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Lisbon and Lisbon Metropolitan Region: population context at the core of the Urban Food System

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Abstract

The food system has traditionally been viewed as a system linked to primary production and therefore as an essentially rural theme. In recent years, it has gained relevance within the discourse on resilience and urban sustainability due to its crucial role.

Population dynamics at national level, as well as the internal dynamics of urban areas necessarily condition the organization of food systems since ensuring the food security of growing urban, non-productive, populations implies the implementation of Sustainable and Resilient Urban Food Systems (SRUFS) able to meet the demand and adapt to different population movements.

This depends on the structure and distribution of production activities, on the distribution and consumption network, its access to and use of quality food in amounts adequate to an active and healthy life, in accordance to the preferences of the population.

Keywords: Urban Food System, Lisbon, production, distribution, resilience.

Full Paper

1. Introduction

The analysis of distribution dynamics of the world population evidences a trend towards intensified urban processes. According to the report by the United Nations (UN, 2014).

According to Walter Christaller (1933) and August Lösch's (1940) central place theory, a central place is a settlement that provides functions that meet population demands. The urban function is any type of institution, service, etc. that serves a specific population (FORBES, 1972).

The food system, as an essential urban function, has specific features and multilevel functions:

Space - between the urban centres and the production areas located outside the urban centres;

Institutional - among the distribution activities, which establish flux circuits and access point network and the consumption points; and between these activities and the waste management systems that contribute to the sustainability of the system.

Food Systems, as essential urban functions, have not traditionally been considered in the strategies and policies of urban planning and territory organization within the urban context. This contributes to the false sense of food security, mainly in the developing countries, where there are usually no restrictions to physical and economic access to food (VEENHUIZEN, 2006; POTHUKUCHI, 2000).

However, current population dynamics (increase in the world population and a growing population urbanization) raise important issues as to the organizations of food systems and their ability to ensure food security to the world population and to the urban populations in particular (CRUSH & FRAYNE, 2011). Our discussion will focus on this issue.

Conceptually and methodologically, the analysis of food systems evidences the relation between the rural and the urban and offers partial visions of reality (OCDE, 2011).

Our analysis, developed within our PhD thesis on Urban Studies, aims to contribute to Urban Food Systems (UFS) being comprehensively understood, based on the existence of relevant continuity between the rural (productive) and urban (consumer) areas which is made evident in the fluxes between the two activities and reflect the existence of a functional region (KARLSSON & OLSSON, 2006).

Population dynamics at national level, as well as the internal dynamics of urban areas necessarily condition the organization of food systems since ensuring the food security of growing urban, non-productive, populations implies the implementation of Sustainable and Resilient Urban Food Systems (SRUFS) able to meet the demand and adapt to different population movements.

This depends on the structure and distribution of production activities, on the distribution and consumption network, its access to and use of quality food in amounts adequate to an active and healthy life, in accordance to the preferences of the population.

The SRUFS structure is a relational network whose intensity will impact sustainability and resilience of urban areas (and of the SRUFS in particular) .

The size and organization of the SRUFS essentially depend on two factors: the size and density of the population, which represents a demand level and determines the density of networks and access points (distribution), the amounts to supply (production) and for public or private consumption points (consumption).

We aim to provide a general idea of the structure of SRUFS in the Lisbon Metropolitan Region and raise issues regarding the potential to ensure food security to urban populations.

We will describe the population dynamics in Continental Portugal, in the Lisbon Metropolitan Region and in the Municipality of Lisbon, identifying growing urbanization processes and drawing attention to the existence of different internal dynamics and, lastly, linking the food production potential and a brief analysis of soil uses and the network of access point at the metropolitan level.

2. Population dynamics in Continental Portugal

Continental Portugal is located in the Iberian Peninsula, has an area of 89,102.14 Km and 10,047,621 inhabitants according to the 2011 Census.

Population Census from 1864 to 2011 allow us to conclude that the population in Continental Portugal almost doubled in this period and that this increase has been gradual, the exception to this will be mentioned later in the text (Figure 1).

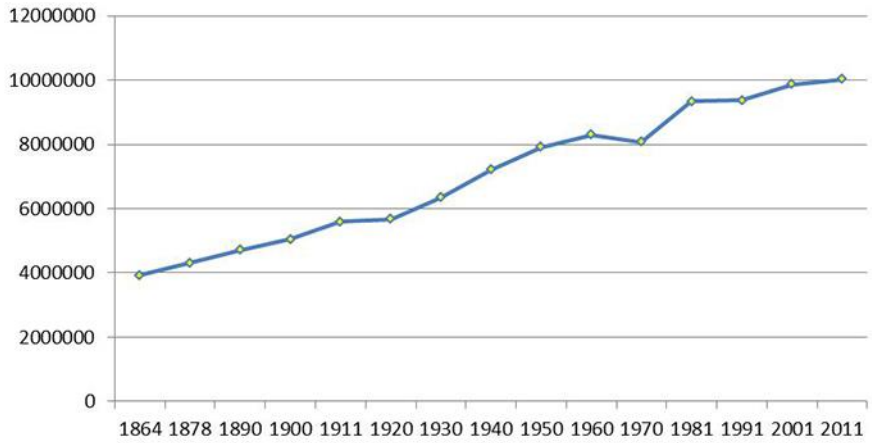

Figure 1. Population residing in Continental Portugal at the date of the Census

(Figure 1)

Source: INE, Population Census, Decenal

After the 2011 Census, estimations pointed to 9,839,140 residents in 2015, which is a 2.1% decrease when compared to 2011 (Figure 2).

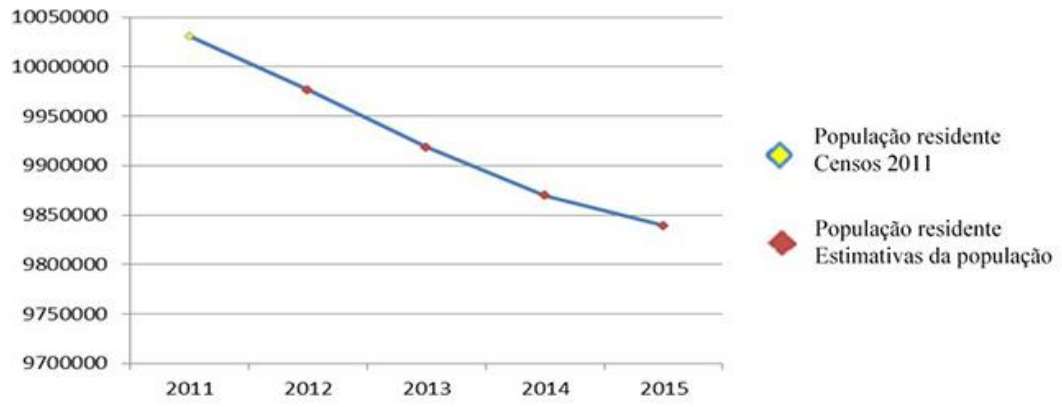

Figure 2. Resident population - population estimates

(Figure 2)

Source: INE, Population Census (2011) and Population Estimates

3. Population distribution

Based on the analysis of the population dynamics of Portuguese districts in three different Census: 1890, 1950 and 2011 (Figure 3), we may see that between 1890 and 1950 there is an increase in the population of the districts of Continental Portugal, a trend that is inverted in the second period.

In 1890, most districts north of the river Tagus have a population above

200,000 inhabitants, with the exception of the district of Bragança, which contrasts with the districts south of the Tagus, most of which have less than 200,000 inhabitants, with the exception of the district of Faro. The district of Setúbal is the only one that has less than 100,000 inhabitants (Figure 3).

The districts of Lisbon and Porto already have more than 500,000 inhabitants - 506,821 and 549,047, respectively. The population of the district of Porto is only larger than that of Lisbon in the 1900 Census. After this period.

The 1950 Census (Figure 3) evidenced an increase in the population in all the districts of Continental Portugal, though to different degrees.

The population of all the districts of Continental Portugal was above 200,000 residents. However, the population of districts north and south of the Tagus were very different. Those north of the river Tagus (except Bragança and Viana do Castelo) have more than 300,000 inhabitants, among those south of the Tagus, only Setúbal and Faro have more than that number.

In 1950, the population in the districts of Lisbon and Porto is 1,216,125 and 1,053,255, respectively. In the district of Braga, the population was above 500,000 inhabitants and in the districts of Coimbra, Aveiro, Viseu and Santarém it was above 400,000 inhabitants. (Figure 3).

The district of Setúbal has the highest population increase, doubling its population to 324,829 inhabitants.

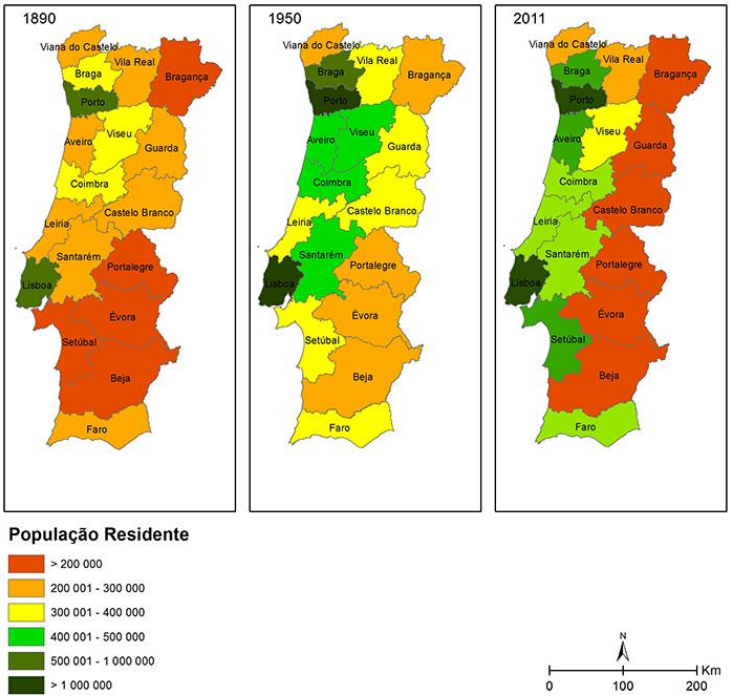

Figure 3. Population residing in the districts of Continental Portugal at the time of the 3 Census: 1890, 1950 and 2011

(Figure 3 DST_POP 1890; 1950;2011)

Source: INE, Census – Historical series

Between 1950 and 2011, there is a clear change in the population distribution patterns. The gap between districts north and south of the Tagus is lessened and the difference is now between coastal and inland districts, in particular those near the border with Spain.

During this period there is a decrease in the population of Continental Portugal.

The 1960s, when there is much immigration, marks the beginning of major changes in population dynamics in Continental Portugal.

From this decade on, all the districts near the border with Spain (except Faro) decrease in population - to less than 200,000 - while coastal districts (except Viana do Castelo) have a population above 400,000. The district of Setúbal has a significant increase in population and, in 2011, it has more than 500,000 inhabitants. (Figure 3).

Analysing the population variation in Continental Portugal in two periods 60 years apart allows us to identify the change in the population dynamics between 1890 and 1950 and between 1950 and 2011 (Figure 4).

Whereas in the first period (1890-1950), there is a population increase in all districts, in the second (1950-2011) the inland districts evidence a significant population decrease. Population only increases in the districts around the Metropolitan Regions of Lisbon and Porto and the district of Faro.

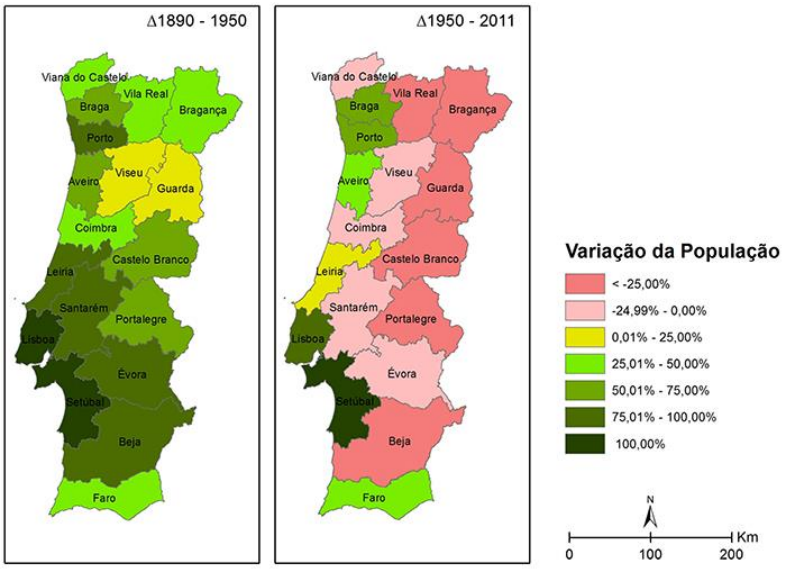

Figure 4. Variation of resident population per district in the periods 1890-1950 and 1950-2011

(Figure 4)

Source: INE, Population Census, Historical series

Therefore, between 1890 and 1950, the increase in population in the inland districts (to the north of Castelo Branco) is much lower than Continental Portugal (99.37%), though there is an increase in the districts of Viseu and Guarda (25%) and in Vila Real and Bragança (25-50%).

Among the coastal districts, only Faro and Viana do Castelo have a population increase lower than 50% between 1890 and 1950. The remaining districts increase their population in more than 50%. The most significant variations are those in the districts of Lisbon, Porto and Setúbal.

In the sixty years between the 1890 and the 1950 Census, the populations of Setúbal, Lisbon and Porto increase by 205.83%, 139.95% and 91.83%, respectively. The inland districts, and in particular those in the north, have the lowest increase - Viseu increases 23.89% and Guarda 21.35%.

In the second period, between 1950 and 2011, only 7 of the 18 districts continue to increase and those who do are coastal districts: Lisbon and Porto

(85.06% and 72.53% respectively), Braga (55.26%), Aveiro (47.82%), Faro (37.45%), Leiria (18.92%) and Setúbal (162.06%).

The 1960s is a turning point in the population dynamics of the districts of Continental Portugal.

The maps in Figure 6 show the population variation in the 1960s, 1970s and 1980s and are the result of specific events that have an impact in terms of population and are due to external events linked to the history of Portugal.

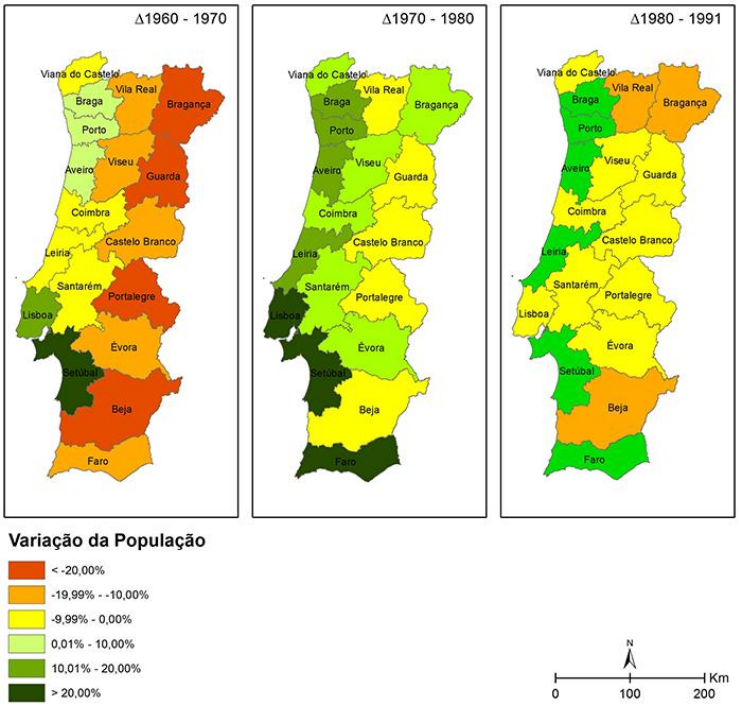

Figure 5. Variation of population in the districts of Continental Portugal in the 1960s, 1970s and 1980s.

(Figure 5)

Source: INE, Census – Historical series

In the 1960s, all districts in the continent had a significant decrease in their population dynamics. Only the districts of Porto, Braga and Aveiro (with an

increase under 10%), Lisbon (with a 13.41% increase) and Setúbal (that has again the highest population growth - 24.51%) have an increase.

The remaining districts lose population: Bragança, Guarda, Portalegre and Beja have the highest decrease. Bragança has a -22.17% variation and Beja -26.17%, much lower than the percentage of Continental Portugal as a whole, -2.62%.

This coincides with the war in the colonies and to immigration movements, especially from the inland districts, to European countries, and to major urban centres in the country.

Between the 1960 and the 1970 Census, the population decreases in about 220,000 inhabitants, which corresponds to a period of much immigration (from 30,000/year in 1950 to 173,000 in 1970). (LEWIS & WILLIAMS, 2015).

In the 1970, after the independence of the African colonies, there is a shift due to the return of about 1m Portuguese (LEWIS & WILLIAMS, 2015), which yet contributed to increasing the gap between coastal and inland districts in terms of population dynamics.

When we analyse the population variations in the districts (Figure 5) between 1970 and 1980, population is still decreasing in five inland districts. The variation is -10% to 0% in Vila Real, Guarda, Castelo Branco, Portalegre and Beja. The remaining districts evidence a population increase though much lower than before.

The districts of Faro, Setúbal, Lisboa, Leiria, Aveiro, Porto and Braga are those with a higher population increase. Leiria increases in 11.48 %, Setúbal 40.20%, Lisbon 31.98%, Porto and Faro about 20%, and Aveiro and Braga 14.26% and 16.33%, which is similar to the average increase in Continental Portugal, 15.63%.

After the 1970s, the population dynamics of the districts of Continental Portugal was resumed, the general trend being that of a slower population increase in coastal districts and a gradual decrease in the inland districts.

In the 1980s, Beja, Bragança and Vila Real decrease by 10.07%,

14.35 % and 10.62% respectively, and other nine municipalities lose population - between -0.81% in Lisbon and -8.49% in Guarda.

In the next two decades, the gap increases between coastal and inland districts in terms of population dynamics, with a slight improvement in districts such as

Faro, whose population grows in 15.76% in the 1990s, and 14.12% in the 2000s; the population of Lisbon increases in 4.05% and 5.36% in the 1990s and 200s0s, respectively; and the population in Setúbal grows 16.65% in 1991 and 7.96% in 2001.

In the 1990s and the 2000s, the population growth in Leiria, Porto and Braga is similar to the average in Continental Portugal, 1.81%.

The population in the district of Aveiro increases a little above average - 9.05% (the average is 5.26%) in the 1990s and below the average in the 2000s - 0.09% (the average is 1.81%).

3. Lisbon Metropolitan Area in the context of Continental Portugal

As stated, Continental Portugal evidences a trend to higher population density in coastal districts, which leads to higher urbanization processes in these areas.

Applying the first criterion for the definition of urban areas, population density, to the boroughs of Continental Portugal, is possible using the data from the census and the respective cartographic information supplied by INE for 2011 (BGRI 11), 2001 (BGRI 01) and 1991

(BGRE 91) iii.

The criterion of population density by TIPAU (typology of urban areas) 2014 defines 3 classes of population density - < 100 Inhab./km2, between 100 Inhab./Km2 and 500 Inhab./Km2 and >500 Inhab./km2. The analysis is conducted using the statistical subsections (FERRÃO, 2012).

Our analysis presents six classes so as to be able to understand the different urbanization levels.

The first class corresponds to the threshold defined by INE as “predominantly rural”. 100 Inhab. /Km2.

Those territory units with a population density between 100 and 500 Inhab/Km2 are classified as “moderately urban” and, when the population density is above 500 Inhab/Km2, they are considered “predominantly urban”.

In our analysis, the latter (population density above 500 Inhab/Km2) is subdivided into four classes because we consider there may be significant differences in the organization of urban centres with different population densities and in the organization of their food systems in particular.

The four classes are: centres with population density between 500 and 2,000 Inhab/km2, between 2,000 and 10,000 Inhab/Km2, between 10,000 and 20,000 Inhab/Km2 and above 20,000 Inhab/Km2.

In general, for the time of the three Census (Figure 6), the coastal municipalities have a higher population density. There are two highly dense areas in the Metropolitan Regions of Lisbon and Porto.

There are also some higher population density centres (above the threshold used to define predominantly urban areas) in some inland municipalities, in cities such as Castelo Branco, Guarda and Guimarães (Figure 6).

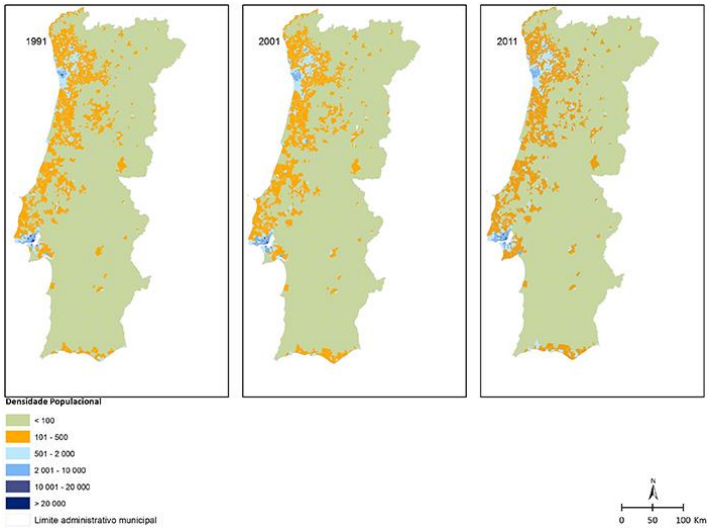

Figure 6. Population density in the boroughs of Continental Portugal at the time of the 1991, 2001 and 2011 census

(Figure 6).

Source: INE, Population Census, 1991, 2001, 2011

Analysing the data of the 2011 Census, the hundred most populated boroughs of Continental Portugal represent a total of 2,811,778 inhabitants (27.99% of the population in Continental Portugal) and 61 are located in the Lisbon Metropolitan Region.

The number of boroughs in the Lisbon Metropolitan Region that are included in the hundred most populated boroughs was 71 in 2001, 61 in 2011, the opposite occurring in the Porto Metropolitan Region – 18(2001) to 27 (2011) boroughs included in the 100 most populated in the same dates.

Analysis of the population density cartography at borough level in the years of the census - 1991, 2001 and 2011 - (Figure 6) evidences some stability in population densities, as well as some heterogeneity within the urban centres, namely in the Lisbon and Porto Metropolitan Regions, in which there are areas with very different population densities.

If we analyse the Lisbon Metropolitan Region in detail (Figure 7), we realize that there is a decrease in the population in the central boroughs and an increase in the peripheral boroughs, which may be in tune with the analysed trends - the loss of population of historical centres in Metropolitan Regions and urban sprawling.

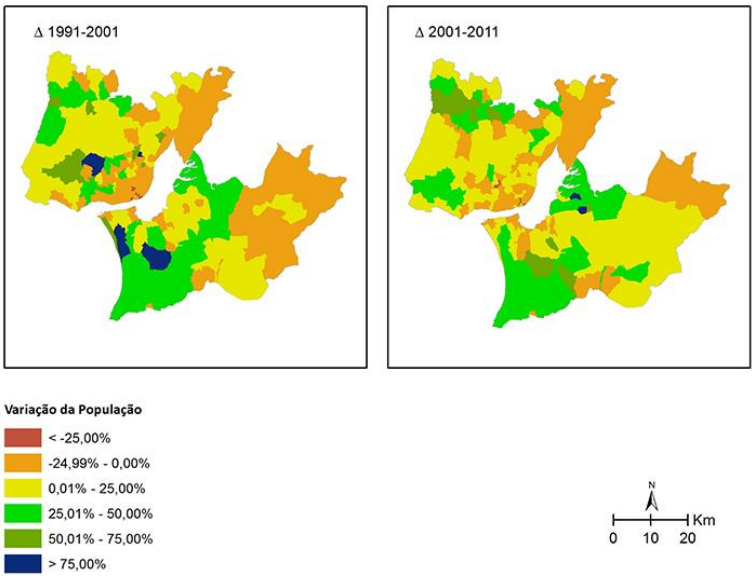

Figure 7. Variation of population in the boroughs of the Lisbon Metropolitan Region 1991-2001 and 2001-2011

(Figure 7) Source: Variations calculated based on population percentage by INE, Population Census

Analysing the population density of boroughs in the Lisbon Metropolitan Region (Figure 8) allows us to identify, as expected, the decrease in population in the central areas of the Lisbon Metropolitan Region corresponds to a decrease in

population density; yet, in the most peripheral boroughs, there is an increase in the population which is especially important in urban centre.

This dynamic is consistent with the fact that the Lisbon Metropolitan Region is an increasingly polycentric Metropolitan Region (HALL & PAIN, 2006).

The two dynamics - decrease in population in the central boroughs and increase in population in peripheral ones - has an impact in the organization of food systems.

On the one hand, they may lead to imbalances - either under or over dimension of access networks - and to adjustment processes that respond to demand levels and market areas and disregard the characteristics of the population, including the fact that the residents of historical centres are aging population and the appearance of food deserts in specific urban areas.

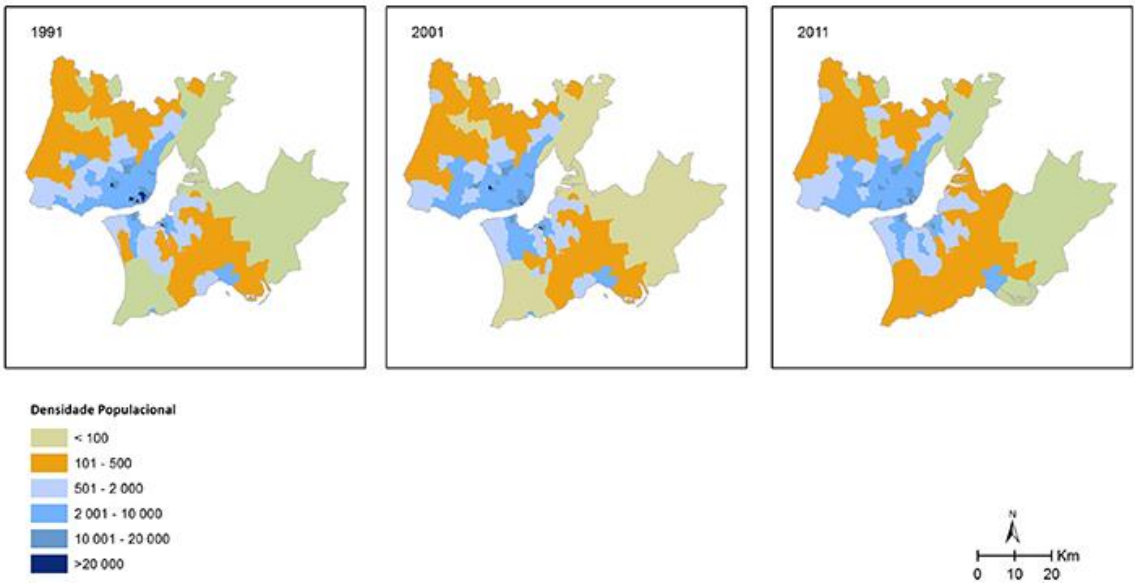

Figure 8. Population Density in the boroughs of the Lisbon Metropolitan Region

(Figure 8) Source: INE, Population Census, 1991, 2001, 2011

Analysing in detail the population density at statistical subsection level for the Lisbon Metropolitan Region (Figure 9), we realize that areas with a population density below 100 Inhab./K2 commonly coincide with areas with a population density above 10,000 Inhab/Km2.

Simultaneously, we can clearly identify a “centre” with a higher population density and in which low density areas (<100 Inhab/Km2) are not very

significant; an adjacent area with mostly moderately dense spaces (101 – 500 Inhab/Km2); and an outer area in which most spaces have low density and where high or very high population density spaces (101 – 500 Inhab/Km2) do not exist.

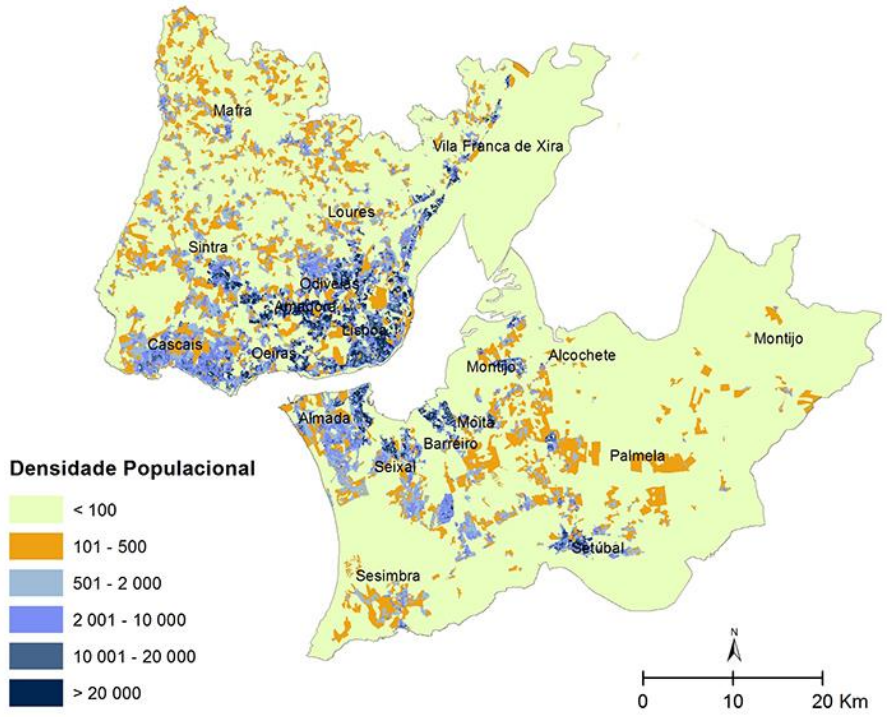

Figure 9. Population Density (statistical subsections). Details for the municipalities in the Lisbon Metropolitan Region (2011)

(Figure 9) Source: INE, BGRI 2011

The Municipality of Lisbon has been losing population since the 1991 census (Figure 10).

Between 1991 and 2001, the population of seven boroughs in the Municipality of Lisbon has been decreasing in more than 30% - São Tiago, São Miguel, São Cristóvão e São Lourenço, Santo Estêvão, Socorro, Santa Justa and Sé - and the population of four of the boroughs has been increasing - Carnide (in about 28.5%), Charneca, Lumiar and Encarnação (below 10%).

Between 2001 and 2011, the scenario changed slightly. Though the population of most boroughs has been decreasing, currently population has been increasing in fifteen of them, four of which in about 15%: Santa Justa, Ameixoeira, Carnide and Socorro.

As we can see, the population of most boroughs has been decreasing in more than 10%, in seven of them the decrease is higher than 20%. Sé, São Paulo, Santo Estêvão, Santiago, Encarnação and Castelo.

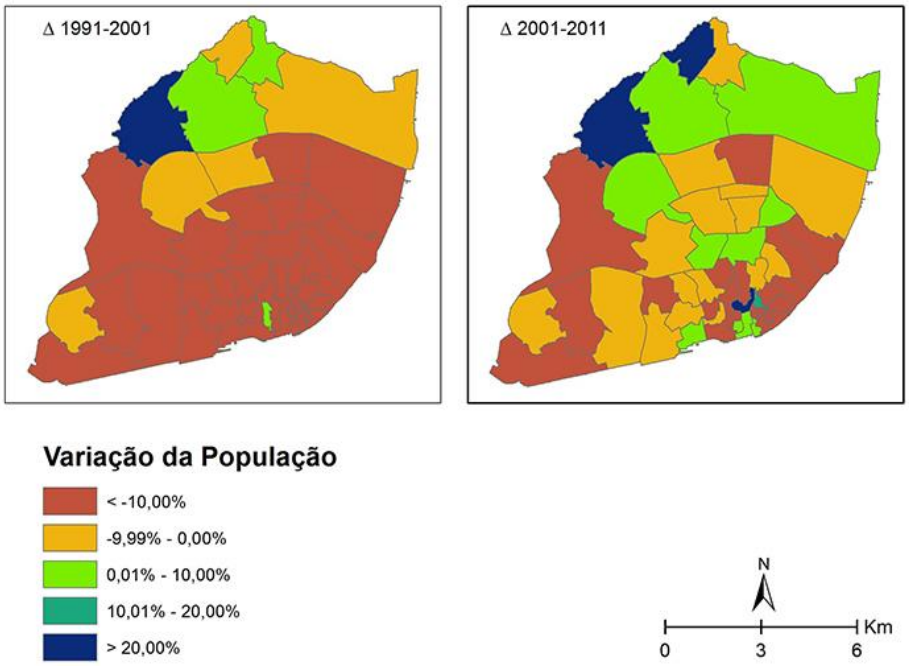

Figure 10. Variation of the Resident Population in the Boroughs of the Municipality of Lisbon.

(Figure 10).

Source: Variations calculated based on the data from the 1991, 2001 1 2011 Census

Though the decrease in population is slower in the boroughs in central Lisbon and there is even an increase in some (Santa Justa increases in 28% - 191 residents), the analysis to the population density at statistical section level (Figure 11) points towards an increase in intermediate density areas and a decrease in the high density ones.

The decrease in density of more central boroughs, which continue to lose significant number of people, is also evident.

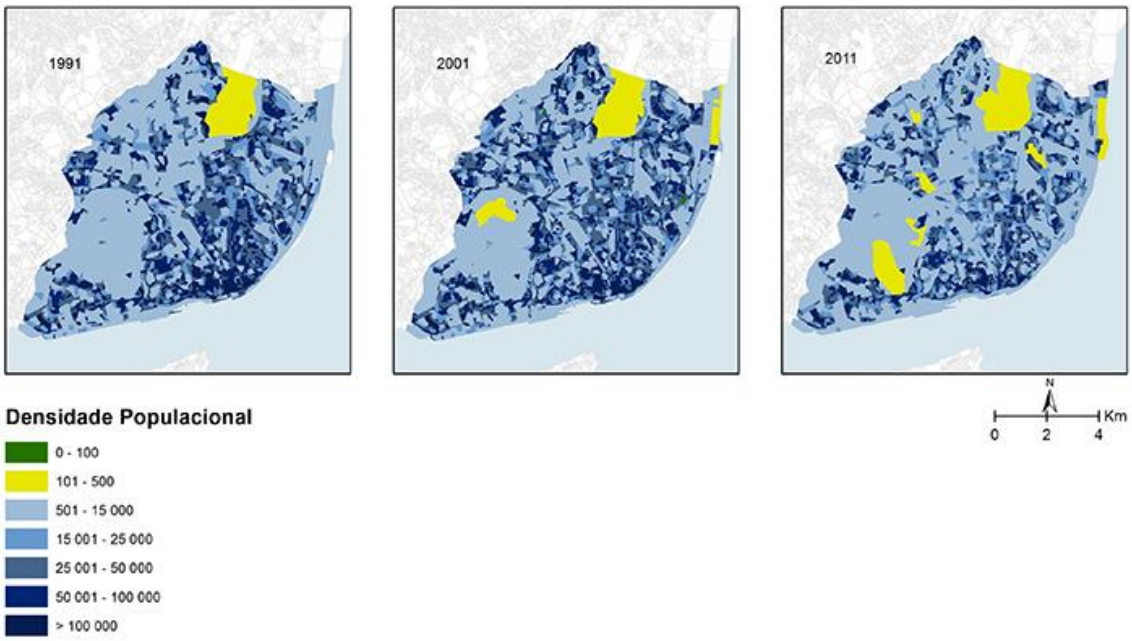

Figure 11. Population Density (statistical sections). Detail for Lisbon

(Figure 11)

Source: Densities calculated based on the data from the 1991, 2001 and 2011 Census

4. The food context

Analysing the Food context in urban areas must include analysing land use and identifying productive areas, as well as activity distribution within the food system.

We must nevertheless consider that, by definition, urban areas are essentially importers of food products and exporters of urban services and functions. (MOUGEOT, 2006)

The population density of the Lisbon Metropolitan Region is made manifest in land use chart (Figure 12) and in the absence of land use for primary production. Therefore, SRUFS must be analysed as functional region defined based on the existing flows between the places of production (outside the urban centre) and the places of consumption (urban centres).

The Lisbon Metropolitan Region, with an area of 2,994 Km2 (18 municipalities represent about 3.3% of the territory in Continental Portugal) and a population of about 2,7 m people (about 28% of the population of Continental Portugal), the data from the 2009 agricultural census (Recenseamento Geral Agrícola - RGA09), indicate that farming corresponds to about 36% of the territory.

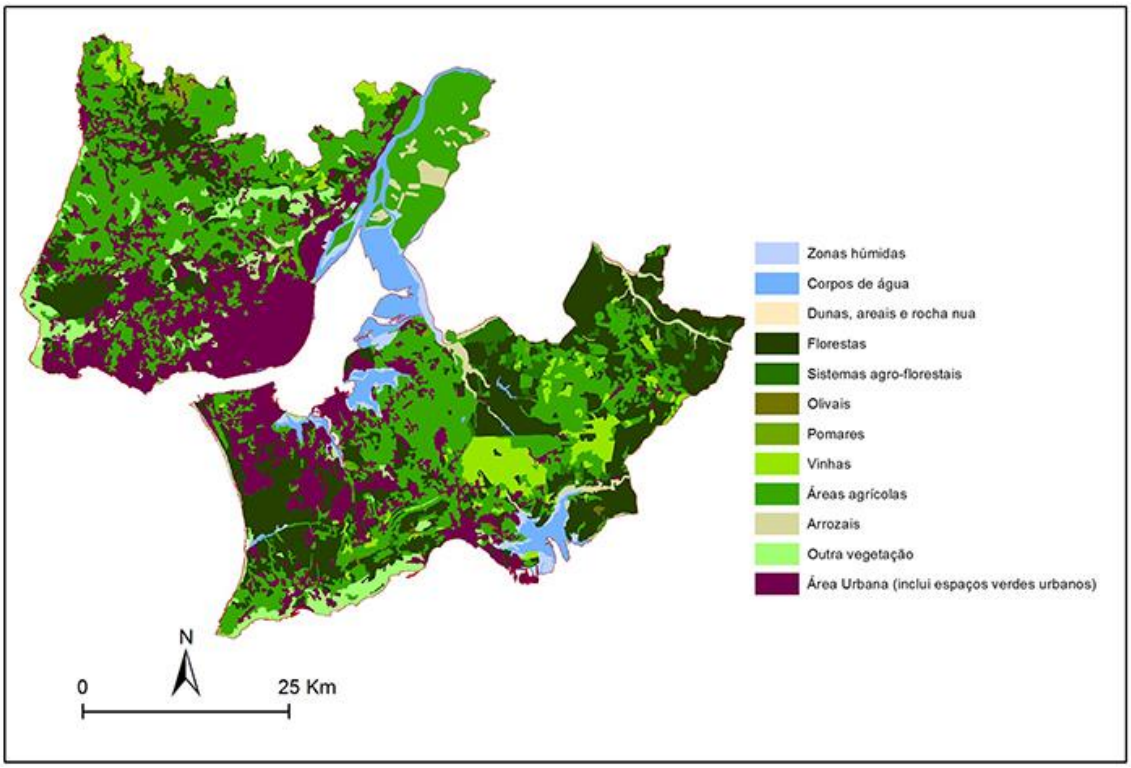

Figure 12. Land use Maps - detail of the Lisbon Metropolitan Region - based on Corine Landcover 2006

(Figure 12)

Based on these elements we cannot determine how intense is the food supply flux between the productive areas and the urban centre. However, the amounts involved may indicate a significant supply potential.

How this potential may be used to increase the sustainability of the urban food system depends on its inclusion in the urban planning strategy.

Besides this production potential, we must also refer to the density of the network of points of access that the activities linked to SRUFS represent.

The analysis of shops whose CAE is linked to food production, distribution or consumption per borough (Figure 13) evidences the aggregating role of the Municipality of Lisbon in activity distribution in the Lisbon Metropolitan Region: 107,135 shops belong to these CAEs (about 3.5 times the number of similar businesses in Sintra).

The number of shops in Lisbon (19 shops/100 residents) is also the double of those in Sintra (8 shops / 100 residents), which reinforces the aggregating power of Lisbon.

This fact is surely linked to the number of fluctuating population, which can be assessed based on the commuting data and those on tourism.

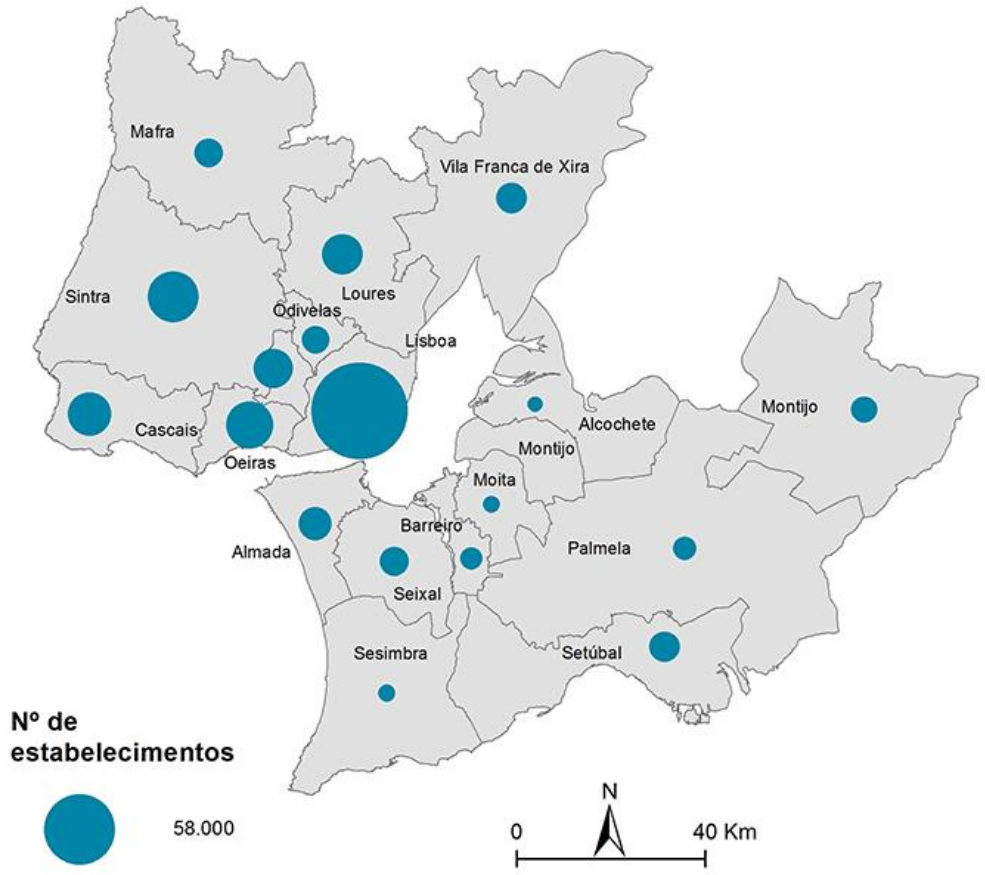

Figure 13. Land use Maps - detail of Lisbon Metropolitan Region - based on Corine Landcover 2006

(Figure 13)

Source: INE, System of Integrated Business Accounts 2014 (SCIE)

5. Conclusions

The population dynamics and the space organization of activities conducted by SRUFS and their impact in how Urban Food Systems are organized cannot be analysed unless the populations residing in the areas are analysed and described, as well as the network of distribution and access points.

They nevertheless allow us to raise important questions regarding the ability that Urban Food Systems so as to ensure sustainable Food security to urban populations in terms of availability, access and use while contributing to achieve standards of social well-being that are in tune with a healthy and active life (ERICKSEN, 2008).

Analysing the population dynamics of Continental Portugal allows us to identify clear trends. The first is that since the late 19th c. Urbanization of coastal areas has increased, in particular in the Metropolitan Regions until the 1990s.

From this decade onwards, the urbanization of the metropolitan regions has become stable though the trend towards an increase in population of coastal areas, namely in the outskirts of urban centres, still continues.

There are exceptions in inland areas, as is the case of the districts of Brag, Bragança and Castelo Branco, whose specific dynamics coincide with the implementation of institutional decentralization strategies, as was the case of universities and polytechnics, which have greatly contributed to the changes in the dynamics of these urban centres.

The national population distribution in Continental Portugal raises important issues as to the ability to ensure primary production of food, namely through the decrease in the population in areas devoted to farming, which has an impact in the labour force available to work and ensure economically sustainable farms.

On the other hand, increase in urbanization in coastal and urban areas has contributed to a larger gap between consumption and production areas, not only in geographical terms due to sub-urbanization processes and urban sprawl but also in relational terms, due to the fact that the supply to larger centres necessarily involves longer and more complex supply chains.

At a more detailed level of the statistical subsection, we can also identify some features that evidence the existence of internal dynamics in more urbanized centres as is the case of Lisbon and Porto Metropolitan Regions.

A sustainable and resilient food system will have to be able to adjust according to the dynamic character of the populations in more urbanized centres, not only through adjusting the density of access points as well as through the different organization types and the access point types so as to ensure that healthy food, and food that the population prefers, is available, accessible and adequately used.

The need to ensure food security to urban populations and to define strategies to increase the food resilience in urban centres implies its inclusion in urban planning and regional planning strategies so as to guarantee the increase in relations between urban and rural areas supported by food production and supply activities in urban centres and contribute to enhancing territory cohesion processes based on these relations.

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Notes

i INE, Census 2011 – Recenseamento Geral da População, Decenal

ii Source, INE Population Census, Historical Series

iii BGRE - Base Geográfica de Referenciação Espacial

BGRI - Base Geográfica de Referenciação da Informação

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