Spain). In this work, indicators and indexes are developed into a GIS environment from factorial analysis techniques. This collection of tools has a great importance to define a continuous audit system of the rural-urban inequality which will support the monitoring and evaluation of rural development.

2. Material and Methods

2.1. Study area

The province of León is located within the North-Western quadrant in the Iberian Peninsula, as represented in Figure 1, it has an area of 15468 km^2 and a current population of 500200 inhabitants (López, 2007). This province is a clear example of a peripheral area (OSE, 2008), remote area (Moltó and Hernández, 2004) or disconnected place (Camarero, 2009). Its problematic is representative of the whole Galaico-Leonesa area (León, Zamora, Lugo and Orense) which presents a notable ageing and drastic reduction of the generational basis. The supporting generation (28 to 52 years old) is reduced to the maximum and the decrease of women within the young people is important. These places, many times in a remote location, have difficulties to overcome a traditional development model very linked to the farming exploitation of the territory by the family. They do not attract population and the demographic exhaustion draws a social landscape in which the prints from past take preference over the future opportunities. In Figure 1 are represented the rural and urban areas from the population density. As seen, the province has a marked rurality and a strong contrast among the two urban poles (León and Ponferrada), some scarce intermediate municipalities and the rest of the distinctly rural municipalities.

2.2. Information sources

For this study a data base has been created at the municipality scale (LAU2, Nomenclature of the Statistical Territorial Unities, EU); altogether, 211 municipalities

were studied and in each of them, 140 variables have been selected and cartographied. In Table 1 are shown and described the main information sources used in the study. From these variables were elaborated indicators and synthetic indexes. As these have the great advantage of being objectively verified they can help in the monitoring and evaluation of changes and they are a good tool for communication.

Previously to the selection of indicators or the elaboration of indexes, a conceptual analysis of the problem was done. The variables related to the concept of rural-urban inequality in peripheral areas use to be different to the variables which we can theoretically find in other regional realities, as the typologies of rural areas can be many. The indicators were selected specifically in order to their relevance for politic issues and they are related to a specific time and place (Dolpheide and Martínez, 2007). This is why it was very important to establish a theoretical frame and make the right selection of them. Similar methodologies have been used by Harrington and O'Donoghue (1998) or Pacione (2004). In Table 2 fourteen indicators of inequality which have been finally elaborated, are classified and described. These indicators have been classified into six categories: territory and population degree, dynamic of the demographic structure, human capital, productive structure, uses and land fiscality and degree of access to infrastructures and services.

All the indicators have been integrated into a geo-referred database (GIS), as the systematic use of rural indicators and GIS analysis techniques make the monitoring of this problem easier (Martínez, 2005). So, GIS and indicators can help monitoring inequalities, focusing on needy areas, setting priorities and reassigning resources in the rural development policies.

2.3. Methods: construction of indicators and indexes and integration into a SIG

The methodology used to construct indicators and indexes and their subsequent integration into a GIS has been adapted from the generally proposed by Wong (2006) and it has been sequenced into 4 steps:

- Step 1. Consolidation of concepts. The aim of this step is to clarify the basic concepts of the analysis. The ones from the indicators to be developed have been identified and defined.
- Step 2. Analysis of the structure. The aim is to establish the structure of the indicators, providing a frame analysis in which indicators will be taken in and analyzed.

- Step 3. Identification of indicators. The aim is to translate the key factors identified in the previous step to indicators and measurable indexes.
- Step 4. Construction of the indicators. The aim is to construct the indicators and indexes from the brute data. This is the main step of the work and it is here where all the statistical procedures and geo-process of the information has been done. Particularly, the factorial analysis is a multivariable technique which aim is to reduce a collection of "v" random variables (interrelated) into a collection of "f" latent factors (independent), so "f" factors will always be, in number, less than "v" initial variables. The factors show the synthesis of the redundant information of the variables. As a last resort, the success of this technique is proportional to the fulfilment of two basic requirements (Rodríguez, 2000; Peña, 2002). This step has been divided into two substeps according to the methodological sequence of the factorial analysis.
  - Substep 4.1. Construction of indicators. The application of this technique allows the identification of the most significant dimensions and/or indicators of the concept under examination. The element that characterizes this technique is its capability to summarize information, which is achieved eliminating from the collection of initial variables those which offer redundant information and the ones that do not adapt to the multiple regression model, from which this technique is based. A study of the communalities was done and also an examination of the correlation and lineal association among variables through the interpretation of the correlation matrix.
  - Substep 4.2. Construction of synthetic indexes. The extraction of factors was done, which allowed summarizing the collection of indicators into a subcollection of indexes. To facilitate this task, rotation and factorial punctuation were used. They permit determining to what extent the selected factors are given within the individuals or other units of analysis. The selected indexes have been mapped creating a thematic cartography of the inequality.

In the proposed methodology a step 5 is suggested, which generally seeks the communication and diffusion of the indicators and indexes (Wong, 2005; Dolpheide and Martínez, 2007). In this study this step has not been taken considered.

3. Results and Discussion

3.1. In connection with the elaboration of indicators of rural-urban inequalities

In this chapter we will study to what extent the conceptually selected indicators are able to explain the rural-urban inequality in the study area. It has also been possible to establish a hierarchy of the cause of this inequality determining, which indicators are the best explaining the inequality model.

In Table 3 is showed, for each of the indicators included into the analysis, some descriptive statistics: mean, standard deviation and coefficient of variation CV (%). As we can see, there is a wide territorial variation in each indicator, which can initially indicate a good capacity to detect inequality situations. Together with the density of population classically used to define rural areas, we have another as the territorial labour activity or the general depopulation dynamic which initially express important inequality levels. Other clearly segregating indicators are the educational level, the agricultural activity or the telecommunication level.

Table 4 contains the communalities initially assigned to the variables (initial) and the communalities reproduced by the factorial solution (extraction). The communality of an indicator expresses how much of its variance can be explained by the obtained factorial model. By studying the communalities of the extraction we can value which are the best explained indicators by the inequality model. In our example, these are the population density indicators, territorial labour activity and educational level (the model is able to reproduce more than 93% of its original variability). We can check that 9 indicators are highly explained by the model, which indicates their kindness for the studied phenomenon. From Table 4 it has been possible to begin to set out if the number of obtained factors is enough to explain every indicator included in the analysis, this would let us knowing how many territorial inequality indexes can be constructed avoiding the lost of information during the process.

In Figure 3 is presented a sample of the cartography of indicators elaborated. Specifically we can observe the spatial representation of the agricultural activity, the educational level, the general depopulation dynamic and the territorial labour activity. It can be clearly observed the bipolarity of the studied province around the municipalities of León and Ponferrada. For instance, the high levels of the depopulation general dynamic indicators or the territorial labour activity are mainly concentrated around these urban cores and they are clear indicators of the rural-urban inequality. It is interesting to attend to the importance of indicators as the agricultural activity, that

becomes apparent as a classically differentiator indicator of the rural-urban, but nowadays it is only used to differentiate rurality types, and most rural areas have lost their agricultural activities (OSE, 2008; OECD, 2009). These maps that we present are only some examples of the potential of the continuous audit developed system of the rural-urban inequality.

Table 5 shows the correlations matrix, it is, the Pearson correlation coefficients between each pair of indicators. As we can see, there is a good correlation between indicators, which is a synonym of quality in the analysis. The matrix also offers, in addition to the correlations matrix, the unilateral critical level (*Sig. unilateral*) associated to each correlation coefficient. A critical level lower than 0.05, indicates that the population correlation between the correspondent pair of variables can be considered significantly different to zero.

In this study two statistics that allow valuing the kindness of adjustment or suitability of the analyzed data to a factorial model have been used: the measurement of sample suitability KMO and the Bartlett sphericity proof . KMO is higher than 0.6, thus it is adequate using this kind of analysis with the available data. Assuming that the data come from a multichangable normal distribution, the Barlett statistical is distributed approximately according to the chi-square probability model. These good results indicate the factorial model is adequate to explain the studied problem.

3.2. In connection with the elaboration of inequality rural-urban indexes

In Figure 4 are represented the diagrams of rurality of two arquetypical municipalities of rural-urban inequalities: León (urban) and Molinaseca (rural). The diagram of rurality is a tool which allows representing graphically the rurality spectrums from the set of selected indicators and it is very helpful to analyze connections between indicators previous to the construction of inequality synthetic indexes. In the example it can be visually observed which indicators are the most differing. For instance, the indicators population density, territorial labour activity and educational level would be clearly differing and, from the former, they will be very transcendent and significant for the construction of the indexes.

In Table 6 is shown the total percentage of variance explained by the factorial model. It is shown a list of the eigenvalues of the variances-covariances matrix and the percentage of variance that represents each of them. By default are extracted as many factors as eigenvalues higher that 1 contains the analyzed matrix. In this example there

are 3 eigenvalues higher than 1, so the procedure extracts 3 factors which are able to explain 65.39% of the variance of the original data.

The information in Table 6 has been used to identify the suitable number of inequality indexes that can be constructed (factors according to the statistic terminology). In this study we decided to elaborate three indexes. The previous connections between indicators and the territorial meaning of the solution led us to make this decision.

In Table 7 is the factorial solution, strictly speaking. It contains the correlations between original variables (or saturations) and each factor. Comparing the relative saturations of each variable in each of the three factors we can appreciate the first factor is constituted by the territorial labour activity, population density and educational level indicators. All these indicators saturate into an only factor because they constitute a differenced group of variables within the correlations matrix.

This factor seems to show the dimension of "population resources" within the municipality and it is generally called Human Capital Index (HCI). The HCI allows developing an operative definition of "rural area" which has usually been developed attending only to the number of inhabitants or to the population density (Ocaña-Riola and Sánchez-Cantalejo, 2005). In Figure 5 we can check how the HCI clearly differ the distinctly urban territories (basically Ponferrada and León and their neighbouring areas) from the rural areas.

The HCI is based on a factorial analysis, which gives rise to an only factor related to something as differential and strategic as the existence of human capital, not only regarding to the number of people, also to qualification, innovation potential, etc. The HCI can be periodically actualized to study the territorial evolution of the implemented developing policies.

The second factor picks up the set of indicators connected to the population changes as the depopulation general dynamic and the depopulation present dynamic, thus it could represent "future perspectives or the population sustainability of the territory"; this factor will be called Population Dynamic Index (PDI). In Figure 5 we can see how the PDI has also an identifying effect of the different rurality stages, hence it can be useful to make a clear distinction of the different socioeconomic situations within a territory.

Finally, the third factor is made up of three indicators: agricultural activity, level of rustic fragmentation and automovility. This factor has a less clear interpretation and it

has been connected to the agricultural structure. These municipalities in which agricultural activities are still developed and in which property is less fractioned are perhaps where it would be easier to recover agricultural activities in the future. Generally, this index has been called Agricultural Potential Index (API).

4. Conclusions

The study presents the advantages of the use of GIS to construct indicators and synthetic indexes in the study of territorial inequalities. In the study, different databases have been integrated, such as census and administrative data, in order to quantify inequalities and analyse the gap between rural and urban areas, generating maps to detect and connect the problematic areas. From this analysis, 14 indexes and 3 synthetic indicators have been elaborated, stressing among these the Human Capital Index which behaves as a clear threshold between rural and urban areas, improving the traditional rurality indexes.

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Table 1. Main sources of information used in the study

Document	**Abbreviation**	**Description**	**Year**	**Entity**
Population and Housing Census	CPyV	These are exhaustive population recounts which compile, summarize, value, analyze and publish demographic, cultural, economic and social data from all the inhabitants of the country (residing in dwellings or in collective buildings) and their political-administrative divisions, referred to a determined moment or period.	2001	INE
Municipal Registration	PM	This is an administrative register where all the inhabitants of each municipality are listed.	1900-2007	INE
Agricultural Census	CA	Es una operación estadística periódica a gran escala, patrocinada por el Estado para la recogida, elaboración y publicación de información, en gran parte cuantitativa, de la estructura del sector agrario y con referencia a un momento determinado.	1999	INE
Infrastructure and Local Equipment Survey	EIEL	Recoge una información completa sobre infraestructuras y equipamientos de competencia municipal.	2001	INE
Active Population Survey	EPA	Investiga las características socioeconómicas de la población, y recoge las categorías poblacionales en relación con el mercado de trabajo.	2007	INE
Disabilities, Deficiencies and Health Survey	EDDES	Recoge un estudio completo sobre discapacidades, deficiencias y estado de salud de la población española.	1999	INE
Other Sources: Members of the Social Security (Ministry of Work and Social Issues, General Treasury of the Social Security), Study of the Rustic Property (Ministry of Economy and Treasury. Cadastral General Direction)				

Table 2. Classification and description of the inequality indicators

Category	Indicator	Description	Abbreviations	Unities
1. TERRITORY AND POPULATION	Population density	Population density	DP	Inhabitants / km^2
	Peripherycity	Distance capital province	DCP	km
	Importance of the second dwellings	Second residence dwellings over total dwellings of the municipality	ISR	%
2. DINAMYC OF THE POPULATION STRUCTURE	Depopulation general dynamic	Population difference between 1986-2006 in connection with total inhabitants	I66	%
	Depopulation present dynamic	Population losses 2007 over the total	I6	Inhabitants
3. HUMAN CAPITAL	Educational level	% university studies population	IF	%
	Dependency level	% disable population	ID	%
4. PRODUCTIVE STRUCTURE	Agricultural activity	% agricultural workers	IAA	%
	Labour activity	% worker population	IAL	%
	Unemployment level	% unemployed population	IND	%
	Territorial labour activity	Labour activity density	IAT	Workers/ km^2
5. USES AND FISCALITY OF THE LAND	Rustic fragmentation level	Mean area of plots	NPR	ha
6. ACCESS TO INFRASTRUCTURES AND SERVICES	Automobility	Automobiles per inhabitant	IMP	%
	Telecommunication level	Dwellings with telephonic connection	IT	%

Table 3. Descriptive statistics of the indicators

Category	Indicator	Mean	Standard deviation	CV (%)
1. TERRITORY AND POPULATION	Population density	47,73	241,63	506,24
	Peripheriсity	63,70	38,09	59,80
	Importance of second dwellings	55,15	50,75	92,02
2. POPULATION STRUCTURE	Depopulation general dynamic	-25,11	27,90	111,11
	Depopulation present dynamic	-2,10	2,45	116,67
3. HUMAN CAPITAL	Educational level	4,50	3,74	83,11
	Dependency level	16,96	3,57	21,05
4. PRODUCTIVE STRUCTURE	Agricultural activity	39,32	27,38	69,63
	Labour activity	23,47	17,19	73,24
	Unemployment level	5,26	2,36	44,87
	Territorial labour activity	17,17	115,25	671,23
5. LAND USES AND FISCALITY	Rustic fragmentation level	0,52	0,46	88,46
6. INFRASTRUCTURES AND SERVICES ACCESS	Automovility	0,47	0,09	19,15
	Telecommunication level	8,82	8,60	97,51

Table 4. Communalities of the indicators

Indicators	Initial	Extraction
Population density	1	0,97
Territorial labour activity	1	0,96
Educational level	1	0,93
Agricultural activity	1	0,77
Dependency level	1	0,74
Depopulation general dynamic	1	0,69
Peripheriсity	1	0,65
Unemployment level	1	0,61
Automobility	1	0,57
Depopulation present dynamic	1	0,46
Rustic fragmentation level	1	0,44
Telecommunication level	1	0,38
Labour activity	1	0,34

Table 5. Matrix of correlation

		Indicators*												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Correlations	1	1,00	-0.14	0.22	0.40	-0.19	0.14	0.16	-0.10	0.16	0.99	-0.24	0.93	-0.04
	2	-0,14	1.00	-0.25	-0.15	-0.22	-0.21	0.35	-0.22	-0.22	-0.14	0.09	-0.08	-0.49
	3	0,22	-0.25	1.00	0.36	-0.46	0.30	0.23	-0.17	0.55	0.17	-0.65	0.17	0.00
	4	0,40	-0.15	0.36	1.00	-0.25	0.14	0.13	-0.01	0.28	0.39	-0.31	0.43	-0.02
	5	-0,19	-0.22	-0.46	-0.25	1.00	-0.30	-0.56	0.40	-0.31	-0.17	0.65	-0.20	0.28
	6	0,14	-0.21	0.30	0.14	-0.30	1.00	0.08	0.00	0.15	0.20	-0.37	0.12	0.27
	7	0,16	0.35	0.23	0.13	-0.56	0.08	1.00	-0.43	0.15	0.13	-0.35	0.17	-0.28
	8	-0,10	-0.22	-0.17	-0.01	0.40	0.00	-0.43	1.00	-0.05	-0.09	0.04	-0.09	0.32
	9	0,16	-0.22	0.55	0.28	-0.31	0.15	0.15	-0.05	1.00	0.12	-0.45	0.14	-0.01
	10	0,99	-0.14	0.17	0.39	-0.17	0.20	0.13	-0.09	0.12	1.00	-0.20	0.92	-0.02
	11	-0,24	0.09	-0.65	-0.31	0.65	-0.37	-0.35	0.04	-0.45	-0.20	1.00	-0.23	-0.12
	12	0,93	-0.08	0.17	0.43	-0.20	0.12	0.17	-0.09	0.14	0.92	-0.23	1.00	-0.06
	13	-0,04	-0.49	0.00	-0.02	0.28	0.27	-0.28	0.32	-0.01	-0.02	-0.12	-0.06	1.00
Sig. (1-tailed)	1		0.02	0.00	0.00	0.00	0.02	0.01	0.07	0.01	0.00	0.00	0.00	0.28
	2	0,02		0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.13	0.00
	3	0,00	0.00		0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.50
	4	0,00	0.01	0.00		0.00	0.02	0.03	0.42	0.00	0.00	0.00	0.00	0.37
	5	0,00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	6	0,02	0.00	0.00	0.02	0.00		0.12	0.49	0.01	0.00	0.00	0.04	0.00
	7	0,01	0.00	0.00	0.03	0.00	0.12		0.00	0.02	0.03	0.00	0.01	0.00
	8	0,07	0.00	0.01	0.42	0.00	0.49	0.00		0.24	0.10	0.26	0.10	0.00
	9	0,01	0.00	0.00	0.00	0.00	0.01	0.02	0.24		0.04	0.00	0.02	0.45
	10	0,00	0.02	0.01	0.00	0.01	0.00	0.03	0.10	0.04		0.00	0.00	0.39
	11	0,00	0.10	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00		0.00	0.05
	12	0,00	0.13	0.01	0.00	0.00	0.04	0.01	0.10	0.02	0.00	0.00		0.19
	13	0,28	0.00	0.50	0.37	0.00	0.00	0.00	0.00	0.45	0.39	0.05	0.19	

* 1: Population density; 2. Peripheralicity; 3: Depopulation general dynamic; 4: Educational level; 5: Agricultural activity; 6: Second dwellings importance; 7: Unemployment level; 8: Rustic fragmentation level; 9: Depopulation present dynamic; 10: Territorial labour activity; 11: Dependency level; 12: Telecommunication level; 13: Automobility.

Table 6. Explained variance percentages

Factor	**Initial eigenvalues**			**Sums of the square saturations (extraction)**		
	Total	*% Variance*	*% Accumulated*	*Total*	*% Variance*	*% Accumulated*
1	4,04	31,09	31,09	4,04	31,09	31,09
2	2,36	18,22	49,31	2,36	18,23	49,32
3	2,08	16,07	65,39	2,08	16,07	65,39
4	1,01	7,79	73,18			
5	0,78	6,01	79,19			
6	0,64	4,98	84,18			
7	0,59	4,56	88,74			
8	0,48	3,69	92,43			
9	0,38	2,96	95,40			
10	0,34	2,61	98,01			
11	0,17	1,31	99,32			
12	0,08	0,64	99,96			
13	0,00	0,03	100,00			

Table 7. Factorial structure matrix (rotated)

	Factors		
	1	**2**	**3**
Territorial labour activity	0.98		
Population density	0.98	0.12	
Educational level	0.96		
Telecommunication level	0.47	0.39	
Dependency level	-0.12	-0.84	0.12
Depopulation general dynamic	0.11	0.83	
Depopulation present dynamic		0.68	
Agricultural activity		-0.63	0.60
Labour activity	0.10	0.54	0.18
Periphericity	-0.14	-0.30	-0.73
Automobility		0.19	0.73
Unemployment level		0.32	-0.71
Rustic fragmentation level		-0.11	0.65

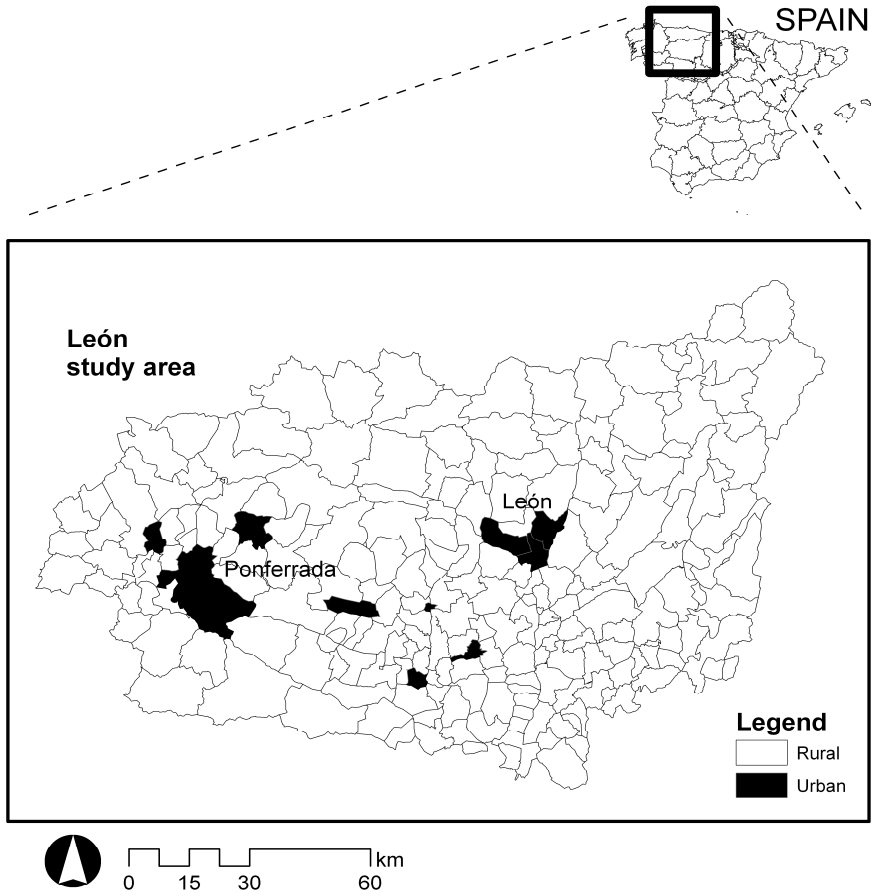


Figure 1. Study area location and cartography from the former of the rural-urban

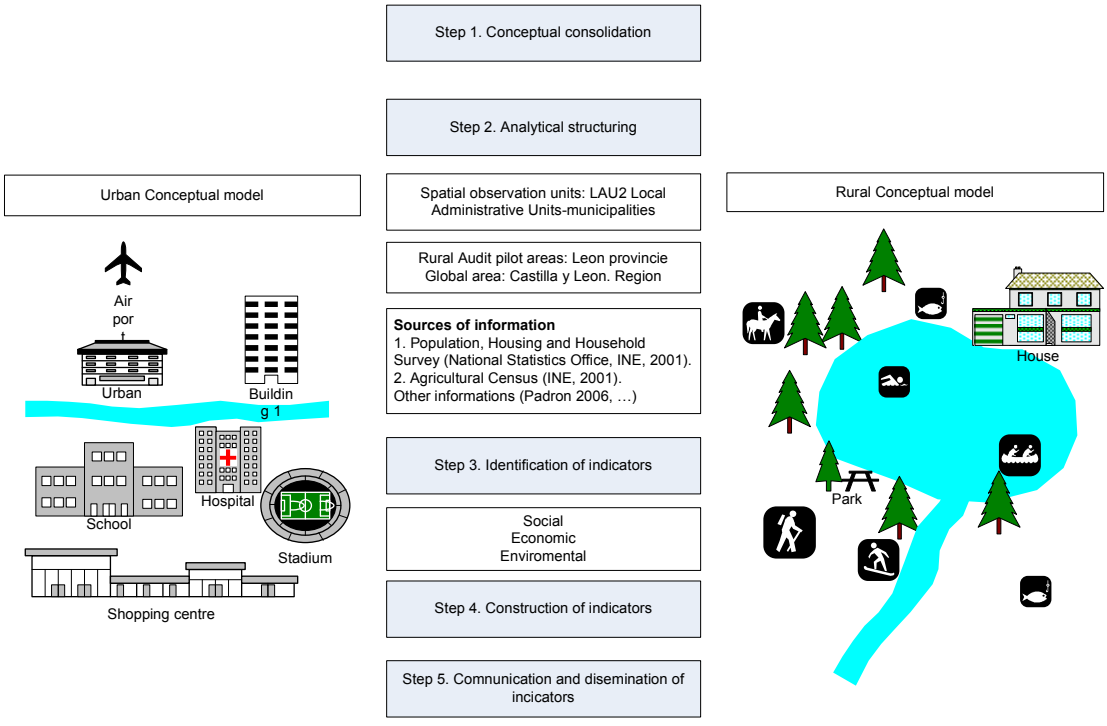


Figure 2. Methodological sequence for the construction of inequality indicators and indexes

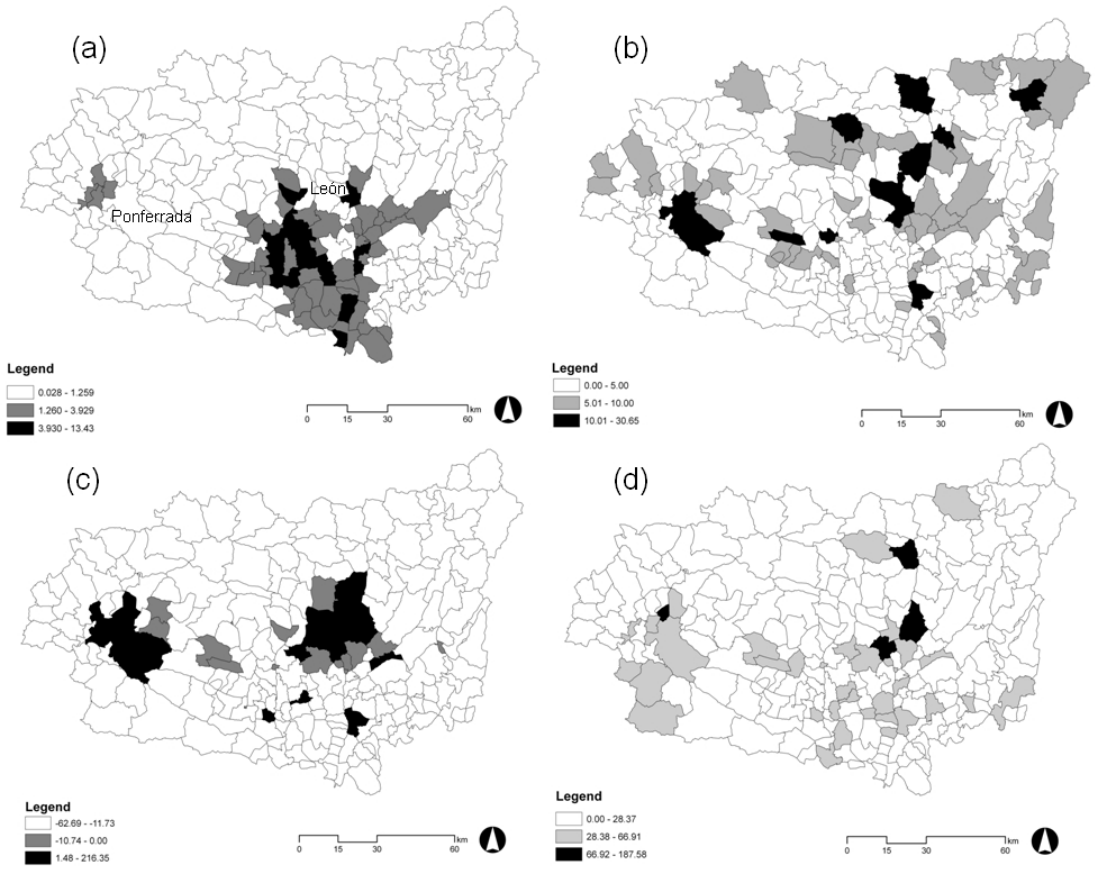
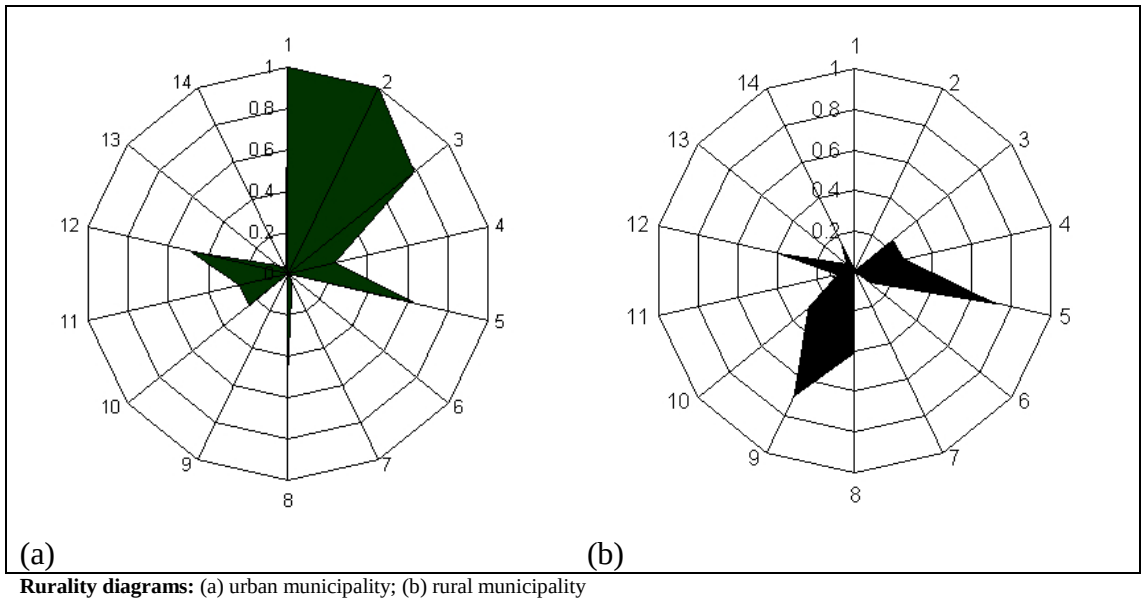


Figure 3. a) Agricultural activity b) Educational level c) Depopulation general dynamic d) Territorial labour activity



Rurality diagrams: (a) urban municipality; (b) rural municipality
Indicators legend: *1: Population density; 2: Territorial labour activity; 3: Educational level; 4: Depopulation general dynamic; 5: Depopulation present dynamic; 6: Agricultural activity; 7: Rustic fragmentation level; 8: Automobility; 9: Periphericity 10: Dependence level; 11: Labour activity; 12: Unemployment level; 13: Telecommunication level; 14: Importance of the second dwellings.*

Figure 4. Rurality diagrams

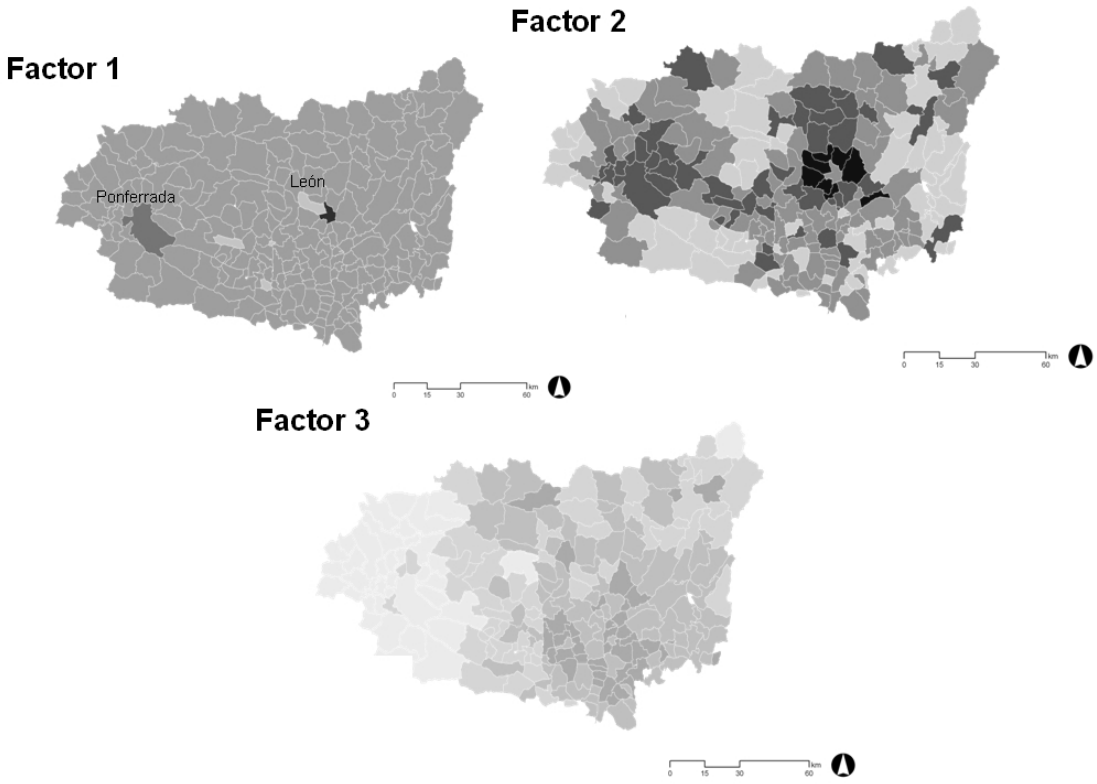


Figure 5. Inequality indexes cartography: Factor 1: Human Capital Index; Factor 2: Population Dynamic Index; Factor 3: Agricultural Potential Index