

06.06 Population Density (Edition 1996)

Overview

The term population density is a measure of how many people live in a given area. Population density as used here is the number of inhabitants per hectare (1 hectare is an area about 86 yards on a side. 1 hectare = 2.47 acres, or 1 acre = 0.4047 hectare. 640 acres = 1 sq. mile). The population density of Berlin's entire urban area is 37 people/hectare (p/ha). This figure is in the middle range for German and European cities. Hamburg has an average of 43 % fewer people per hectare. Paris has a population density almost three times greater (cf. Fig. 1).

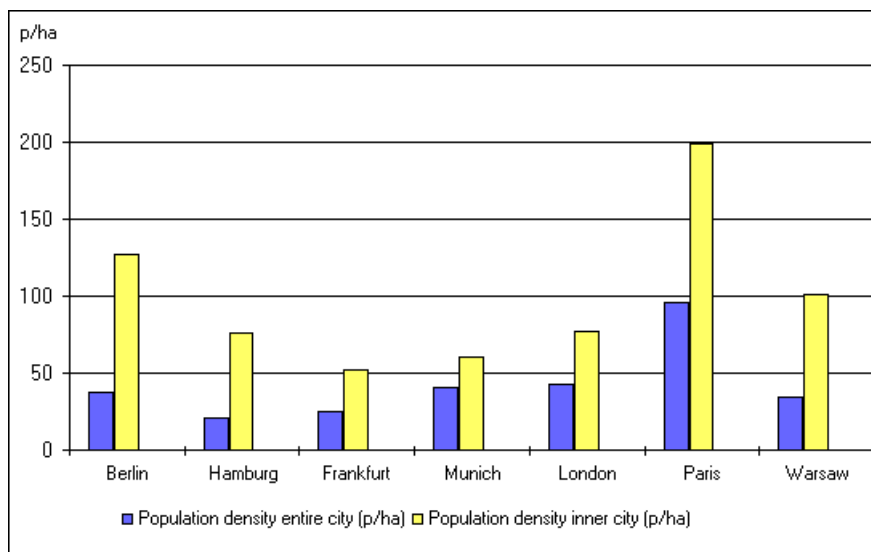
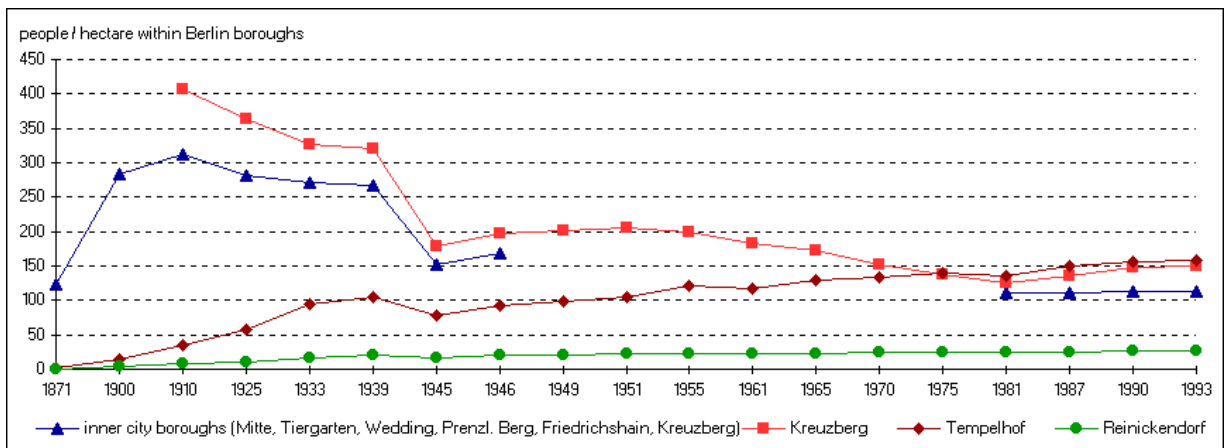


Fig. 1: Population Density of Berlin Compared to Other Cities, in People per Hectare

The 127 p/ha population density of the Berlin inner city is above average. Only the Paris inner city is significantly more densely inhabited with 199 p/ha.

The Map of Population Density depicts population density in terms of statistical blocks (cf. Methodology). High population density causes great environmental stresses, such as noise from traffic and air pollution from heating facilities. Residents are dependent on a small number of public green areas for relaxation. These areas are mostly small, heavily visited, often overused, and loud. Private green areas exist only to a limited extent. Some densely populated areas of Berlin are attractive residential areas in spite of this. Some late 19th-century block-style constructions are especially attractive when they have living quarters of generous size, and are complemented by a good infrastructure of small businesses, restaurants, cultural facilities, services, and an extensive public transportation system. Rich urban life flourishes here. This urbanity is missed by many living in the purely residential areas at the edge of the city. These areas have a relatively low population density, a high ratio of open space, and less air and noise pollution.

The inner city boroughs of Mitte, Tiergarten, Wedding, Prenzlauer Berg, Friedrichshain and Kreuzberg reached their greatest population density in 1910 with 311 p/ha. Today, the population density of these boroughs has dropped to 114 p/ha, one-third of the peak value (cf. Fig. 2).



*Fig. 2: Development of Population Density for Selected Berlin Boroughs (people/hectare within Berlin boroughs)**

**Population figures for inner city boroughs existed only as a total sum for the years 1871 and 1900. No population data for the eastern city boroughs was available between 1949 and 1975. This prevented a calculation of population density for inner city boroughs for these years.*

In contrast, the population in the outer boroughs rose continuously, except for a drop in 1945 caused by general war-time conditions. In 1933, the Tempelhof borough had an even higher average population density than the Kreuzberg borough.

A growth in population of up to 300,000 people is expected by 2010. Up to 90 % of the residential space for these inhabitants is to be created by increasing the density of existing structures: putting additional floors on buildings; converting attic and roof spaces into residential units; building on vacant lots; increasing the density of more open construction styles; extending buildings constructed in the post-war period; etc..

Lower population density results not only from high proportions of green and open spaces and lesser degrees of development. Lower density can also be due to a large amount of small business, trade and service use, as well as public facilities, etc.. These property areas are included in calculations of population density.

Detailed and current data bases of population density in specific urban areas are useful for the planning of various public departments. The Department of Urban Planning, for example, uses these figures as a basis for planning such infrastructure facilities as schools, businesses and playgrounds. Landscape Planning uses these figures for analyzing the number and accessibility of green spaces near to residential areas (cf. Map 06.05, SenStadtUmTech 1996a). Knowledge of population density also allows conclusions to be drawn regarding environmental stresses, such as calculating emissions from the use of solvents and cleaning chemicals in private residences, and determining carbon dioxide loads (cf. Map 03.08, SenStadtUm 1994b).

Statistical Base

The Map of Population Density is based on the file of mandatorily registered residents who have stated Berlin to be their main place of residence. This file was current as of 31 December 1994 and is managed by the Berlin State Statistical Agency (Statistisches Landesamt Berlin) (Berlin is both a city and a German state.). This file contains, among other things, the total of inhabitants registered with the Resident Registration Agencies for all statistical blocks in Berlin which have at least one inhabitant. The file is updated every six months on the basis of registrations, cancellations, and transfers.

The type and size of individual blocks and block segments was taken from the 1994 file of Area Types and Sizes in the Environmental Information System (UIS = Umweltinformationssystem) of the Berlin Department of Urban Development, Environmental Protection, and Technology. Criteria used for differentiating various areas were construction and open space structure type, age, and use (cf. Map 06.07, SenStadtUmTech 1996b).

Methodology

The spatial reference system was provided by the digital working map of the Environmental Information System (UIS). This working map contains individual statistical blocks with block numbers. Blocks with more than one use are divided into block segments. The numbering and street limit lines of blocks corresponds to those used by the Berlin State Statistical Agency in 1990.

Population density was determined for each statistical block. The size of each statistical block, needed for the calculation of population density, was taken from the UIS Data Base. Figures for the number of inhabitants were assigned to statistical blocks according to the UIS spatial reference system. Classification problems occurred in statistical blocks whose street limit lines and/or numbering was changed by the State Statistical Agency after 1990. Two different methods were used to correlate resident figures derived from the block street limit lines of the State Statistical Agency in 1994 to the block street limit lines and numbering of the UIS.

If one statistical block was subdivided into several new blocks after 1990, the resident figures of the new blocks were added together and assigned into the UIS according to old block numbers and street limit lines.

If several blocks of the UIS were consolidated into a new statistical block by the State Statistical Agency after 1990, then first the area type and area size of the individual statistical blocks or the individual segments of a statistical block was determined with the aid of the file of Area Types (cf. Fig. 3).

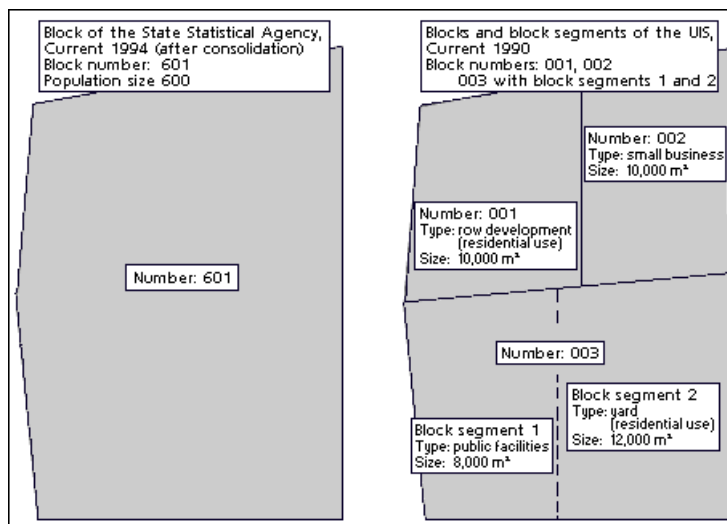


Fig. 3: Assignment of Population Figures for Redefined Blocks

Because residents are mainly to be expected in areas primarily used for residential use, resident figures were assigned only to these type of blocks or block segments. In the example in Figure 3, the 600 residents of the "new" Block number 601 were assigned to Block 001 and to Block Segment 2 of Block 003 according to the ratio of their area size. Block 001 was thus assigned 273 residents and Block 003 was assigned 327 residents. Block 002 and Block Segment 1 of Block 003 have small business and public facilities. No residents were assigned to them.

Table 1 lists the widely varying average population densities of Area Types. Areas containing sub-areas of greatly different population density were dealt with as in the following example in Figure 3. Block 003, Block Segment 2 is a "Garden" Area Type and Block 001 is a "Row Development" Area Type. One-half of the resident total retroactively determined by calculation for the Garden Type Block 003, Block Segment 2 ($327 \text{ divided by } 2 = 163.5$) was assigned to Row Development Type Block 001 ($273 + 163 = 436$). Figure 3 gives the adjusted resident totals 436 for Block 001, and 164 for Block 003.

Population densities were classified into categories for depiction in the map. In order to portray smaller differences in population density in the lightly populated outer areas of the city, categories in the lower ranges of density are more finely differentiated than for greater population densities (from 151 p/ha).

Blocks not contained in the file "Mandatorily Registered Residents according to Main Residence" were later assigned to the category "Less than 5 residents per hectare". These were usually green and open areas, small business areas, traffic areas, core areas, public facilities, and utilities areas.

Map Description

As a rule, population density increases from the city edge to the city center. In the city center itself, however, only up to 70 p/ha are found in most blocks. Factors for this are the large open areas of the Tiergarten park and the Zoo, trade and service centers, and the large number of construction sites. Leipziger Strasse (street) and the new residence units on Wilhelmstrasse are densely populated and are conspicuous exceptions to general conditions in the city center.

The Wilhelminische Ring stands out with a "predominately high population density of 351 and more p/ha". The area has a block structure from the late 19th-century and is located within and on the edge of the City Rail Circle line. There are peak values of 793-796 p/ha in the Neukölln, Kreuzberg and Charlottenburg boroughs. Outside the City Rail Circle line, the relatively high population density continues south into the Schöneberg, Friedenau, and Steglitz boroughs. Population distribution similar to that within the inner City Rail Circle line is found in older development areas of Spandau, and is similar to other areas such as Tegel, Schöneweide, Adlershof, and Tempelhof. When these areas were developed around the turn of the century, they were on the edge of Berlin. They were later incorporated into Berlin.

The high-rise and industrially-prefabricated settlements at the edge of the city are relatively densely populated with 151 to more than 550 p/ha in large block areas. These are Märkisches Viertel, Hohenschönhausen, Marzahn, Hellersdorf, and Gropiusstadt.

Small settlements with post-war high-rise development fall predominately in the 151 to 250 p/ha range. These areas at the edge of the city in Spandau, Lichtenfelde, Marienfelde, Waidmannslust, Bohnsdorf, and Köpenick are relatively less densely populated. Some locations in this population density class are settlements with block-edge and row development. Examples are Haselhorst, Siemensstadt, Zehlendorf, and Plänterwald.

Typical for the city edge, and the most numerous, are relatively thinly populated settlements with 5 - 150 p/ha. These blocks are block-edge or row development, 71 - 150 p/ha; low developments with yards, 5 - 70 p/ha; and villa developments with park-like gardens and some semi-private re-greening, 31 - 70 p/ha. The eastern edge of Berlin is generally less densely settled than the western edge.

The distribution of population density correlates quite clearly with Environmental Atlas Map 06.07, "Urban Structure". It is apparent that area types can be assigned a certain range of population density. Table 1 gives average population densities for residential area types. These calculations are based only on areas of uniform use, not on blocks of heterogeneous use.

Tab. 1: Average Population Density per Area Type and Use		
Area type	Average population density (p/ha) per use	
	Residential area	Mixed area I
Closed courtyard	549	396
Courtyard	414	265
Preservation-oriented reconstruction	437	274
Decorative and garden court	263	200
Shed court	129	156
Post-war block-edge	331	220
Reconstruction by de-coring	380	271
Large court	257	175
Twenties and thirties row	176	143
Fifties and later row	182	142
Unplanned reconstruction	252	239
High-rise	318	255
Eighties and nineties pre-fab block-edge	347	257
Row yard	57	-
Yard	44	-
Open settlement development	18	-
Park-like garden	53	-
Yards and semi-private re-greening	87	-
Village	46	46
Mixed area II with low development	66	
Mixed area II with dense development	168	

Tab. 1: Average Population Density per Area Type and Use

The population density of non-uniform use blocks can vary greatly from the average values of their assigned class. One example is the area north of Innsbrucker Platz, along the Hauptstrasse in the

Schöneberg borough. Population density values for this area range from 88 to 638 p/ha for blocks of the area type "closed courtyard", "courtyard", and "preservation-oriented reconstruction". The averages for these types are 549, 414, and 437 p/ha. One factor is that population density calculations are based on the entire block, but different uses within a block may not have been taken into consideration. Besides "residential" use, the block with "88 p/ha" also has public buildings, such as schools, public library, a police station, and a public park. One block with only 191 p/ha has a larger utilities area. Other blocks with values of 219, 261, and 282 p/ha have Mixed Area 1 use. The block with 638 p/ha is solely residential.

Literature

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