

comes from state or municipal subsidies. Local taxation tends to be insufficient to meet the service provision obligations of local authorities. Only when local taxes are raised on income does local financial autonomy become significant.

Forms of metropolitan government

In the spectrum of institutions that can exercise government responsibilities in metropolitan agglomerations, situated at any point on the scale from the local level to that of the state, there is a band occupied by institutions with a specifically metropolitan outlook.

Some institutions are of a local nature and operate in one specific metropolitan territory; others cover a substantially larger area, as a result of a territorial subdivision of the state adopted aside from metropolitan dynamics. Nevertheless, as we mentioned earlier, institutional levels of state decentralisation, such as regions or provinces, may sometimes coincide with the metropolitan area. In these cases, the institutions concerned can in fact act as metropolitan governments, even though they were created for a different reason.

Below we list some of the different forms adopted by metropolitan governments in various European cities:

- **Local governments with metropolitan powers:** Warsaw, Katowice, Budapest.
- **Voluntary associations of municipalities:** the *Mancomunitat de Municipis* of Barcelona Metropolitan Area, the *Regionalverband Ruhr* in Cologne.
- **Specific bodies and sectoral agencies:** the Metropolitan Areas of Lisbon and Porto, the Regional Planning Agencies of Frankfurt/Rhine-Main and Munich, the Environment and Transport Authorities of Barcelona and Valencia, the Tyne and Wear Fire and Civil Defence Authority in Sunderland, the Greater Manchester Waste Disposal Authority, the West Midlands Passenger Transport Executive.
- **Consortiums:** Metropolregion Hamburg, Barcelona Metropolitan Transport Authority.
- **Provinces:** Stockholm, Vienna, Milan, Turin, Naples.
- **Regions with metropolitan powers:** Île-de-France, Madrid, Lazio, Piedmont, Lombardy, Campania, Brandenburg and Berlin, Nottingham, Prague.
- **Specifically metropolitan governments created by law:** Greater London Authority, the various *Communautés Urbaines de France*.

It is clear from the above that the institutional diversity is very great, and that even within the same country different solutions are adopted to organise supramunicipal realities. These solutions often entail overlapping institutions and duplicated powers, leading to malfunctions in the governance of these urban areas. In some cases, the tendency to reinforce some instruments of municipal cooperation prevails, in order to achieve a better management of common services, from the efficiency and effectiveness point of view.

In order to clarify this complexity a summary datasheet has been incorporated into the study, describing the institutions and the government responsibilities of each of the large metropolitan agglomerations. It consists of a systematic description of the various bodies and administrative levels that make up the 35 large agglomerations defined in this study, in accordance with the variables and categories described in this section, with the aim of objectivising the comparative analysis of the forms of government.

furthermore we have been able to start a monitoring process of the demographic development of European metropolises from the demographic and territorial point of view. We ought to mention that some aspects in favour of the methodology used are ease of updating and the systematic and homogeneous application of the same criteria to all the cities studied. These aspects have been confirmed in this study. They allow obtaining a precise representation of the extension and boundaries of the more dense urban areas and, at the same time, emerging agglomerations not found by other studies can be identified.

The results forthcoming from this methodology have been contrasted with those of other studies of a functional nature (that employ data on commuting to define metropolitan area) or of a physical kind. The comparison of results shows that, despite the diversity of approaches, in most cases there is agreement about the dimensions and the delimitation of the European urban reality.

URBAN PERSPECTIVE

Objectives

In order to get more insight into the European metropolitan realities and with the aim of analysing the transformations in the urban network, the report *Grans Aglomeracions Metropolitanes Europees (European Large Urban Agglomerations)*¹, published in 2002, has been updated. It contained the results of a study carried out with the aim of providing a methodology allowing the delimitation of large urban concentrations in Europe according to a homogeneous and comparable set of criteria. In this revision the methodology used in the previous edition has been kept: the variable of population density, the geographical contiguity between the various municipalities and the criteria of urban intensity.

In 2002 the study employed statistical data for the years 1996-1998 and the map databases of the 15 countries that comprised the European Union at that time. With the enlargement of the European Union it was considered necessary to extend the study to the whole of Community territory, including all the urban agglomerations of the countries that made up the European Union in 2006², and the present study on *European Metropolitan Agglomerations (EMA)* was undertaken. We have taken advantage of this new process to update all the statistical data and also to validate and simplify some of the steps of the methodology used. In this way we have obtained up-to-date results for all the metropolitan agglomerations and

The European demographic context

This revision has incorporated 11 new countries³, this has meant extending the study by nearly 85 million inhabitants and 17,500 municipalities. More than 455 million people live in the 25 European Union countries studied, which have a total surface area of almost 4 million sq km and an average density of 117 inhabitants per sq km. One prominent feature is the great heterogeneity of the different European countries regarding the size of their population, their surface area and their administrative structure.

The population is not distributed evenly over the EU countries, and very diverse demographic realities are to be found:

- Six countries with a very large demographic weight: in first place Germany with 82 million; France, Italy and the UK with populations of around 58 million; and then Spain with 44 million and Poland with 38 million. These six countries alone account for 75% of the population and occupy 60% of European territory.
- Six countries with populations of around 10 million: Austria, Belgium, Czech Republic, Portugal, Sweden and Hungary. The Netherlands stands in an intermediate position at 16 million.
- Three countries with populations of around 5 million: Denmark, Slovakia and Finland.
- A group of countries with populations that are smaller but range widely, from the 4 million of Ireland and Lithuania, through

the 2 million of Slovenia, Latvia and Estonia, to the three countries with a population of around half a million, namely Luxembourg, Malta and Cyprus.

With regard to population densities, the countries presenting the highest values – tripling and quadrupling average European values (117 inh/sq km) – are Belgium and the Netherlands, while at the other extreme, with very low population densities that fall short of a third of the EU average, we find Finland and Sweden, very large countries, and small countries such as Estonia and Latvia.

One country that merits a special mention is Malta, which stands out for its high level of urbanisation, as its 400,000 inhabitants live in territory measuring 320 sq km, with a resulting density of more than 1,200 inh/sq km.

The administrative divisions at a local level of the various European countries do not respond to a single model, as the historical conditioning factors have shaped a particular municipal structure and have generated a great diversity of situations: administrative divisions of mediaeval origin are overlaid with more modern structures, either by means of the annexing of small villages, or because the modernisation of the structure of the state reaches the local sphere.

Nor should we neglect the effect of different legal approaches about territorial matters in each country. In the case of the countries with an Anglo-Saxon tradition this has shaped a very dynamic perception of administrative divisions. Continental Europe countries used to show a more rigid and steady fragmentation of its territory and, in some cases, used to adapt to new needs through intermunicipal cooperation. France, Germany, Spain, Italy and the Czech Republic are countries with a high number of municipalities as a result of the permanence of these structures. At the same time they are an example of this kind of organization, although keeping their own specific features.

It should be pointed out that in the cases of Ireland, Lithuania and the UK we were unable to study the most basic local levels for technical reasons, due to the impossibility of cartographic identification and insufficient breakdown of demographic data.

Urban municipalities

One of the most widely known demographic characteristics of the European Union is its high level of urbanisation and the concentration of the majority of the population in a small number of municipalities. In order to be able to

analyse and measure this phenomenon, in this study the concept of the *urban municipality* has been defined as one which has a population density of 250 inh/sq km or higher. This threshold, contrasted with other sources, proved to be significant in the previous edition. It draws a map of the EU that shows the main urban concentrations, more sparsely urbanised areas, and unoccupied areas, showing the continent's high degree of urbanization.

Urban municipalities constitute the basis on which, following the procedures established in the methodology of the present research, it will be possible to recognise metropolitan agglomerations. Urban municipalities are the frame on which the compact urban fabric, an identifying element of Europe's big cities, is spread.

Among the 88,000 European municipalities studied only 11,000 are urban municipalities and are inhabited by 300 million people⁴. In other words, 65% of the population of the EU lives in 12% of its municipalities. This makes for high population densities in urban centers, with a European average of 877 inh/sq km, varying from about 1700 inh/sq km of Greece and Lithuania to approximately 600 inh/sq km of Slovenia and Slovakia.

The countries with the highest percentages of urban population are the Netherlands, Belgium and the UK, where more than 75% of the respective national populations live in urban municipalities. Germany, Spain, Italy, France and the Czech Republic, among others, also have levels of urban population that are above the European average (64.2%). The countries with the lowest urbanisation percentages are Finland, Slovenia, Ireland and Sweden, all of them with less than 40% urban population, result of the low global densities of these countries.

However, sometimes the percentage of urban population does not correspond to the number of urban municipalities. The two clearest cases among the countries studied are Spain and France, which despite their relatively low number of urban municipalities (less than 10% of the total of their municipalities) nevertheless have a very significant volume of urban population, thus indicating a high level of concentration of the population in a small number of cities.

Metropolitan agglomerations

Metropolitan agglomerations are generally characterised by the existence of a core city of prime demographic, historic and social importance, around which are organised urban networks that relate physically, economically and functionally.

In this edition, working from the basis of the urban municipalities, we have identified 104 metropolitan agglomerations (MAs) which define the urban sprawls constituted by contiguous municipalities that add up to a population of over a quarter of a million inhabitants and have an overall density higher than 1,500 inh/sq km.

More than 155 million people live in these 104 MAs, on a surface area equivalent to 2% of EU territory. This means that more than a third of European citizens live in a small number of densely populated areas, defined as metropolitan due to the physical contiguity that exists between their municipalities and urban intensity.

The 104 MAs identified can be classified according to their population:

- 35 MAs, with more than 1 million inhabitants, European metropolises.
- 27 medium MAs, with between 500,000 and 1 million inhabitants
- 42 small MAs, with between 250,000 and 500,000 inhabitants

As was to be expected, the largest number of metropolitan agglomerations is detected in those countries with the greatest demographic weight: Germany and France have 15 agglomerations each, and Italy and the UK have 12.

However, Spain – the fifth largest country in Europe in population terms – is top as regards the number of agglomerations, as 16 are detected within its borders: 4 metropolis with more than 1 million inhabitants (Madrid, Barcelona, Valencia and Seville), 2 medium ones (Bilbao and Las Palmas de Gran Canaria) and 10 smaller ones.

Although it has been an EU member state since 1981, it was not possible to study Greece in the previous edition due to lack of statistical data and accurate place-names. These technical impediments now overcome, it is incorporated into the study with two metropolitan agglomerations: the metropolis formed around the capital, which totals three and a half million inhabitants and a medium-sized one around Thessaloniki with a population of 900,000.

The countries that joined the EU in 2004 and have been analysed for the first time in this edition contribute a total of 16 metropolitan agglomerations. Poland, with a population of almost 40 million, has an urban structure that follows a similar pattern to other European countries of a comparable size. There are 10 MAs within its borders, 2 of them metropolis (Katowice and Warsaw, each with a population of around 2 million), 5 MAs medium-sized and 3 MAs small.

In Hungary and the Czech Republic we find two metropolis centred on their respective state capitals: Budapest with 2,260,000 inhabitants and Prague with 1,240,000. Czechia also contains a small agglomeration, around Brno. Estonia, Latvia and Lithuania each add a medium-sized or a small metropolitan agglomeration: Riga with 800,000 inhabitants, and Tallinn and Kaunas with approximately 400,000 each.

In the remaining countries there is no MA: Slovakia and Slovenia because their respective capitals, Bratislava and Ljubljana, even though their population exceeds 250,000, do not meet the density criterion to be centres of an agglomeration; and Luxembourg, Malta and Cyprus because there is no city reaching the required population threshold.

It should be noted that in Europe there are other major urban realities that do not feature as metropolitan agglomerations because they fail to meet the established selection criteria. This is the case of the Italian region of the Veneto, where an urban continuum exists around cities such as Venice, Verona and Padua that contains more than 3 million people, yet on applying the selection filters, only the city of Padua meets them and forms a small MA of 300,000 inhabitants.

Still in Italy but further down the Adriatic coast, the Rimini area constitutes another area with a high level of urbanisation and over 1 million inhabitants, but there is no city with the required minimum population to be the core city of an MA.

Spain provides more examples around the cities of Málaga and Murcia, where urban areas are formed with close to 1 million inhabitants, but their capitals fail to reach the required density. In turn, the city of Zaragoza has over 670,000 inhabitants, but because it has a very large municipal district it does not reach the density required to be considered an MA.

The European metropolises

The 35 large metropolitan agglomerations or European metropolises, those that exceed 1 million inhabitants, are studied in greater depth from the demographic and governance viewpoints in the detailed datasheets for each agglomeration, which can be consulted below. If we analyse them as a whole, bearing in mind their size and internal structure, we can single out several characteristic features:

- 3 metropolises with more than 10 million inhabitants: London with 12.7 million, and Paris and Cologne with 10 million each. In London and Paris the core cities are clearly discernible. In contrast, the agglomeration

of Cologne has a polycentric configuration made up of 5 cities with a population of over 500,000, usually called the Rhine-Ruhr area and coinciding approximately with the agglomeration defined in this study as regards both its population and its extension.

- 3 metropolises with a population of around 6 million inhabitants: Amsterdam-Rotterdam, Liverpool-Manchester and Milan. Some studies give the metropolitan areas of these cities tighter limits than those provided by the EMA methodology. These differences are due to the fact that these other studies consider each of the main cities individually, without their surrounding areas, and therefore do not recognise their twin-core nature (in the case of Amsterdam and Liverpool). As for Milan, the differences would derive from the fact that the parameters established in the EMA methodology, which are effective for most cases, extend the agglomeration whenever it is possible to establish contiguity among urban municipalities. Around this city there is a large number of medium-density urban municipalities are contiguous and enable the agglomeration to spread.

- 14 metropolises with a population of between 5 and 2 million, 7 of which are centred on state capitals (Madrid, Berlin, Athens, Rome, Brussels, Lisbon and Budapest). Barcelona occupies eighth place, with 4.6 million inhabitants. These agglomerations are usually formed around core cities with very high population densities and a marked urban hierarchy.

- The 15 remaining metropolises, with a population of between 1 and 2 million, including 5 state capitals (Vienna, Warsaw, Copenhagen, Stockholm and Prague). The other 10 that are not state capitals all belong to the 5 big European states, with the exception of Porto-Vila Nova de Gaia.

As far as density is concerned, the agglomerations with the highest concentrations are those of Athens (4,500 inh/sq km), Paris (3,150 inh/sq km) and Barcelona (2,680 inh/sq km): these figures reflect the high densities of the core cities, as a result of the small size of their respective municipal districts.

As regards the surface area of the agglomerations, London with 8,400 sq km and Cologne with 6,750 sq km are the largest, followed by Amsterdam-Rotterdam, Liverpool-Manchester and Milan, with surface areas in the region of 4,200 sq km. The agglomerations of Paris, Naples, Birmingham and Madrid all have a surface area of about 2,500 sq km. There are 11 agglomerations that occupy less than 1,000 sq km.

The internal structure of the agglomerations from the point of view of the urban hierarchy of the cities of which

they are comprised takes highly diverse forms depending on the historical and geographical peculiarities of each of them. In order to characterise the different structures we have considered the weight of the core city with respect to its metropolitan environment and we have identified the following models of urban configuration:

- Metropolises in which the weight of the core city amounts to more than 50% of the total of the agglomeration, and that therefore constitute clearly *monocentric* structures in which the core city has a great preponderance over its surrounding area. This is the model adopted by most European state capitals, such as London, Paris, Berlin, Madrid, Rome, Budapest, Stockholm, Vienna, Warsaw and Prague. Other cities that are not capitals but follow the same pattern are: Munich, Turin, Marseille and Seville.

- Metropolises with a core city that is important but accounts for less than 50% of the population of the agglomeration as a whole. These cities have a metropolitan structure that could be defined as *radial*, because despite the presence of a marked core, it coexists with medium-sized cities that show a certain degree of centrality, albeit with a very different intensity to that of the core city. This is the structure of the agglomerations of Barcelona and Milan, which are surrounded by second-order medium-sized cities that are related to the main city and at the same time agglutinate their own respective surrounding area. This is the case of cities such as Sabadell, Terrassa and Mataró near Barcelona, and Brescia, Monza and Bergamo near Milan.

- *Polycentric* metropolises characterised by the presence of two or more cities with equivalent representativeness and demographic characteristics and that are closely interrelated by means of communication flows and networks. Examples of this type of structure are the twin-core agglomerations of Brussels-Antwerp and Amsterdam-Rotterdam.

One very specific polycentric model, emphasising the lattice arrangement of the cities that make up the agglomeration, is the one centred on Cologne. Following the criteria laid down in this study, the agglomeration is named after the city with the largest population, Cologne, but it includes 4 cities with more than half a million inhabitants (Dortmund, Essen, Düsseldorf and Duisburg), 7 cities with a population of 200,000 to 500,000 and 13 cities with over 100,000 inhabitants. Together they make up a region that encompasses 10 million inhabitants and is commonly known as the Rhine-Ruhr area. On a smaller scale, but again displaying this lattice structure, is the Liverpool-Manchester agglomeration, which consists

of 15 cities with a population of 200,000 to 500,000 (including Leeds, Bradford, Wirral, Wakefield and Wigan) that together total 6.5 million inhabitants.

METHODOLOGY

Methodological procedure

The delimitation method used in the revision of the EMA study is essentially the same as that used in the first version, although some aspects have been simplified.

The delimitation process uses two basic information sources: a map database of EU municipalities and the statistical data on population, surface area and density of the administrative units of each country, equivalent to Eurostat's level 1 and 2 local administrative units (LAU): municipalities, *communes*, wards, *Gemeinden* or similar units. These sources are incorporated into a geographic information system that integrates them and provides the spatial analysis tools that make it possible to carry out delimitation processes.

The first step, once the records are homogenised and standardised, is to link the statistical data for each of Europe's 87,901 municipalities. Then we select those that have a population density equal to or greater than 250 inh/sq km; these constitute the urban municipalities (10,630 in the European countries studied) to which the delimitation process will subsequently be applied.

Then we select the cities that are eligible as metropolitan agglomeration core cities because they meet the established criteria of having a population greater than 100,000 and a density higher than 1,500 inh/sq km. Once these are identified, a succession of search procedures is put into operation for each city in order to find, out of all its contiguous urban municipalities, the one with the highest population density and incorporate it into its area, thus forming a new area. This procedure is repeated as many times as necessary until the agglomeration is complete, either because no further contiguous urban municipality can be found or because the population density of the agglomeration as a whole drops below the fixed threshold of 1,500 inh/sq km.

The results obtained with this procedure have defined 104 metropolitan agglomerations, i.e., 104 cities around which an urban sprawl has formed that meets the conditions laid down to detect a particular level of metropolitan intensity. They are urban areas made up of contiguous municipalities that form areas with a population greater than 250,000 and a density higher than 1,500

inh/sq km, and have at least one central core consisting of a city with more than 100,000 inhabitants, which provides the name of the agglomeration. Of Europe's 104 metropolitan agglomerations, which are made up of 3,211 urban municipalities, 35 have more than 1 million inhabitants, 27 between 500,000 and 1 million, and 42 fewer than half a million.

In an effort not to overlook any major urban entity, we ought to mention that there is a group of cities each with a population greater than 250,000 which the methodology used does not identify as metropolitan agglomerations. Although these cities constitute notable urban centres, they have low population densities and do not meet the required density criterion (over 1,500 inh/sq km). The 24 European cities in this situation are listed below.

At the end of the study, it is included a list of all European cities with a population greater than 100,000, and as such eligible to be considered core cities and to form a metropolitan agglomeration. For each of them we specify the basic demographic data and its urban characteristics in relation to the criteria established in this study.

Results of the 2000 and 2006 editions

One of the aims of updating this study is to analyse the evolution of the urban reality over the period 2000-2006 by comparing the results of the two editions. However, obviously we can only compare those countries that are common to both reports.

In general terms, most of the European countries have remained demographically steady. Austria and Belgium have grown a 3% and The Netherlands, Luxembourg and Ireland a 6, 7, and 8 % respectively. Spain has had the higher increase with the arrival of 4.4 millions of inhabitants that makes a 11% increment.

In the period studied there has been an increase in the population living in urban municipalities of six and a half million people, which amounts to a rise of 2.7% over the 2000 data. The statistical sources consulted confirm this rising trend and at the same time indicate that the growth corresponds to the migratory flows experienced by all of Europe.

In order to know if the population increments have been homogeneous among all the studied cities, the urban municipalities have been analysed according to municipality size. This analysis shows that the European urban configuration is characterised by the huge number of cities with fewer than 50,000 inhabitants. In these cities (8,423) is where the great majority of people live, more than 90 million, and have registered the

steepest increases in absolute numbers. The more significant growth rates, a 3.9%, are registered in the medium-small cities (495), those with a population between 50,000 and 100,000 inhabitants.

The population's increments in this group of medium and small cities confirm a trend towards more intense growth in the peripheries of big cities rather than in their centers. This data corroborate the deconcentration of the population to the metropolitan surroundings and emphasize the urban sprawl phenomenon in contrast with the compact city, model of the European city.

A comparative ranking of metropolitan agglomeration is drawn up with 81 MA, 7 being excluded in respect to the 2000 edition for various methodological reasons⁵. If we observe the demographic variations of the 81 agglomerations as a whole, we find that approximately half have grown larger and have gained population, while 25% have kept stable, without significant changes, and the remaining 25% have undergone population losses in both absolute and relative terms.

The demographic balance shows an increment of 2,3 million inhabitants, that is a 2% growth respect to the previous edition. Those agglomerations that show increases mostly do so by spreading out territorially and incorporating new urban municipalities around their edges rather than through the demographic increase of their built-up areas. There are 10 MA that grow more than 100,000 inhabitants and it should be noted that Madrid, Barcelona and Valencia are the cities with the stronger increments, with absolute demographic increases of 800,000, 500,000 and 226,000 inhabitants, a reflection of the Spanish demographic dynamism in recent years.

The MA losing population more significantly are Liverpool-Manchester (-400,000 inhab.), Rome (-330,000 inhab.), Cologne (-200,000 inhab.) and Sunderland (-140,000 inhab.). These losses can not be only attributed to demographic elements, for example the decrease of population density is some municipalities, but to the disappearing of municipal contiguities due to technical questions of the delimitation process.

If we focus in the study of all MA's central cities we can see that the demographic balance of the whole is positive on 350,000 inhabitants. Of all this group the Spanish cities are the ones that attract our attention: Madrid with 274,000 inhab. followed by Barcelona with 88,000 inhabitants and Valencia and Palma de Mallorca with 57,000 inhab. The cities with greater losses are the Italian: Roma with -160,000 inhab., and Torino and Genoa with -46,000 inhab.