Population analysis of the Spanish-Portuguese basin of the river Tajo

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*Abstract :*Over the last few decades, distribution and redistribution of the population within the territory has gained in importance as a subject of social interest, both regionally and nationally. This study is part of research which analyzes changes in how the population is settled and its effect on spatial organization of the urban network. The aim of this research is to analyze the changes in the population distribution of the municipalities located in the international basin of the River Tajo.

This is an investigation of a quantitative nature, in its methodological approach, through the use of population census data covering the period 2001-2011. In the study of the municipalities in the international basin of the River Tajo, population size categories are applied. Likewise, the structure of the current population is examined and a predictive model of the population evolution will be performed to enable us to anticipate rationally future trends in the populations analyzed.

Key-Words: Rurality Index, Population Analysis, Population Distribution, Spatial Organization, Population Structure, River Tajo

1 Introduction

Since ancient times, states have pursued the aim to know the amount and characteristics of population, due to military and economic interests.

Population behaviour is a basic fact to bear in mind whatever the research to be considered and no matter what possible scenario is to be depicted from a future perspective. Thus, when assessing the present so as to act in the future, it is essential to have enough information about population, in order both to observe the behaviour and real satisfaction of social demand, as well as to design a suitable economic and social policy in response to the basic needs of the population occupying and using a given space (Requés, Rodríguez, 1996).

1.1. Theoretical framework

Population density is generally used as an indicator to distinguish between rural and urban areas. The definition of rural areas established by the Organization for Economic Cooperation and Development (OECD 1996) is based on a combination of the size of territory and population density. The territory may be the administrative unit

corresponding to the municipality (in terms of the UE / Eurostat NUTS-Framework: LAU 1). LAU 1 set criteria to consider a rural area as one which has a population density lower than 150 inhabitants/km^2. From our perspective, this does not appear to be very accurate when is applied to some countries (Johansen, Nielsen 2012).

It is necessary to break with the rigid economical pattern in which the role of the rural sector has been placed, and move it into the context of politics and institutions (Pérez, 2001). The rural environment is thus a socioeconomic entity within a geographical space, consisting of four components: territory; population; settlements as a whole; and public and private institutions as whole (Muñoz, 2012). It seems clear that, due to so many partial and, sometimes, opposite definitions, the difficulty in distinguishing what is rural from what is urban, both quantitatively and qualitatively, is almost a more intuitive issue than a discursive one, according to the bibliography review (Brennan et al., 2008; Svendsen, Sørensen, 2007; Lee et al., 2005; Bridger, Luloff, 1999; Braden, Mayo, 1999)

The reality of rural areas in Europe exhibits many important regional imbalances of different types and levels (EC, 2010a). The permanent character of these regional disparities has increased since the recent enlargement of the EU and the need to advance towards territorial convergence, propitiating the inclusion of the principle of territorial cohesion in the EU objectives (art. 158 del Tratado de Lisboa). Territorial cohesion has become an important issue in EU policies and a priority in the legislative proposals of the cohesion policy for the period 2014-2020 (EC, 2011) (Sanchez-Zamora et al., 2014).

In this context of territorial disparities, it is clear that Europe's rural areas do not evolve homogeneously, confirming the existence of different spatial dynamics. The concept of rural territorial dynamics refers to the processes of development in the socioeconomic structure, the institutional framework, environmental capital in rural areas and the changes that accompany the effects of development (Rimisp, 2007). It could be said that there are two types of rural areas that coexist within the EU: those that have developed dynamics defined by strong economic growth, social cohesion and environmental sustainability, and those where the economic stagnation, depopulation and environmental degradation persist (Sanchez-Zamora et al., 2014).

In the last years, the increase in intensity of the changes and diversity of the dynamics that are occurring in rural areas have highlighted the need for research that can cope with the intellectual and political challenges that arise as a result of these issues. As a consequence, several projects have tried to distinguish between rural "leaders" and "laggards" in order to compare their characteristics and to identify factors that might explain these different processes of change (Sanchez-Zamora et al., 2014).

Some of the most important projects in Europe include the Study on Employment, Growth and Innovation in Rural Areas (SEGIRA) (EC, 2010b), European Development Opportunities for Rural Areas (EDORA) (Kahila et al., 2009, Copus et al., 2011), and Dynamics in Rural Areas (DORAS) (Bryden, Hart, 2004). Beyond Europe's borders, one of the most important projects in Latin America is the Rural Territorial Dynamics Project (Rimisp, 2007). In this regard, several authors have tried to identify the key factors that influence the dynamics of territorial development from an economic perspective (Terluin, 2003; Agarwal, et al., 2009), social (Putnam, 1993; Whiteley 2000; Nelson, Sampat, 2001; Kahila et al., 2009) and environmental perspective (Hoggart et al., 1995; Courtney et al., 2006; Langlais, Tepecik, 2009).

1.2. Objectives

The accelerated worldwide urbanization progress over the last few decades has given rise to the consolidation of an uneven pattern of concentration, that is to say a heterogeneous population distribution over a geographical space, thus creating territorial imbalances (United Nations 2008; Prieto, 2011). The spatial intensity and speed of recent changes in Spain and Portugal provides a paradigmatic example of the rapid shift to a new system of urban-rural relationship in the international basin of the River Tajo, based on a modified dichotomy between urban and rural areas (Stellmes et al., 2013). In this regard, our research fits into the studies which analyze recent changes in the population settlement system and its effect on the spatial organization of the urban network in the international basin of the River Tajo (Prieto, 2011).

The main objective therefore is to determine population flows in the Spanish-Portuguese municipalities of the international River Tajo basin. This objective is complemented by more specific ones, such as: a) Calculating the current rurality

index of the basin; b) Assessing the current evolution of the population (2001-2011); c) Analyzing population structure; d) Drawing up a predictive model for population evolution starting from the analysis of the current population.

2 Materials and methodology

2.1. Area of Research

The international basin of the River Tajo is the third largest in the Iberian Peninsula, spreading over an area of some 88,700 km2: 55,800 km2 (69%) belong to Spain and roughly 24,900 km2 (31%) are in Portugal. The international basin of the River Tajo is the longest river in the Peninsula, with 827 km. in Spain, 230 km. in Portugal and 43 km making up the border between the two countries, which gives a total of 1,100 km. (Fig. 1).

Over 12 million people rely on the international basin of the River Tajo for their urban water supply, of whom nearly 8 million are to be found on the Spanish side, while more than 4 million are located in Portugal.

It should be pointed out that both national capital cities in the Peninsula rely on the basin, as well as Europe's main transfer channel. In Spanish territory, 120,000 ha. of public irrigated land and 110,000 hectares of private irrigated land receive this water supply (HISPAGUA 2014).

2.2. Methodology of work

The methodological approach of this research is quantitative. An analysis of spatial distribution of the population located in the international basin of the River Tajo is performed. Starting from censual data we try to reproduce the make-up of the population system of the latest demographic census (2011).

One of the ways of presenting the results of municipal censual data is by grouping localities according to their population size. To this effect, 5 population strata were defined, thus achieving representation of all the municipalities in the international basin of the River Tajo: under 500; 501 to 2000; 2001 to 5000; 5001 to 10000 and over 10000 inhabitants (Mora et al., 2015a).
This paper will also analyze the current evolution of the population along the international basin of the River Tajo in a period spanning from 2001 to 2011. In this regard, we are using as main data source the national censuses of the populations of Spain and

Portugal. Bearing in mind Lindenboim and Kennedy's (2003) recommendations, we will work with revised, therefore definitive data.

In order to find out upcoming trends in that population, a predictive model of demographic evolution will be performed, bearing in mind demographic variables and ageing of the current population along the international basin of the River Tajo (Requés, Rodríguez, 1996).

This paper is supplemented by the application of the database into a Geographical Information System (GIS), in order to establish both spatial and temporal dynamics and their expression in the international basin of the River Tajo (López, Pérez, 2005; Prieto, 2011; Mora et al., 2015b).

3 Results and discussion

3.1. Grouping of localities by population size

Within the basin taken as a whole, most of the municipalities are small-sized ones, since 68.28% of them have a population under 2,000. On the contrary, the most populated centres (more than 10,000) represent 11.44% of the whole (Table 1).
Going into a more in-depth study of both demarcations, most of the municipalities are in the Spanish demarcation. Overall, 1,020 of the 1,119 municipalities which have the international basin of the River Tajo as their axis are Spanish: 91.15% of the whole.

Most of the municipalities on the Spanish side are small-sized ones, since 74.90% of them (764 municipalities) have fewer than 2,000 inhabitants (Table 2). These population centres are chiefly to be found on the west side of the basin, Cáceres province and the south of Salamanca, while localities in the provinces of Guadalajara and Cuenca stand out on the eastern side. It is to be noted that among the towns in the western side, the most numerous populations range from 501 to 2,000 inhabitants, while in the east, populations with fewer than 500 inhabitants are the majority.

On the contrary, the most populated localities (more than 10,000 inhabitants) are the least represented, since they are only 6.47% of the whole (66 municipalities) (Table 2). These municipalities are to be found in the central part of the basin, where the city of Madrid stands out with all of its metropolitan area (Alcalá de Henares, Alcorcón, Coslada, Móstoles, among others). However, other

important localities such as Talavera de la Reina, Plasencia o Cáceres must be noted.

In the Portuguese demarcation we find 99 of the 1,119 municipalities which the international basin of the River Tajo urban system includes, accounting for 8.85% of the whole. As opposed to the Spanish localities, the Portuguese ones are characterized by the fact that most of the municipalities have a population over 10,000, which constitutes 62.63% of the whole (Table 3). Nearly all the most populated municipalities are gathered at the mouth of the Tajo, where Lisbon, Portugal's capital, and all its metropolitan area (Sintra, Amadora, Cascais, among others) is located. Nonetheless, Castelo Branco and Fundão o Covilhã are also worthy of mention in the north of the demarcation, while population centres like Estremoz or Montemor-o-Novo stand out in the south.

On the other side we can find the least representative municipalities in the Portuguese demarcation. There are some whose population ranges from 2,001 to 5,000 inhabitants, which constitutes 19.19% of the whole (19 municipalities), and there are others whose population varies between 5,001 and 10,000 inhabitants, representing 18.18% of the whole (18 municipalities) (Table 3). As a kind of paradox, it is to be noted that there is no locality with fewer than 2,000 inhabitants in the Portuguese demarcation, while on the Spanish side these municipalities constitute 74.90% of the whole (Table 2). However, it must be pointed out that the Portuguese population system is very different from the Spanish one, since municipalities there consist of many minor local entities, called *freguesias*, and many of them have far fewer than 2,000 inhabitants.

3.2. Population size by number of inhabitants

Altogether 12,276,941 people live in the international basin of the River Tajo, of whom 7,879,123 inhabitants (64.18% of the whole) dwell on the Spanish side and 4,397,818 inhabitants (35.82% of the whole) are settled on the Portuguese side. As for the whole of the basin, roughly 11 million people (88.86%) are settled in municipalities with more than 10,000 inhabitants, while just 651,503 people (2.86%) live in localities with under 2,000 inhabitants (Fig. 2).
64.18% of the whole basin population (7,879,123 inhabitants) live in Spain. Most of the population is gathered in towns of over 10,000 inhabitants, since they represent 85.17% of the whole (6,710,363 inhabitants). The three largest towns are Madrid, with 3,265,038 inhabitants, Móstoles, with 205,015

inhabitants, and Alcalá de Henares, with 203,686 inhabitants, coming to 3,673,739 inhabitants, which makes up 46.63% of the whole population dwelling on the Spanish side of the international basin of the River Tajo (Table 4). However, just the city of Madrid accounts for 41.44% of the whole, since it is the Peninsula's largest city.

On the other hand, the population living in municipalities ranging from 5,001 to 10,000 inhabitants comes to 405,863 people, making up 5.15% of the whole. The 411,394 inhabitants (5.22% of the whole) living in municipalities ranging from 2,001 to 5,000 dwellers come next, while the least numerous group of population is in localities smaller than 2,000 inhabitants, since they only include 351,503 people, which means 4.46% of the whole population in the Spanish demarcation of the international basin of the River Tajo (Table 4).

The same applies to the Portuguese demarcation as to the Spanish demarcation, since we can observe 95.49% of the population (4,199,429 inhabitants) is settled in centres larger than 10,000 inhabitants. The three largest cities are Lisbon, with 2,821,699 inhabitants, Sintra, with 377,837, and Cascais, with 206,429 inhabitants, altogether coming to 3,405,965, which accounts for 77.44% of the whole of the demarcation (Table 5).

On the contrary, 126,426 people live in localities ranging from 5,001 to 10,000 inhabitants, which represents 2.8% of the whole, followed by the 71,963 inhabitants (1.64% of the whole) dwelling in municipalities smaller than 5,000 inhabitants. It should be pointed out that, unlike on the Spanish side, on the Portuguese side there is no locality with fewer than 2,000 inhabitants, (Table 5).

Nonetheless, as mentioned in the previous section, it must be pointed out that the Portuguese population system is very different to the Spanish one, since municipalities there consist of many minor local entities, called *freguesias*, and many of them are smaller than 2,000 inhabitants.

3.3. Evolution of the current population (2001-2011)

The international basin of the River Tajo has experienced a population growth of 12.73% between 2001 and 2011, which represents an increase of 1,386,327 people. However, this growth has been uneven on both sides of the border, since

in the Spanish demarcation it was 18.64% (1,237,760 inhabitants), whereas on the Portuguese side it was 3.50% (148,567 inhabitants) (Fig. 3).

The largest towns in the basin are Madrid, Lisbon and Sintra, with a total population of 6,464,574, accounting for 53.52% of the whole of the basin. It must be noted that Madrid and Lisbon, the two peninsular capitals, are sited in the basin, and, along with their respective metropolitan areas, they induce a large economic attraction on the population.

As regards demarcations, growth has been higher on the Spanish side, at 18.64%. However, we can observe that demographic growth of the population during the decade under study takes place mainly in Madrid's metropolitan area, since the rise in the Spanish capital was lower than 10%, while adjoining localities go beyond 20%, even taking into account the provinces of Toledo and Guadalajara. This is due to the fact that the cost of housing has soared in recent years, causing many families or groups of young people to choose to live outside the capital, where land prices were more affordable.

Additionally, the three most populated cities on the Spanish side belong to the Community of Madrid: Madrid, Móstoles and Alcalá de Henares, totalling a population of 3,637,739, which represents 46.63% of the whole demarcation.

On the Portuguese side there has been a 3.50% growth, almost all of it around the mouth of the international basin of the River Tajo. It can be observed that the Portuguese capital has lost population, while its metropolitan area has benefitted. This may be due to the high cost of housing in the city, which makes younger population groups with children choose to live in the adjacent municipalities, where the price of housing is lower. As a result, the fastest growing towns are Mafra, 41.07%, and Sesimbra, 31.76%.

The three most populated cities in the Portuguese demarcation belong to the Lisbon area: Lisbon, Sintra and Cascais, totalling 3,405,965 inhabitants, which accounts for 77.44% of the population. This percentage is much higher than on the Spanish side, where the three most populated cities account for 46.63%.

3.4. Population structure

Looking at the population pyramid of the international basin of the River Tajo in the year 2011 we can observe a predominance of the female gender (400,000 more women than men), with a masculinity ratio of 93%[2] (Fig. 4)

However, the number of females is not always higher all across the pyramid. During the first years there are more males, since more boys than girls are born (106 boys for every 100 girls), as can be seen in the pyramid's longer bottom bar on the male side. From that point on, the balance steadily increases as we rise in the age groups within the population pyramid. It can be observed that, from 25 years of age onwards, women start to predominate across the cohorts of the pyramid, even doubling the number of men in the final cohort (>85). This is due to a higher female life expectancy: 84 years as against 78 years for men. Higher life expectancy is women is due to male mortality because of biological, working and social reasons (a life style more exposed to risk factors) (Fig. 4) (INE 2001).

The basin's population pyramid is clearly bulb-shaped, with a narrow base, indicating progressively decreasing cohorts, due to a low birth rate, and a peak with wider steps showing a large adult population, because of higher life expectancy. We can therefore confirm that we are dealing with an ageing population, a trait of developed societies.

Following an age-group analysis we find a large number of people in the population group over 65. In this group, we can observe a clear predominance of females (58.53% of the whole population over 65), as opposed to the male group, due to higher female lifespan and the high rate of emigration, consisting mainly of males, which significantly affected the localities in the international basin of the River Tajo (INE 2001).

Most of the basin's population (67.16%) is adult (16-64 years). In this group, the most significant demographic issues could be, first of all, the increase in birth rate following the so-called baby boom of the 1960s and early 1970s. The cohorts born between the years 1957 and 1975 (35-54 years) fit into this boom. This phenomenon was caused by the economic growth of the country from the late 1950s till the mid 1970s.

The second demographic aspect to be considered regarding the adult population group is the indent affecting the pyramid starting from the 30-34 year (1977) age cohort, as the bar length starts decreasing due to lower fertility. This is a consequence of the important political, social and economic transformations happening both in Spanish and

Portuguese societies from 1975 and 1974 onwards respectively (INE 2011).

The group of young people (0-14 years) is very small, since it only contains 15.22% of the basin population, due to the lower fertility mentioned above. This has meant that the young population has decreased by cohorts since 1977, thus having a direct impact on the ageing of the population and putting generational replacement at risk. However, it must be noted that cohorts ranging from 0 to 14 years have experienced a significant increase, and so we can observe that 10-14 age group is larger than the preceding one (15-19 years), which may be due to the economic kick-start in 1998, when the Spanish production model changed as a result of soil liberalization. This factor made the Spanish economy rise sharply in following years (up to 2008), drawing a large number of young immigrants, and leading, as a result, to the rejuvenation of the population. This explains the fact that the 35-39 cohort is the largest of the basin. The arrival of population of a childbearing age from other countries has led to the birth rate rising again, breaking with the previous years' trend, as can be seen in the 0-9 cohorts.

In conclusion, the pyramid corresponding to the international basin of the River Tajo population reveals an ageing population, a characteristic trait of developed societies. The causes for this ageing of the population must be sought in a very low birth rate and high life expectancy. The first cause is an outcome of changes in ways of thinking (secularization of society, transformation of family customs, incorporation of women in the work market, availability of contraceptive methods, etc.), the economic crisis which affected the developed world from 1973 onwards (oil crisis), cultural changes (longer years of study) and improvement in the population´s standard of living, all factors that, since the mid seventies, have brought about a substantial decrease in fertility.

The ageing of the population, as the dependency ratio increases, may pose, in the mid- to long term, some problems as to the viability of the current social care systems, especially when it comes to pensions, as well as medical and healthcare aspects. However, this is more an economic question than a demographic one, since, as employment increases, the dependency ratio can be lowered with the arrival of young immigrants who provide the system with higher income via their social security contributions.

An increase in ageing is foreseeable, since people ranging from 55 to 64 years (11.23% of the entire population) are the ones to reach pensionable age in the short to mid term. The problem with ageing is not so much a gradually higher number of people over 65 people, as a gradual decrease in young population. However, the increase of the birth rate over the last few years gives new hope for the rejuvenation of the population living in the basin, since generational replacement, a very necessary factor in sustaining the current standard of living, can take place.

3.5. Predictive models of population evolution (2023)

If the current the international basin of the River Tajo demographic trends persist, the population will become stagnant or with slight growth over the forthcoming years, since, in spite of the higher birth rate over the last few years, the population over 65 will continue to grow larger, because the large baby boom generations will start to reach retirement age. Nonetheless, the international basin of the River Tajo is dynamic economically, and consequently it might draw young population from other territories, which would cause rejuvenation of the population.

Life expectancy for the year 2022 is estimated at around 81.8 years for men and 87 years for women, which represents an increase of 2.5 and 1.9 years respectively from current values. At the same time, by 2022, life expectancy for 65 year-olds will have increased by up to 20 years for men and 24.1 years for women, which would cause excessive ageing of the older population. This fact will lead to a rise in the rate of mortality, due to the increasing number of older population in the higher age groups. However, it must be noted that most of the population of both Madrid and Lisbon, along with their metropolitan areas (the most populated places in the basin), stem from the rural exodus which affected both countries during the 60s and 70s, and a great deal of that human capital which moved to the cities to work in industry is likely to return to their hometowns on retiring. This fact, along with the arrival of young population to fill the posts of those who retire, will alleviate the ageing rate of the whole basin (INE 2014).

Unless the current demographic model changes, one of the possible effects is that the number of deaths will exceed births by 2023, which would mean a negative natural increase, mainly due to the lower birth rate. By age groups, the 2023 population would fall into the age brackets between 20 and 49,

while population would rise across the upper part of the population pyramid. As a matter of fact, all the age groups over 50 would grow in number.

The consequences of population-ageing will pose a challenge to society in the future, since the current demographical changes are going to require some social, economic and political reforms, as dictated by the ageing process. This may account for a direct impact on the increase in healthcare budget, social benefits and disability allowance, due to the larger number of retired people and the smaller active population, since one worker for each pensioner has been estimated for 2023, which might be setting at risk the sustainability of the system (Mora, Mora, 2015).

This situation may be reversed, provided that the demographic model changes and that is why childbearing-boosting politics should be encouraged. These would bring about a decrease in the ageing rate. Nonetheless, this should come hand in hand with greater economic development, quite the opposite of the current situation; this development could cause an increase in immigration, so rejuvenating the population structure of the basin.

3.6. Rurality index

Over the last century several different rurality indexes have been created, taking into account the conditions of each country (Zamudio et al., 2008). The Spanish Ministry for Agriculture, Fisheries and Food defines as *predominantly rural* those municipalities with fewer than 2000 inhabitants, *average rural* those ranging from 2000 to 10000 inhabitants, and *urban* those centres with more than 10,000 inhabitants.

As regards this paper, the *predominantly rural* definition applies to those municipalities with fewer than 5000 inhabitants, since we considered that this suited better the traditional settlement model in Spain and the Law providing the Bases for Local Regulation[1]. The *average rural* definition serves for those municipalities ranging from 5000 to 10000 inhabitants, which usually have more facilities; while the *urban* definition applies to municipalities with more than 10000 inhabitants. This adjustment of established parameters has been made in order to achieve a greater match with reality in the municipalities of the international basin of the River Tajo.

The municipalities in the international basin of the River Tajo have a predominant rurality index, but it is to be noted that other indexes such as average rural and urban index bear considerable weight on the west and centre of the basin.

The Spanish demarcation of the basin possesses most of the rural index municipalities, and they are mostly to be found in the east (provinces of Cuenca and Guadalajara) and west (Toledo, Cáceres, South of Ávila and Salamanca). On the other hand, rural index localities are the least representative as a whole in the Portuguese demarcation, showing the disparity on both sides of the border (Fig. 5).

The urban index municipalities are those with more than 10,000 inhabitants. These localities are more representative on the Portuguese side, where municipalities like Castelo Branco, Abrantes, Santarém, Lisboa or Sintra stand out. However, the urban index carries less weight on the Spanish side, although the most noteworthy urban centres are Madrid and all of its metropolitan area, Talavera de la Reina, Plasencia or Cáceres, among others (Fig. 5).

Such a disparity between the rural and urban worlds has increased over the previous decade (2001 to 2011), since, although the international basin of the River Tajo population has expanded demographically, this has not happened evenly, making this contrast stronger. This imbalance is due to the fact that the fastest growing localities are the capitals of province and their adjoining municipalities. We can take as examples Madrid and all its area of influence (provinces of Toledo and Guadalajara), Talavera de la Reina, Plasencia or Cáceres on the Spanish side; Castelo Branco, Benavente, Lourdes, Cascais or Sintra on the Portuguese side. On the contrary, where population has been lost is in the eastern municipalities of the basin (provinces of Cuenca and Guadalajara) and on the western side, precisely in those municipalities where the rural index is dominant (Fig. 5).

4 Conclusions

Altogether 12,276,941 people live in the international basin of the River Tajo, spreading over 1,119 municipalities; about 68% of them have a population under 2,000, although just 2.86% of the population live in these municipalities. On the contrary, 88.86% of the total population live in municipalities over 10,000. Thus we can conclude

that the international basin of the River Tajo presents a very disperse spatial distribution of the population, which alternates population 'deserts' with average and high population concentrations in the most relevant population nuclei in the territory i.e. district market-towns and regional and provincial capitals.

It can be deduced from the population analysis of the last decade that municipalities belonging to the international basin of the River Tajo have a predominant rurality index. However it must be noted that other indexes such as average rural and urban carry considerable weight too. This disparity between rural and urban environments has increased over the previous decade, since, although the population of the international basin of the River Tajo as a whole has grown demographically, it has not been a balanced growth, which has led to an accentuated demographical contrast. This imbalance is due to the fact that provincial capitals and their adjoining municipalities have grown the most during the decade under study.

The population pyramid of the international basin of the River Tajo represents an ageing population, a characteristic trait of developed societies, due to the low birth rate and rising life expectancy. If current demographical trends persist, the existing social protection system will be compromised, especially with regard to pensions, since for the year 2023 it has been estimated there will be one worker for every pensioner, which would jeopardize the sustainability of the system. Nonetheless, the international basin of the River Tajo has strong dynamics in economic terms, since it comprises two country capitals (Madrid and Lisbon), and it may consequently attract from other territories a young population searching for better working conditions, which could lead to a population rejuvenation.

5 Considerations

The peculiarities of the distribution of the international basin of the River Tajo population make it hard to achieve viable territorial planning successfully. We can observe a population system that has little to do with the current economic structure, and whose scattered nature and demographic weakness complicate provision of services, infrastructure endowment and sustainment of a minimal economic activity.

Faced with such a situation, the structuring of the international basin of the River Tajo territory must find a balancing point between the preservation of rural spaces (trust-holders of great eco-cultural wealth) and decision making in order to obtain more or less significant changes, both at a qualitative and a quantitative level.

All this process must inevitably rest upon empowerment of the network of the functional area nuclei, breaking with the demographic and economic weakness that has characterized them to date, and turning them into centres fit to give intermediate public services to their areas of influence and make use of them in turn as a framework for commercial activities.

Overcoming the difficulties in achieving a balanced territory in regard to population distribution, and referring the concept of balance to a new model of rurality, whose definition requires urgent attention, will call for a broad socio-political consensus based on solidarity and the unity of regional space (López, Prieto, 1999).

Notes

1. The April 2 Law 7/1985, providing the Bases for Local Regulation, in article 26, stipulates:

1. *Stand alone or conjoint municipalities will provide, in all cases, the following services:*
   a) *For all Municipalities:*
      Public street lighting, cemetery, rubbish collection, street cleaning, household drinking water supply, sewage network, access to population centres, surfacing of public roads and food and drink control.
   b) *For Municipalities with a population over 5,000, they will also provide:*
      Public park, public library, market and waste treatment.

2. Defined as number of men for every 100 women dwelling in the international basin of the River Tajo January 1st 2011. RM = Men/Women*100

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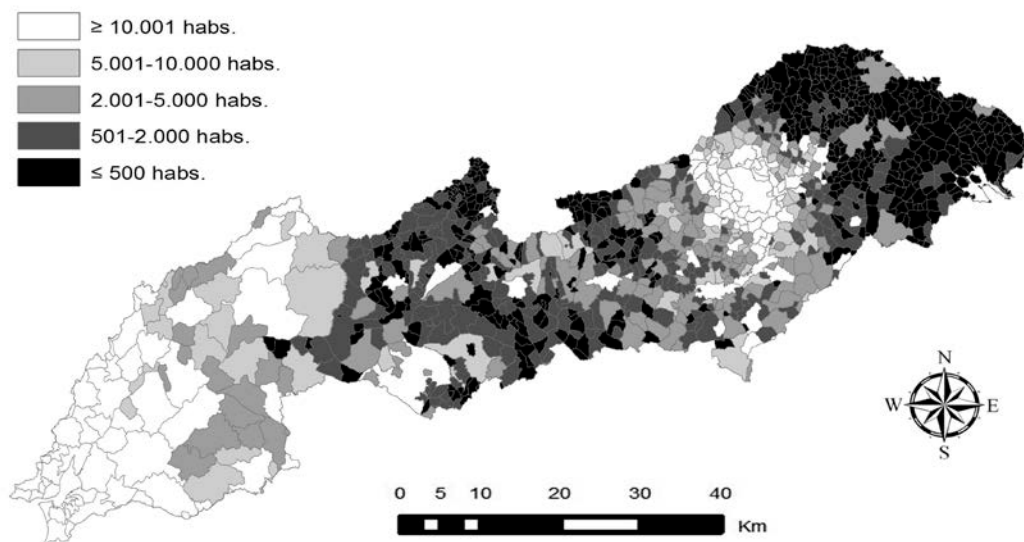
Figure caption:

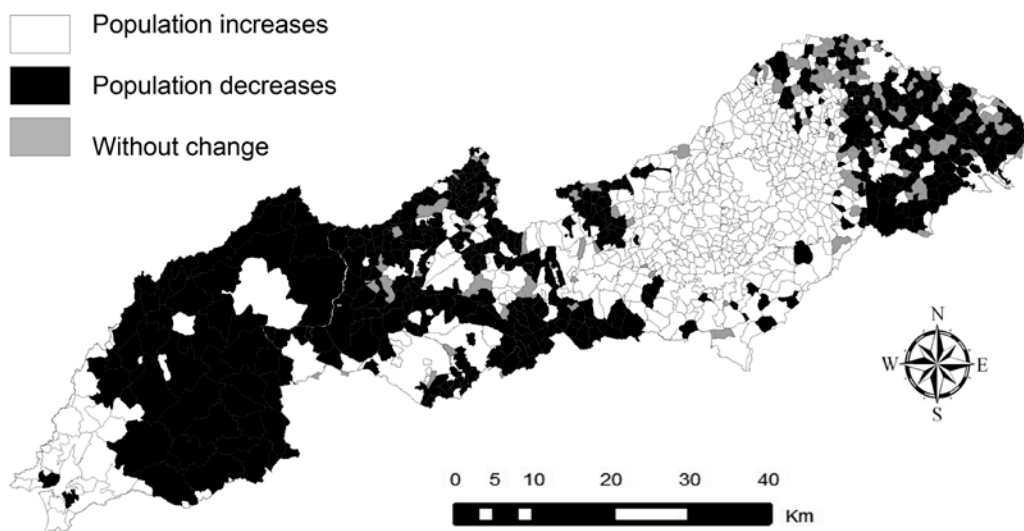Fig. 1. The international basin of the River Tajo location map.
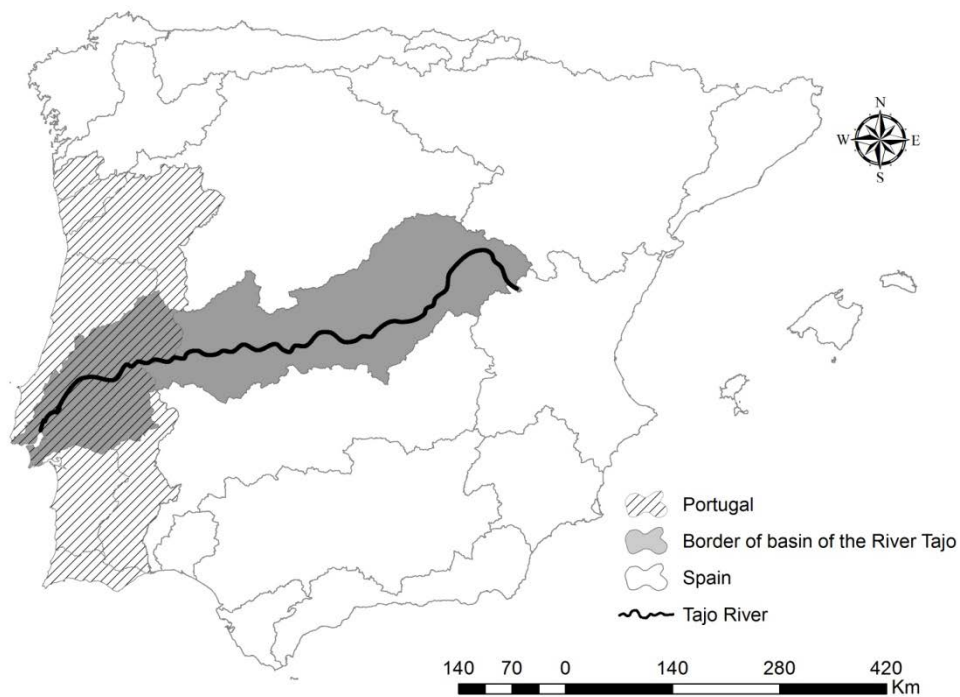
Source: Compiled by author from NCGI (National Centre for Geographic Information) data.

Fig. 2. Map representing the spatial distribution of municipalities by number of inhabitants.

Source: Compiled by author from INE-ES-PT data, 2011 and NCGI (National Centre for Geographical Information) data.

Fig. 3. Map of population evolution in towns in the international basin of the River Tajo for the period 2001-2011.
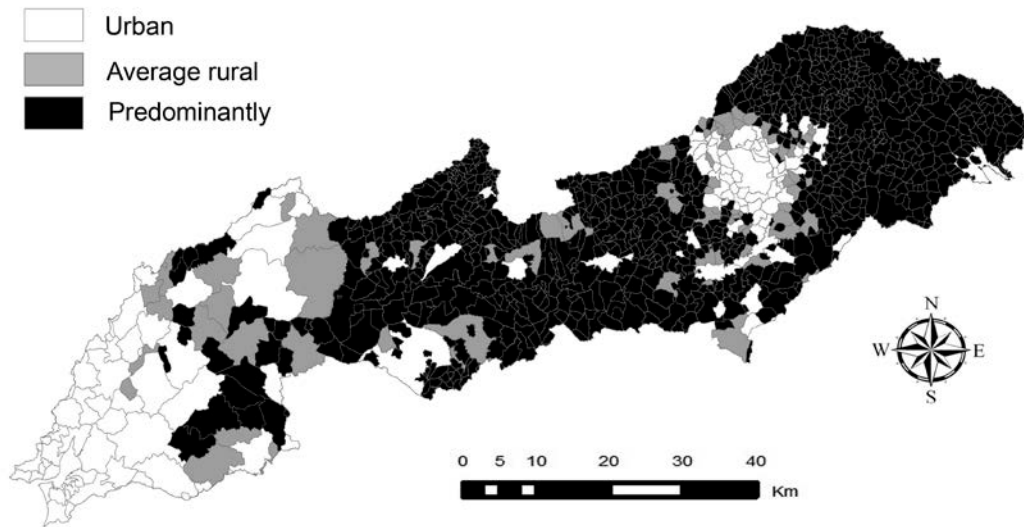

Source: Compiled by author from INE-ES-PT data, 2011 and NCGI (National Centre for Geographical Information) data.

Fig. 4. Population pyramid of the international basin of the River Tajo (2011)

Source: Compiled by author from INE-ES-PT data, 2011.

Fig. 5. Map of rurality index for towns in the international basin of the River Tajo.

Source: Compiled by author from INE-ES-PT data, 2011 and NCIG (National Centre for Geographical Information).

Table caption:

Table 1. Percentage of the number of Spanish and Portuguese municipalities in the international river basin of the river Tajo, according to population size.

Population	Number of municipalities			Municipalities %				Municipalities %		
	Total	Spain	Portugal	Total	Spain	Portugal		Total	Spain	Portugal
Under 500	515	515	0	46,02	50,49	0,00		100,00	100,00	0,00
501-2000	249	249	0	22.25	24,41	0,00		100,00	100,00	0,00
2001-5.000	152	133	19	13,58	13,04	19,19		100,00	87,50	12,50
5.001-10.000	75	57	18	6,70	5,59	18,18		100,00	76,00	24,00
Over 10.000	128	66	62	11,44	6,47	62,63		100,00	51,57	48,43
Total	1.119	1.020	99	100,00	100,00	100,00		100,00	91,16	8,84

Source: Compiled by author from INE-ES-PT data. 2011.

Table 2. Percentage of the number of Spanish and Portuguese inhabitants living in the international basin of the river Tajo, according to population size.

Population	Number of municipalities			Inhabitants %			Inhabitants %		
	Spain	Portugal	Total	Spain	Portugal		Spain	Portugal	Total
Under 500	91.439	0	91.439	1,16	0		100	0,00	100,00
501-2000	260.064	0	260.064	3,30	0		100	0,00	100,00
2001-5.000	411.394	71.936	483.330	5,22	1,64		85,12	14,88	100,00
5.001-10.000	405.863	126.426	532.289	5,15	2,87		76,25	23,75	100,00
Over 10.000	6.710.363	4.199.429	10.909.792	85,17	95,49		61,51	38,49	100,00
Total	7.879.123	4.397.818	12.276.941	100	100		64,18	35,82	100,00

Source: Compiled by author from INE-ES-PT data. 2011.