European Commission

JRC SCIENCE FOR POLICY REPORT

Atlas of the Human Planet 2019

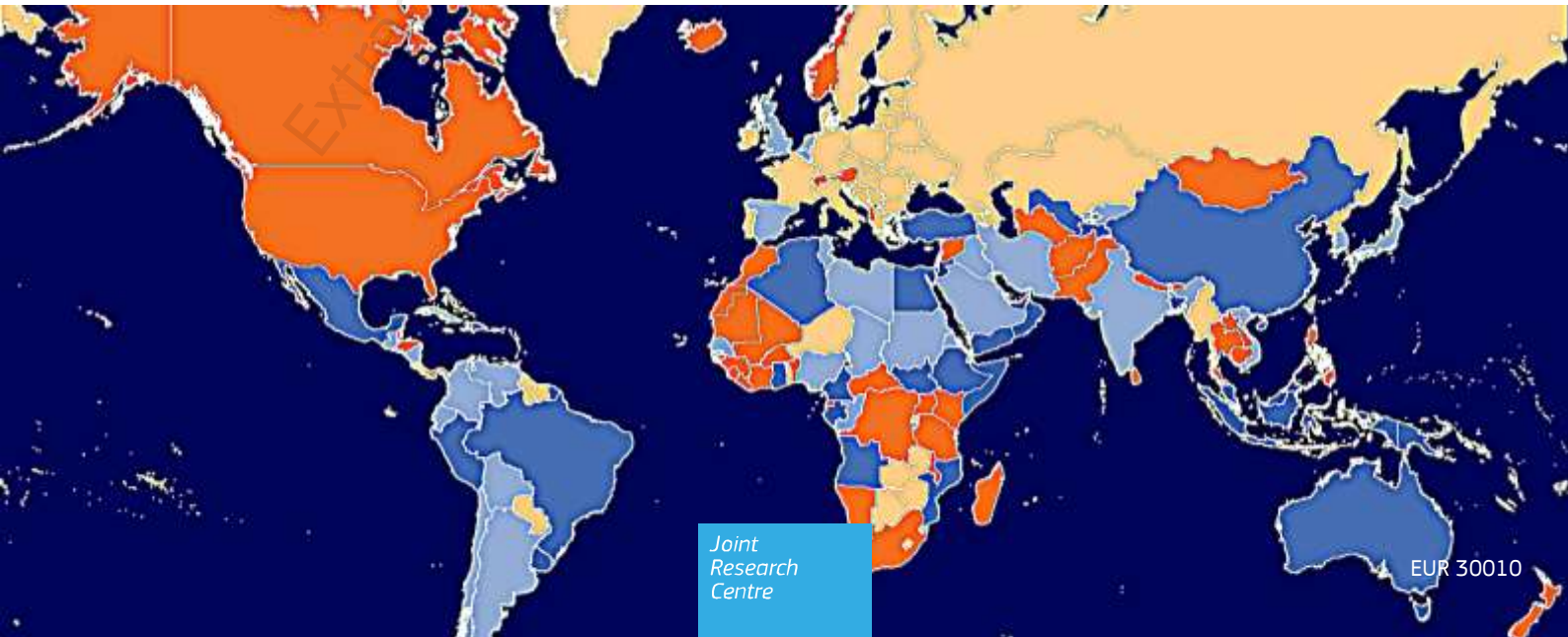
A compendium of urbanisation dynamics in 239 countries

Country brief for

Estonia

2020

Extract from the Atlas of the Human Planet 2019



Joint Research Centre

EUR 30010

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JRC118979

EUR 30010

PDF ISBN 978-92-76-17418-9 ISSN 1831-9424 doi:10.2760/014159

Luxembourg: Publications Office of the European Union, 2020

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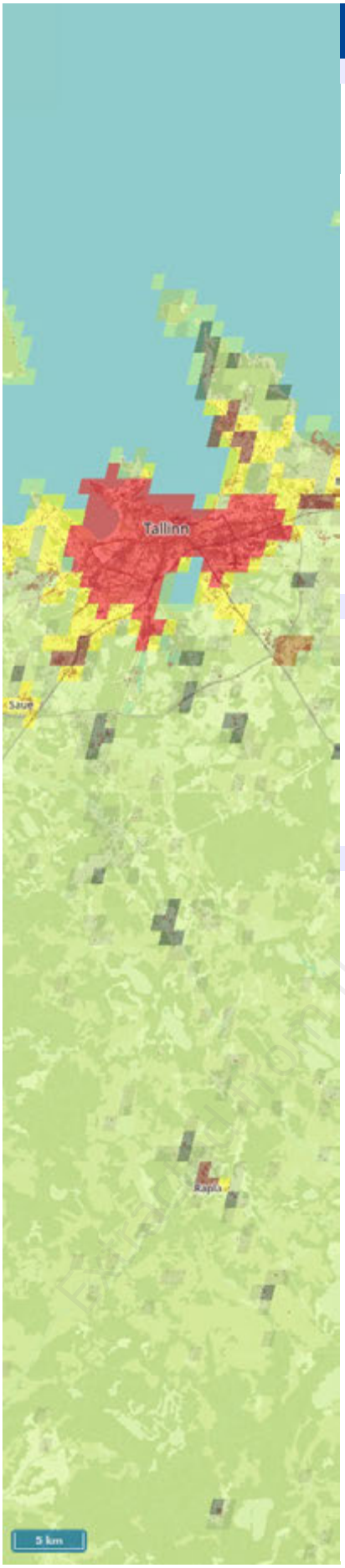
Figure 1 *https://ourworldindata.org/world-population-growth, p. 7,*
Figure 16 *Adobe Stock, 2019, p. 30,*
Figure 36 *Adobe Stock, 2019, p. 45,*
Figure 39 *Adobe Stock, 2019, p.48,*
Figure 41 *Adobe Stock, 2019, p.49,*
Figure 53 *Adobe Stock, 2019, p.58,*
Figure 56 *Adobe Stock, 2019, 60,*
Figure 65 *Adobe Stock, 2019, 73.*

Cover Image: The map classifies countries according to the share of population in urban areas in 2015 and the change of this share since 1990. In countries in blue the share of population in 2015 in urban areas is above global average, in countries in orange this share is below global average. Countries with a dark blue or orange tones accounted for an increase of the share of urban population above global average, the ones in the light tone for one below global average.

How to cite this report: European Commission, Joint Research Centre, Atlas of the Human Planet 2019 –A compendium of urbanisation dynamics in 239 countries, EUR 30010, European Commission, Luxembourg, 2020, ISBN 978-92-76-17418-9, doi:10.2760/014159, JRC118979.

Data from the Atlas of the Human Planet 2019



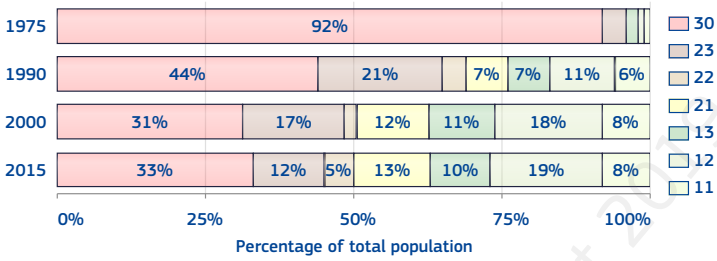
Estonia

DEGREE OF URBANISATION STATISTICS

The share of urban population in 2015 is 63%.

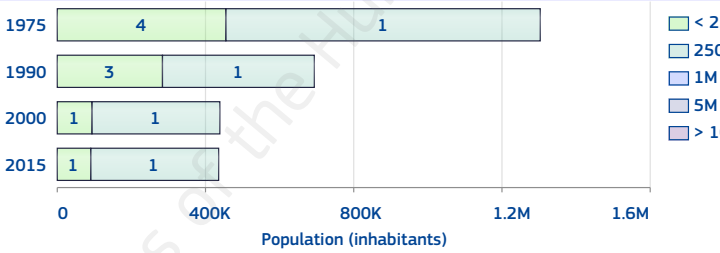
The number of urban centres in 2015 is 2.

The number of urban centre above 300k inhabitants in 2015 is 1.

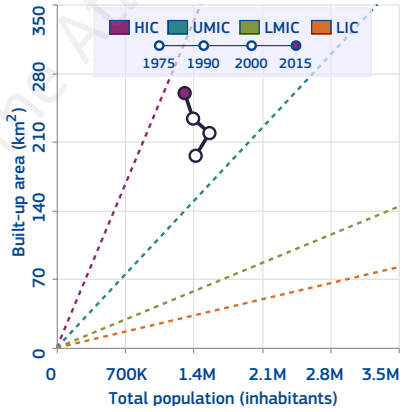


Class	1975	1990	2000	2015
11	14 138	100 291	116 673	110 974
12	9 626	165 296	245 078	247 482
13	28 704	110 475	151 593	127 683
21	2 020	107 231	173 785	167 277
22	185	59 980	31 970	62 815
23	63 195	325 690	238 186	160 250
30	1 304 967	694 941	439 139	433 870

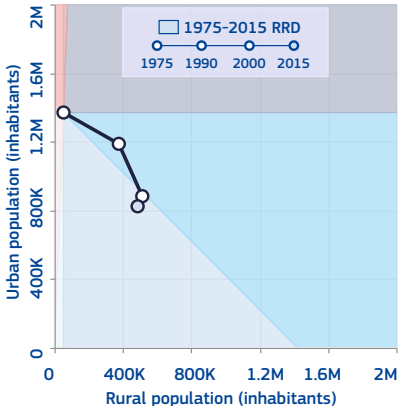
HIERARCHY OF URBAN CENTRES



SOCIETAL VARIABLES TREND



URBANISATION FACTORS



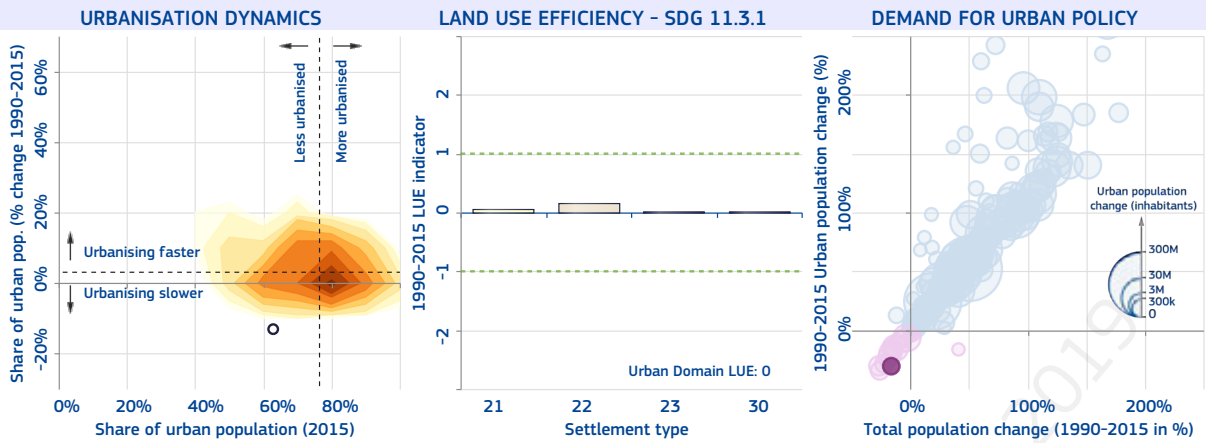
National-specific definition and figures of urban areas

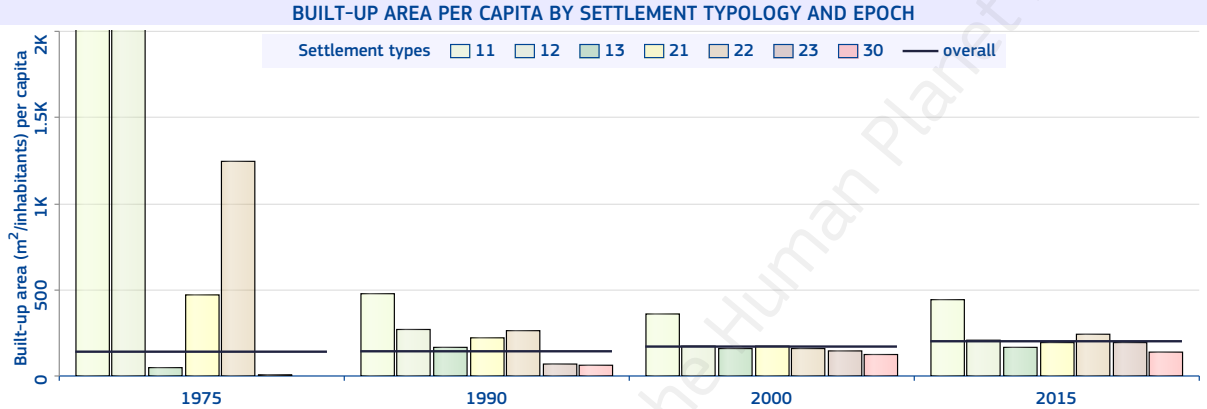
The share of urban population in 2015 is 68%

The number of cities above 300k inhabitants in 2015 is 1

Officially designated urban settlements including cities, cities without municipal status and towns.

Atlas of the Human Planet 2019





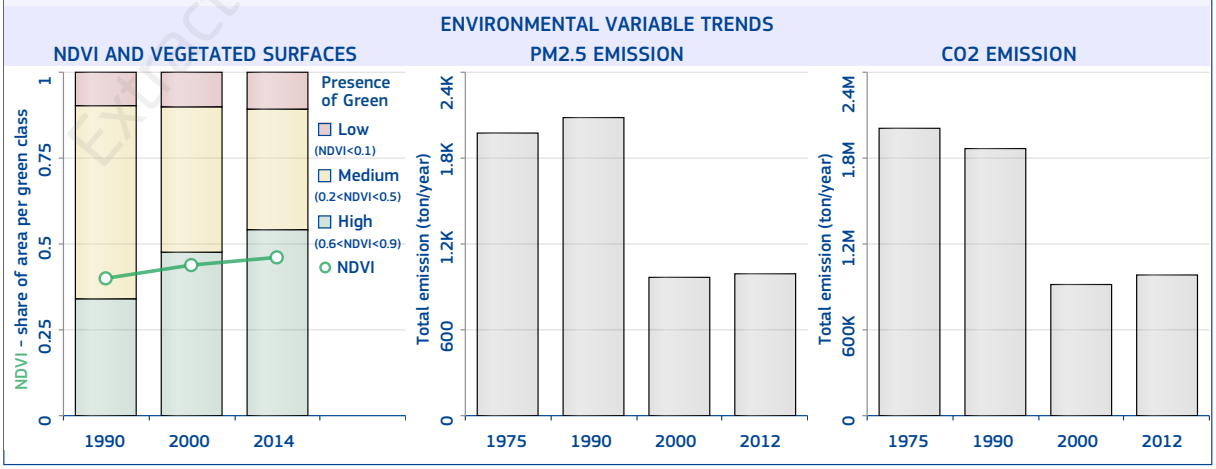
Tallinn

The most populated urban centre of Estonia is "Tallinn" with 344 511 inhabitants in 2015, a surface of 106 km^2 (average population density of 3 250.1 inhabitants/km^2), and 47.7 km^2 of built-up area (built-up area per capita of 138.5 m^2/inhabitant).

The main biome type is "Temperate Broadleaf and Mixed Forests"; the climate class is "Snow, fully humid, and Warm summer", the soil type is "Urban, mining, etc." and the mean elevation is 23.4 metres above sea level. In 2014, the average temperature was 6.8 °C and the annual precipitation 684.6 millimetres.

The MMI earthquake exposure class is 3 (Weak). The maximum of the heatwave magnitude observed during 1980-2010 is "Moderate".

The Land Use Efficiency indicator SDG 11.3.1 for the period 1990 – 2015 is 0.1; as proxies for SDG 11.7.1, the share of population living in dense green areas in 2014 is 0.5% and the percentage of open spaces is 55%.



Extracted from the Atlas of the Human Planet 2019

Here it is shown an extract of the GHS-SMOD 2015 grid layer for the current AOI[1]

GHS-SMOD types[2]:

10 - Water grid cell
11 - Very low density Rural grid cell
12 - Low density Rural grid cell
13 - Rural cluster grid cell
21 - Suburban grid cell
22 - Semi-dense Urban cluster grid cell
23 - Dense Urban cluster grid cell
30 - Urban centre grid cell

Spatial entities[3]:

13 - Rural cluster (RC)
22 - Semi-dense Urban cluster (SDUC)
23 - Dense Urban cluster (DUC)
30 - Urban centre (UC)

Methods & References

[1] Area of Interest (AOI): extent of the current Country or territory as delineated in the GADM 2.8

[2] The GHS-SMOD defines the settlement typologies as a result of the porting of the Degree of Urbanisation concept at level 2 into the Settlement MODel.

[3] A spatial entity is defined as the polygon of all contigous cells (using 4-connectivity) belonging to the same settlement typology; spatial entities are defined only for clusters of settlement typologies 13 (Rural cluster - RC), 22 (Semi-dense Urban cluster - SDUC), 23 (Dense Urban cluster - DUC) and 30 (Urban centre - UC)

The combination of the multitemporal GHSL datasets (GHS-BUILT, GHS-POP and GHS-SMOD; Florczyk et al. 2019b) allows to generate statistics on:

[4] population (pop) i.e. sum of GHS-POP population counts;

[5] built-up area (BU) i.e. sum of GHS-BUILT built-up area;

within each settlement typology in the GHS-SMOD layer for each epoch (1975, 1990, 2000 and 2015) in a given Area of Interest.

[6] The urban domain (UD) is the union of GHS-SMOD settlement typologies:
30 - 23 - 22 - 21

[7] The rural domain (RD) is the union of GHS-SMOD settlement typologies:
13 - 12 - 11

[8] Ehrlich et al. 2018

[9] Grouping by income tested with one-way ANOVA on ranks (Kruskal & Wallis, 1952) using *p-value* < 0.05

[10] Melchiorri et al. 2019b

[11] Urbanisation (urb) refers to increasing share of urban population in the period; de-urbanisation (de-urb) refers to decreasing share of urban population in the period

[12] UNDESA, 2018

[13] Land Use Efficiency (LUE) Melchiorri et al. 2019a; Schiavina et al. 2019

[14] Florczyk et al. 2019a

[15] Normalized Difference Vegetation Index (NDVI) and presence of green Corbane at al. 2018

[16] Fixed boundary approach: the Urban centre extent of 2015 is used for calculation of statistics in all epochs

[17] Crippa et al. 2018

Country or territory (AOI[1])

DEGREE OF URBANISATION STATISTICS

Ratio between pop[4] in the UD[6] and total pop[4] in AOI[1]

Number of all UCs[3] in AOI[1]

Number of UCs[3] above 300 000 inhabitants[4] in AOI[1]

Share of pop[4] in each settlement type and epoch within the AOI[1]

Pop[4] counts in each settlement type and epoch within the AOI[1]

HIERARCHY OF URBAN CENTRES

Number and total pop[4] of UCs[3] in AOI[1] classified by size class (less than 250k inhabitants; between 250k and 1M inhabitants; between 1M and 5M inhabitants; between 5M and 10M inhabitants; and above 10M inhabitants)

SOCIETAL VARIABLES TREND

The black line shows the dynamic of total pop[4] (x) and total BU[5] (y) within the AOI[1] as the trend of essential societal variables of human activity[8] between 1975 and 2015. Dashed lines represent the median historical slopes (from origin [0,0] to 2015) of the countries grouped by UN 2015 income class[9] to compare the AOI[1] slope in the selected period with the median historical slopes by income groups.

HIC - High income countries
UMIC - Upper-middle income countries
LMIC - Lower-middle income countries
LIC - Lower income classes

URBANISATION FACTORS

The black line shows the dynamics of pop[4] in RD[7] (x) and in UD[6] (y) of the AOI[1] as factors of the urbanisation process between 1975 and 2015[10]. The position of the markers classifies the urbanisation process of the AOI[1] as:

RDG - Rural driven de-urb[11] and pop[4] growth
UDG - Urban driven urb[11] and pop[4] growth
UPG - Urban polarised urb[11] and pop[4] growth
URD - Urban resilient urb[11] and pop[4] growth
RDD - Rural driven de-urb[11] and pop[4] decline
UDD - Urban driven de-urb[11] and pop[4] decline
RRD - Rural resilient de-urb[11] and pop[4] decline
RPG - Rural polarised de-urb[11] and pop[4] growth

National-specific definition and figures of urban areas

Note on key urbanisation figures reported by the AOI[1] within *The 2018 Revision of the World Urbanization Prospects* [12]:
- share of urban population in 2015
- number of cities above 300'000 inhabitants in 2015
- national definition of urban areas

Extracted from the Atlas of the Human Planet 2019

URBANISATION DYNAMICS	LAND USE EFFICIENCY - SDG 11.3.1	DEMAND FOR URBAN POLICY
Dynamic of the urbanisation process between 1990 and 2015 of the AOI[1] as the 2015 share of pop[4] in UD[6] (x) and the variation of the share of pop[4] in UD[6] in the period (y). The position of the marker determines if the AOI[1] is more or less urbanised than global average (76.5%, dashed line), and has urbanised faster or slower than the global average change (+3%, dashed line). Graduated coloured areas represent frequencies of AOIs from low (light) to high (dark)	Estimation of the LUE indicator[13] (SDG 11.3.1) between 1990 and 2015 for each settlement type in the UD[6] of the AOI[1]. LUE[13] is obtained as the ratio between land consumed growth rate and population growth rate in the selected period. The "Urban Domain LUE" value reported refers to the whole UD[6] of the AOI[1]. BU[5] is used as proxy for land consumed[13]	Relative change of total pop[4] (x) and of pop[4] in UD[6] (y) of the AOI[1] between 1990 and 2015. Bubble size shows the absolute variation of pop[4] in UD[6]. A relative change of UD[6] pop[4] higher than the total one implies an increased demand for services and facilities suitable for urban life. AOI[1] is highlighted with a black bubble and compared with all other AOIs (blue and red bubbles, for increasing or decreasing pop[4] in UD[6] respectively)

BUILT-UP AREA PER CAPITA BY SETTLEMENT TYPOLOGY AND EPOCH

Amount of BU[5] per capita (m^2) in each settlement type and epoch of the AOI[1]. The aggregated BU[5] per capita for the AOI[1] is provided in black lines. BU[5] per capita is obtained as the ratio between the sum of BU[5] and that of pop[4] in each settlement type at the corresponding epoch

Most populated UC[3, 14] in AOI[1]

Information about the most populated UC[3] in AOI[1] extracted from the GHS-UCDB[14]. Information include the total population, the areal extent, the average population density (inhabitants/km^2), the total built-up areas and the average built-up areas per capita (m^2) for the epoch 2015. Additional information (if available) include the river basin name, the biome type, the climate class, the soil type, the mean elevation above sea level and the average temperature and precipitation (all variables for the latest epoch available in the GHS-UCDB[14]). Additional information about exposure to natural hazards –Modified Mercalli Index, heatwave index, population and built-up areas exposed to flood and storm surge, are displayed if occur. The last paragraph (marked with the SDG 11 icon) displays the LUE value[13] (SDG 11.3.1) of the urban centre between 1990 and 2015, and, as proxies for SDG 11.7.1, the share of the urban centre population accounted in areas with dense presence of green[15] and the share of open spaces in the areal extent

ENVIRONMENTAL VARIABLES TRENDS

NDVI AND VEGETATED SURFACES	PM2.5 EMISSION	CO2 EMISSION
Amount of green vegetation, shown through the NDVI[15] value (green lines), and share of areas with high, medium or low presence of green (stacked bars)[15] in the most populated UC[3] of the AOI[1] at the corresponding epoch 1990 – 2000 – 2014 using 2015 UC fixed boundary approach[16]. The values are obtained from the GHS-UCDB[14]	Total PM2.5 emissions[17] in tonnes per year in the most populated UC[3] of the AOI[1] at the corresponding epoch 1975 – 1990 – 2000 – 2012 using 2015 UC fixed boundary approach[16]. The values are obtained from the GHS-UCDB[14] (by aggregation of emissions per sector)	Total CO_2 emissions[17] in tonnes per year in the most populated UC[3] of the AOI[1] at the corresponding epoch 1975 – 1990 – 2000 – 2012 using 2015 UC fixed boundary approach[16]. The value are obtained from the GHS-UCDB[14] (by aggregation of emissions per sector)

Extracted from the Atlas of the Human Planet 2019

5.2 Country urbanisation briefs contents and methodology

The reporting of Country Urbanisation Briefs uses a standard template. The two pages template for 184 countries contains: a map of the GHS-SMOD grid around the most populated urban centre in the country, the degree of urbanisation statistics, the hierarchy of urban centres, the societal variables trend, the urbanisation factors, the urbanisation dynamic, the land use efficiency –SDG 11.3.1, the demand for urban policy, the built-up area per capita by settlement typology and epoch, and the key statistics for the most populated urban centre in the country.

The methodology to produce the figures in the briefs is summarised in the section "Country urbanisation briefs contents and methodology" (in Annex 9.1 p. 505). For the 16 countries that do not have urban centre settlements, the brief contains most of the information above, but the focus on the most populated urban centre is substituted with a sample image of the Sentinel-1 or Sentinel-2 processed by JRC. For another 39 countries with less than 90 thousands inhabitants (most of which are islands), basic statistics on the degree of urbanisation are contained in a shorter brief, also with a map of the GHS-SMOD grid in the area of interest. Below the list of countries (containing the page number of the corresponding brief) the template for the 184 countries is presented. Each of the components of the brief is explained. Additional methodological insights are contained in the Annex 9.1.

Table 5 Inputs and scales of analysis for the production of Country Urbanisation Briefs contents

Country Urbanisation Brief Contents	**input**					**Scale**
	GHSL				**Other**	
	BUILT	**POP**	**SMOD**	**UCDB**		
The share of urban population in 2015		■	■			Country level
The number of urban centres in 2015				■		
The number of urban centre above 300k inhabitants in 2015				■		
Percentage of total population by settlement class		■	■			
Count of total population by settlement class		■	■			
Hierarchy of urban centres	■			■		
Societal variables trend	■	■				
Urbanisation factors		■	■			
National-specific definition and figures of urban areas					WUP	
Urbanisation dynamics		■	■			
Land Use Efficiency –SDG 11.3.1	■	■	■			
Demand for urban policy		■	■			
Built-up area per capita by settlement typology and epoch	■	■	■			
Urban Centre information				■		Urban centre level
NDVI and vegetated surfaces				■		
PM2.5 emission				■		
CO_2 emission				■		

Extracted from the Atlas of the Human Planet 2020

9.4 Disclaimer

9.4.1 General

The European Commission Joint Research Centre has taken considerable care in preparing the information presented in this Atlas, producing this dataset to improve public access to information. However, the producer accepts no responsibility or liability whatsoever with regard to the information on this dataset. This information is of a general nature only and is not intended to address the specific circumstances of any particular individual or entity; it is not necessarily comprehensive, complete, accurate or up-to-date; and it is sometimes based on external datasets over which the Commission has no control and for which it assumes no responsibility.

The summary includes results from automatic data analytics workflows including global best available satellite data records collected by the Landsat Earth Observation program and census data made available by National Statistical Offices. The population source data are collected by the Center for International Earth Science Information Network (CIESIN) mostly from the national statistical offices and are used as best open and freely available globally-harmonised national census spatial statistics available. Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer method on satellite imagery from Landsat. Despite the best efforts done, unavoidable information gaps in specific locations of the Earth surface and specific points in time, can result from unavailability of suitable satellite data or census data. Moreover, because the method for mapping built-up areas is based on physical observable characteristics as collected from space orbiting sensors, some settlements may be hardly detectable or simply invisible. Typical cases include: settlement carved in rock cliffs, underground settlement, or settlements made by straw huts under large tree canopies are nearly invisible with the data technology used to support the Atlas. GHS-BUILT was produced on the basis of Landsat data availability. For some geographic locations the collections were not complete. Detailed description of Landsat data availability processed for the production of GHS-BUILT is contained in Corbane et al. (2019).

The data is aggregated in four reference years 1975, 1990, 2000, and 2015. They should be considered as nominal dates aggregating the best suitable data in the given period.

Global and country briefs have been generated using multi-temporal GHSL datasets for the years 1975, 1990, 2000, and 2015, from the GHSL Data Package 2019 (Florczyk et al. 2019).

In case of cross-border settlement areas, only population and surfaces estimates related to the corresponding ISO code in the GADM 2.8 layer are considered in the summary figures.

The list of countries and territories used in this Atlas is taken from the Interinstitutional Style Guide 2011, Annex A5 of the Publications Office of the European Union (European Union 2011). *The designations employed and the presentation of materials and maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory or area or of its authorities, or concerning the delimitation of its frontiers or boundaries that if shown on the maps are only indicative. The boundaries and names shown on maps do not imply official endorsement or acceptance by the European Union. Kosovo: This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo Declaration of Independence.*

Urban centres names have been used for the only purpose of the Atlas and do not imply any official status recognition by the European Union. The naming of urban centres is performed with an automatic unsupervised classification based on OpenStreetMap (partially refined by EUROSTAT, GISCO Database).

The settlement maps are delineated from spatial grids in equal area World Mollweide geographical projection at 1x1 km resolution. The visualisation of the maps in section 5.3 and 5.4 of this Atlas are provided in Web Mercator projection, resulting in an apparent visual distortion of the original grid shape.

9.4.2 Country specific

* VAT: the Holy See / Vatican City State is not listed in the summaries due to geospatial data handling constraints.

* BTN: GHS-SMOD contains some cells in typology 30 within the GADM v2.8 extent of BTN. According to the GHS-UCDB for these urban centre(s) the quality control field (QA2_1V) is ≠ 1, hence no information is reported in the urban centre section of the corresponding Country Urbanisation Brief.

* GIB, MCO: No Urban Centres

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doi:10.2760/014159

ISBN 978-92-76-17418-9