Stats in the City – the GHSL Urban Centre Database 2025

Public release GHS-UCDB R2024

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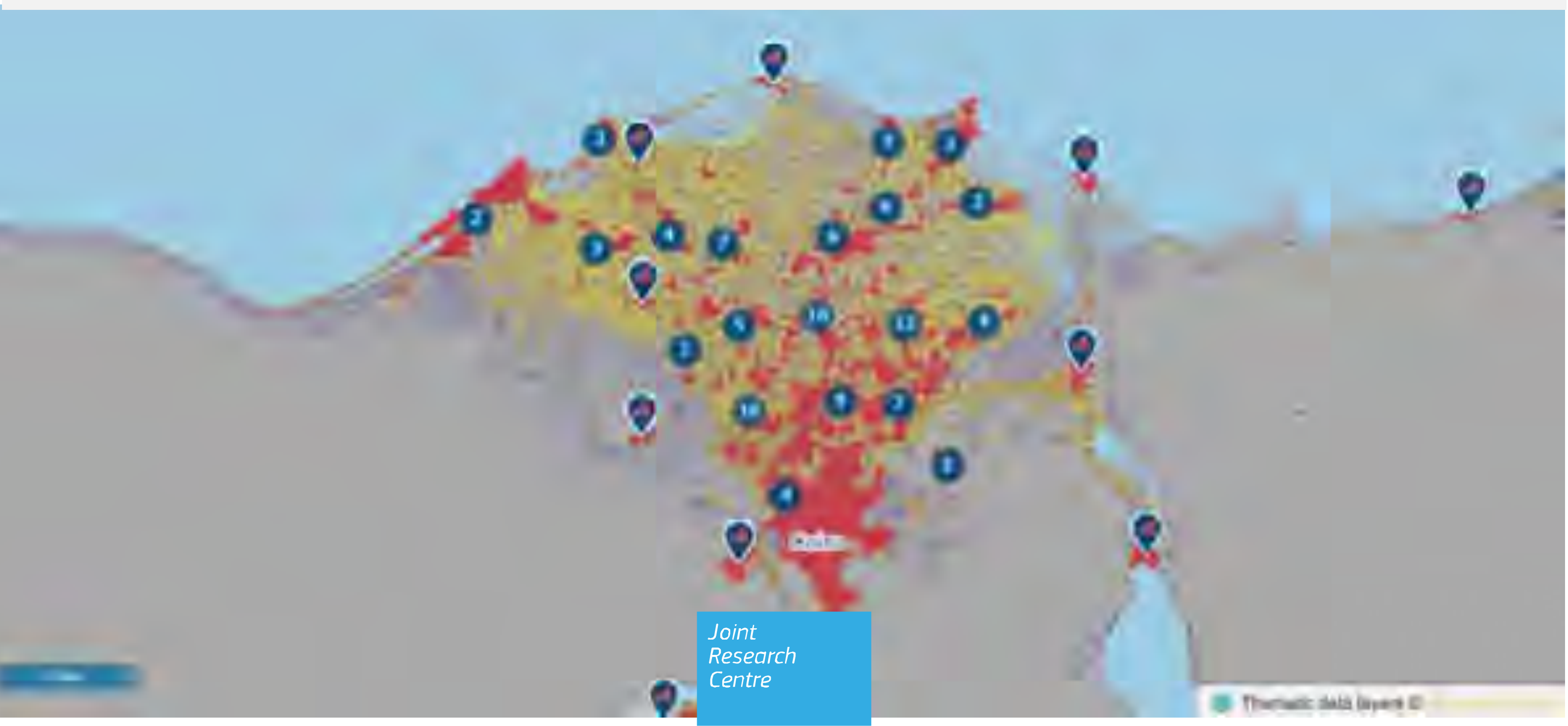

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Contents

Abstract

The Global Human Settlement Layer (GHSL) project produces new global spatial information, evidence-based analytics and knowledge describing the human presence on Earth. It operates in a fully open and free data and methods access policy. The knowledge generated with the GHSL is supporting the definition, the public discussion and the implementation of European policies and the monitoring of international frameworks such as the 2030 Development Agenda. GHSL data continue to support the GEO Human Planet Initiative that is committed to developing a new generation of measurements and information products providing new scientific evidence and a comprehensive understanding of the human presence on the planet and that can support global policy processes with agreed, actionable and goal-driven metrics.

This document describes the public release of the GHSL Urban Centre Database 2025 (GHS P2024). This release is based on the GHSL Data Package 2023, the Degree of Urbanisation to delineate spatial entities, and geospatial data integration from a variety of open source datasets to characterise them. The result is the most complete information system on cities to date with data for 11,422 quality controlled urban centres across 15 thematic domains, 63 indicator groups, 473 indicators, and 2602 attributes. The UCDB has two data streams, one based on the fixed delineation of the 2025 boundaries, the other based on a multi-temporal delineation of entities and their tracking over time.

The UCDB integrates data from Copernicus Services (including Emergency, Land Monitoring, Marine and Climate), peer-reviewed datasets (i.e. from the scientific literature), and institutional information systems (i.e. from the United Nations).

This document serves as a documentation to the dataset and includes **indicator fact sheets** to navigate the database.

Prior to cite this report, please access the updated version available at:
http://ghsl.jrc.ec.europa.eu/documents/GHS-UCDB_2024.pdf

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Contributors

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1 Introduction

1.1 Overview

The Global Human Settlement Layer (GHSL) project produces global spatial information, evidence-based analytics, and knowledge describing the human presence on the planet. The GHSL relies on the design and implementation of spatial data processing technologies that allow automatic data analytics and information extraction from large amounts of heterogeneous geospatial data including global, fine-scale satellite image data streams, census data, and crowd sourced or volunteered geographic information sources.

This document accompanies the public release of the GHSL Urban Centre Database 2025 (GHS-UCDB R2024A) and describes its contents.

Each product is named according to the following convention:

GHS-<name>_<spatial extent>_<release>

For example, a product name GHS-UCDB_GLOBE_R2024A indicates the Urban Centre Database (GHS-UCDB) produced globally in the release R2024A.

Derived and sub-set products of the GHS-UCDB are named with a unique identifier according to the following convention:

GHS_UCDB_<characteristic>_<spatialExtent>_<release>

For example, a layer name GHS_UCDB_THEME_GLOBE_R2024A indicates the GHS-UCDB subset by thematic domain global, included in the release R2024A.

The GHS-UCDB contains the following product and its distributions:

- GHS_UCDB_GLOBE_R2024 – GHS Urban Centre Database global dataset as geopackage, and xlsx table with global coverage based on fixed boundary delineation of the urban centres in 2025;
- GHS_UCDB_REGION_GLOBE_R2024A – GHS Urban Centre Database by UN Region of the World as geopackage, and xlsx tables (all thematic domains, urban centres regional subset);
- GHS_UCDB_THEME_GLOBE_R2024A– GHS Urban Centre Database by thematic area as geopackage, csv and xlsx tables (all urban centres, individual thematic are subset);
- GHS_UCDB_CONTRIBUTIONS_R2024A – GHS Urban Centre Database contributors dataset as a csv and xlsx (all urban centres, a specific indicator);
- GHS_UCDB_MTUC_GLOBE_R2024A – GHS Urban Centre Database global dataset as geopackage, csv and xlsx tables with global coverage based on multi-temporal delineation of entities and their tracking over time.

1.2 Rationale

Open data and free access are core principles of the GHSL (Melchiorri et al. 2019). They are aligned with the Directive on the re-use of public sector information (Directive 2003/98/EC[1]). The free and open access policy facilitates the information sharing and collective knowledge building, thus contributing to a democratisation of the information production.

The GHSL Urban Centre Database contains the new GHSL data produced at the European Commission Directorate General Joint Research Centre in the Directorate for Societal Resilience and Security, in the Risk Management Unit (E.1) in the period 2023-2024 and its integration with other geospatial data.

1.3 History and Versioning

The GHSL Urban Centre Database 1.0 (GHS_STAT_UCDB2015MT_GLOBE_R2018A) was released first released in 2018 relaying on previous versions of the GHSL Data Package (R2018). The GHS Urban Centre Database (GHS-UCDB) described spatial entities called "urban centres" according to a set of multi-temporal thematic attributes gathered from the GHSL sources integrated with other sources available in the open scientific domain.

A version v1.1 was released in 2019 (GHS_STAT_UCDB2015MT_GLOBE_R2019A) fixing values format, previously encoded as strings, and introduced the gpkg format (GeoPackage) OpenSource to encode UTF-8 characters (needed for new names) (v1.1), update of the Travel Time to Country Capital data by fixing issues in the algorithm and update of Greenness data by fixing issues in some values. In 2020, a v1.2 was released to update of CO2 and PM2 emissions data with the newly released EDGARv5.0 results aligned with the GHSL epochs (1975, 1990, 2000, 2015). This dataset is now based on population-based spatial proxies developed using the GHSL Data Package 2019 (Florczyk et al. 2019), update of the main Urban Centre name by using more reliable algorithm and input data (GISCO and OSM datasets).

In 2023 and 2024 scientific contributions consolidated the GHS-UCDB foundations with a Nature Scientific Data descriptor, and a paper focusing on the innovations on urban data reporting introduced with the GHS-UCDB (Melchiorri 2022; Melchiorri et al. 2024).

1.4 Main Characteristics

The GHSL Urban Centre Database 2025 harmonises data reporting for cities addressing semantic clarity and consistency, and thematic and geographic consistency data gaps.

The GHSL Urban Centre Database 2025 is a significantly improved, expanded and tailored product compared to its predecessor. Among the main characteristics:

- **Extended time series**: 1975 – 2030 with 5 years interval up to annual coverage;
- **Wider thematic scope**: 15 thematic domains (GHSL information, Socioeconomic, Land Use Land Cover, Exposure, Hazard and Risk, Greenness, SDGs, Climate, Natural Systems, Health, Water, Infrastructure, Geography, General Characteristics, Emissions), resulting in 473 indicators, and 2602 attributes; 63 indicator groups for a fixed delineation of urban centres,

[1] http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32003L0098

and 2 thematic domains, 10 indicator groups, 21 indicators for multi-temporal urban centres delineation.

- **Copernicus Services data integration protocol**: workflow for the aggregation or sampling, of geospatial data produced in the framework of Copernicus Services and reporting/integration for urban centres over time (from the Emergency, Land, Climate and Marine);
- **Off the shelf science for policy data**: information format tailored to user types (geospatial, spreadsheet, thematic subsets, regional subsets) with direct link to SDG 11 indicators, New Urban Agenda, Paris Agreement and Sendai Framework as well as EU policies. The dataset has been co-developed by policy stakeholders such as DG REGIO and UN-Habitat.
- **Collaborative dataset architecture**: the specific distribution dedicated to collaborators allow to ingest indicators that are produced by the users-crowd and scientific community by keeping the Unique Identifier of the urban centres.

The GHS-UCDB aggregates the most updated datasets from a variety of sources, including scientific datasets, literature, volunteered/crowd datasets, and data from institutional sources. The GHS-UCDB addresses the gaps in semantic clarity about urban/city datasets, the consistency of the delineation of such areas, and offers a complete and multi-thematic information for such harmonised areas –the urban centres (Table 1).

Table 1 Relationship between observed data gaps, data features, design principles and solutions adopted for the production of GHS-UCDB

Data gaps	**Features**	**Principles**	**GHS-UCDB solutions**
Semantic clarity and consistency	Definition	1. Standardized definition of the AOI	Urban centres obtained by the application of the Degree of Urbanisation Method – GHS-SMOD dataset. Responsive to need for: 2. <u>analysis of the evolution of the territory that is today an urban centre</u> (fixed boundary dataset GHS_UCDB_GLOBE_R2024) 3. <u>tracking over time of specific entities that change over time their territorial shape</u> (multi-temporal boundaries dataset GHS_UCDB_MTUC_GLOBE_R2024A)
Thematic and geographic completeness	Coverage	4. Consistent global mapping	Global geographical coverage, 11,422 quality-controlled entries with population ≥ 50,000 inhabitants in 2025
	Spatial representation	5. Spatially explicit delineation of cities	Geospatial representation with extents at 1 km grid cell resolution (polygons), and centroid XY location (point)
	Spatial, temporal and	6. multi-thematic,	Variables across 15 thematic domains, 63 indicator groups, 470+ indicators, and 2600+

	thematic resolution	multi-dimensional, and multi-temporal attributes	attributes. Temporal domain spanning 1975 – 2030 with 5 years interval up to annual coverage
	Usability	7. comparability of information in space and time	Thematic, geographical and semantic consistency

Terms of Use

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[2] JRC Data Policy https://doi.org/10.2788/607378

2 GHS_UCDB_GLOBE_R2024 - GHS Urban Centre Database multi-temporal and multi-dimensional attributes (1975-2030)

The GHS-UCDB is a dataset distributed in geospatial vector format, and in table format providing attributes to characterise 11,422 urban centres between 1975 and 2030 using the urban centres as reporting units (spatial entities).

The GHS-UCDB is produced by geospatial data integration between Areas of Interest or “zones”, the urban centres defined according to the Degree of Urbanisation method, and a variety of open geospatial data. Figure 1 displays the GHSL data anatomy and the series of GHSL data that are upstream of the GHS-UCDB. The database is an Analytical Dataset of the GHSL as it is derived from the analysis of GHSL datasets in combination with other free and open datasets.

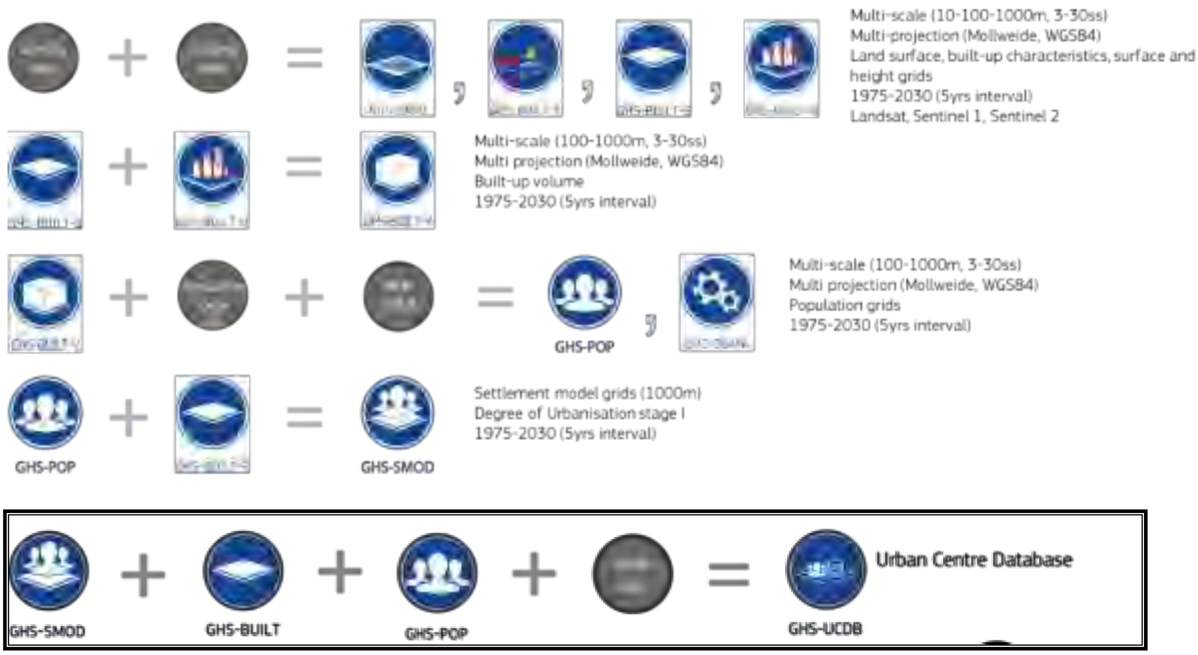


Figure 1 GHSL Data Anatomy and upstream GHSL products for the production of the GHS-UCDB

The production of the GHS-UCDB is based on two main processes (Figure 2): the delineation of the urban centres (the AOIs), and the characterisation of such spatial units with multi-thematic and multi-dimensional attributes.

The **delineation of the urban centres** is obtained from the GHS-SMOD product (European Commission. Joint Research Centre. 2023), that implements the Degree of Urbanisation method – a standardised definition of urban and rural areas recommended by the UN Statistical Commission for international statistical comparison. From the GHS-SMOD Level 1 the class 3 (urban centres) is extracted and retained as AOI. There are two approaches to delineate urban centres. One keeping the 2025 boundaries fixed (addressed in 2.1.6). Another tracking the evolution of the urban centres over time (addressed in 2.1.7).

The **geospatial data integration** is carried out with GIS techniques to obtain specific attributes belonging to an indicator group and to a thematic area for each of the urban centres.

Figure 2 Logical workflow for the delineation of urban centres spatial entities by applying to raster grids the population density, size and grid cell contiguity rules of the Degree of Urbanisation method.

2.1 Definitions

Sub-section 2.1.1 to 2.1.5 refers to the fixed boundary database only.

2.1.1 Thematic Domain

Refers to one of the 15 broad topics covered by the GHS-UCDB. An example of such thematic domain is *Exposure*. Under exposure the GHS-UCDB groups a variety of families and indicators, further divided in specific attributes.

2.1.2 Indicator groups

Refers to the 63 upper classifications within each thematic domain. An example of such family is *Flood*. Under the families there are several indicators, each further subdivided into attributes.

2.1.3 Indicator

Refers to the classification of an indicator group into 473 subdivisions (indicators) in the GHS-UCDB. An example of an indicator is *Total Population exposed to 100 years return period floods*. Each indicator is further divided into attributes.

2.1.4 Attribute

Refers to the most specific level of the GHS-UCDB in the form of 2602 specific columns of the database (attributes). An example of an attribute is *Total Population 1995 exposed to 100 year return period Flood.*

2.1.5 value

Refers to the individual value in the GHS-UCDB as intersection of the individual urban centre record for the specific attribute. The UCDB has more than 23.5 million data records. For example, 7568580.457 is the total 1995 population exposed to a flood (100 year return period) in Dhaka (Bangladesh).

2.1.6 Fixed Boundary

Refers to the concept of a static definition of the urban centre spatial extent. This extent is delineated in 2025 and kept fixed (back and forward) in time.

2.1.7 Multi-temporal Boundary

Refers to the concept of tracking the urban centres delineated in 2025 and linking its changing boundaries through time (i.e. at each epoch urban centre boundaries are linked to each of the 2025 urban centres, see section delineation). Therefore, urban centres identified in 2025 maintain their ID in the other epochs and are subject to changes in their boundaries. This term introduces also birth dates of an urban centre, that is the first year in the database when a cluster of grid cells meet the urban centre definition (i.e. population density ≥ 1,500 inhabitants/km2 and total population ≥ 50,000 inhabitants), and their death whena cluster of pixels falls below the urban centre definition thresholds.

The Multi-temporal Boundary database has 2 thematic domains, 10 indicator groups, 21 indicators, 169 attributes and 1.7 million data records (values).

With respect to 2.1.6 and 2.1.7 the user is warned that the numeric values for a specific attribute or field in the fixed boundary and multi-temporal boundary dataset are different and not comparable. Only the values for 2025 are comparable between the two databases.

2.2 Improvements compared to the previous release

The GHS-UCDB R2024 improves its 2019A release in various ways:

1. **New GHSL input**, based on the R2023A release with a series of key improvements to the GHSL baseline data (BUILT, POP and SMOD) also resulting in an extended time series (1975 – 2030 with 5 years interval and up to annual coverage);
2. **Refines the delineation of the urban centres** with a fixed boundary and multi-temporal boundaries approach;
3. Expands the thematic scope and integrates data from Copernicus Services;
4. Further improves the **quality control** of urban centres spatial entities with a data-driven decision ensemble methodology (further explained in 2.6);
5. **More flexible and tailored products** to user needs by diversifying data format (geospatial, spreadsheets) and subsetting the dataset by region of the world or thematic domain;
6. **Contributed dataset product** to flexibly incorporate and distribute data produced from the crowd.

2.3 Delineation of the Urban Centres – fix boundaries

The GHS Settlement Model layers (GHS-SMOD) GHS-SMOD_GLOBE_R2023A delineates and classify settlement typologies (Figure 5) via a logic of cell clusters population size, population and built-up area densities as defined by the stage I of the Degree of Urbanisation (European Commission. Statistical Office of the European Union. 2021) and recommended by the UN STAT COM. The GHS-SMOD is derived from the GHS-POP (GHS-POP_GLOBE_R2023A, version 1.0) and GHS-BUILT-S (GHS-BUILT-S_GLOBE_R2023A, version 1.0) released within this GHSL Data Package 2023 (GHS P2023).

"Urban Centre" consists of contiguous grid cells (4-connectivity cluster) with a density of at least 1,500 inhabitants per km^2 of permanent land, and has at least 50,000 inhabitants in the cluster with smoothed boundaries (3-by-3 conditional majority filtering[3]) and <15 km^2 holes filled[4]. **The urban centre is defined in 2025**. The delineation of urban centres is done using a **split-by-country version** of the GHS-SMOD R2023A (i.e. clusters are delimited by country boundaries, based on GADM 4.1). (Figure 3). The ID of a fixed boundary urban centre constitute the territorial extent of the urban centre in 2025, and the database explains the evolution of such territory over time.

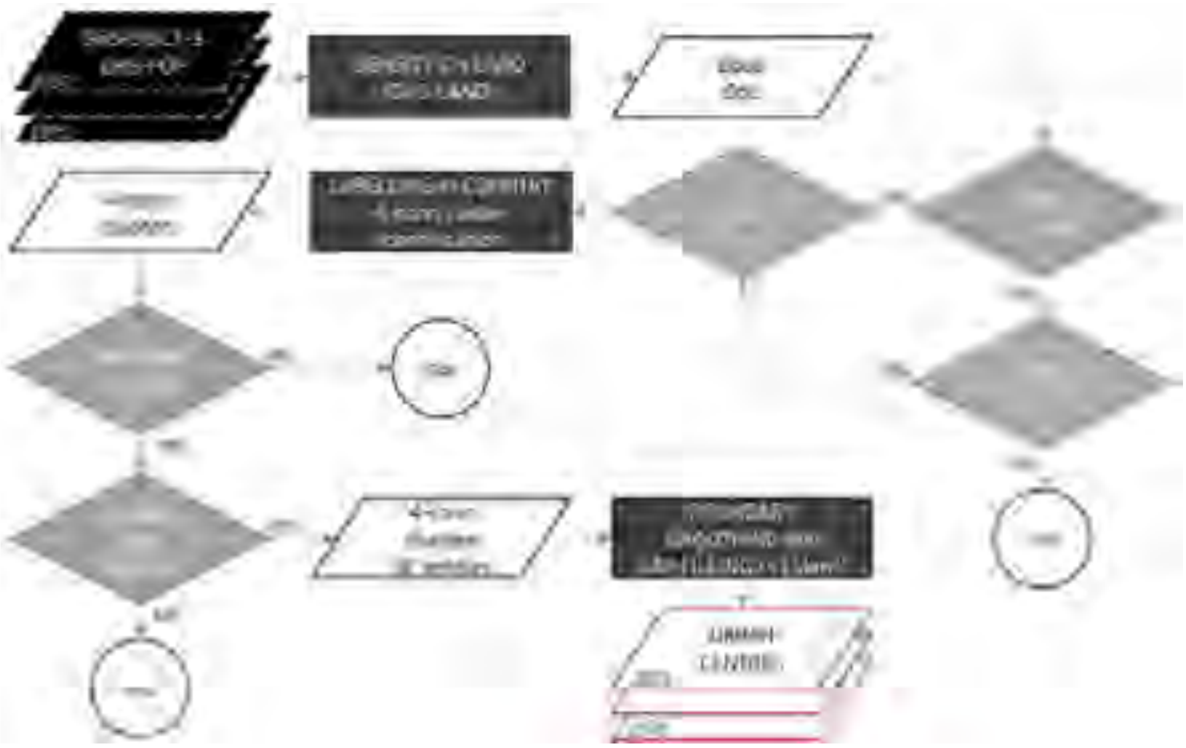


Figure 3 - Schematic overview of subset schema to define urban centres from the GHSL SMOD entities workflow logic. "pop" represents the population abundance per grid cell; "pop_d" represents the population density on permanent land; "bu" represents the built-up share per grid cell; "bu_d" represents the built-up density on permanent land. "DENSITY ON LAND"

[3] Water is excluded and majority is computed among populated or land (land >= 50%) pixels. Cases of draw with even number of pixels are taken as positive realisation.

[4] In a few countries with relatively low-density urban development and a strong separation of land use functions, the Degree of Urbanisation generates multiple urban centres for a single city. Creating urban centres and dense urban clusters using both cells with a density of at least 1,500 inhabitants and cells that have an optimal built-up density on permanent land resolves this issue. Such highly built-up cells typically contain office parks, shopping malls or factories and the optimal threshold is identified according to the average built-up density (GHS-BUILT-S 2020) in clusters with a density of at least 1,500 inhabitants with a minimum population of 50,000 people.

process fill built-up cells on water with max between 50% and built-up share value and population on water with global average built-up per capita. (*) this procedure of enforcement logic allows the delineation of Urban Clusters Entities which contains by definition the Urban Centres and all 2X classes. Each entity has a corresponding vector boundary.

2.4 Delineation of the Urban Centres – multi-temporal boundaries

The Multi-temporal dynamic of the Urban Centres (GHS_UCDB_MTUC_GLOBE_R2024A) addresses these behaviours by setting a reference epoch to define the list entity IDs to follow, adding future (i.e. those yet to be born in reference year) or past entities (i.e. those died before reference year), and linking boundaries across epochs. The linking methodology relies on the idea that a pair of entities of two epochs in a time interval of 5 to 10 years has a spatial overlap and represent the same urban centres across time. Not all overlaps can be considered significative (e.g. is a single pixel overlap enough to link boundaries?), therefore we defined a set of alternative (i.e. 'or') criteria based on the population size in the overlap (≥50,000, i.e. the overlap matches itself the UC thresholds) and its share of total urban centre population in the two epochs (≥50%). These three rules allow to keep track of 'shrinking' cities (i), 'expanding' cities (ii) and 'moving' (i.e. shrinking on one side and expanding in another) cities (iii); dropping minor overlaps at fringes of neighbouring urban centres with few inhabitants. Between two epochs, entities can have 'many–to-one', 'one-to-many' or 'many-to-many' relationships due to significative overlaps. The assumption of a defined list of urban centres implies that all these relationships have to be simplified into 'one-to-one'. The 'many-to-one' relationships (i.e. many entities in past or future years having overlapping boundaries with one entity in the reference year) are considered as spatial dynamics of a single urban centre: one urban centre in the reference epoch that originated from a merge of many entities in the past, or that will split in the future. In both cases the ID of the urban centre in the reference epoch is assigned to all entities of the 'many-to-one' relationship. The 'one-to-many' and 'many-to-many' relationships (i.e. many entities in past or future years having overlapping boundaries with many entities in the reference year) are solved by splitting single entities into parts each one assigned to an urban centre of the reference epoch. The split is performed by assigning each pixel of an entity to the most attracting urban centre. The attracting intensity (inspired by the electric field strength due to a dipole) of the urban centre *U* on the pixel *i* is computed as follow:

$$I_{i,U} = \sum_{j \in U} \frac{POP_j}{dist(i,j)^3}$$

where POP_j represents the population in the pixel *j* (belonging to the urban centre *U*), and *dist(i,j)* the distance between pixels *i*, and *j*. Distances are computed as shortest path on a graph built with pixels centres as nodes having arcs with all the 8 adjacent pixels. Each arc has a cost equal to the planar distance between nodes. To enforce spatial contiguity distances are bounded within the dissolved boundary of all entities involved in the split (i.e. costs of arcs crossing the boundaries are set to infinite).

The MTUC layer released within the GHS-SMOD R2023 dataset is obtained by setting as reference year the 2020 and stepwise moving backward to 1975 and forward to 2030 (i.e. first step: reference year 2020, comparison year 2015, the 2020 ID are linked and transferred to 2015 entities; second step: reference year 2015 with IDs at previous step, comparison year 2010; and so on). The list of urban centres across time is fixed and determined by the GHS-SMOD urban centres of 2020, plus those that died before 2020 or will be born after 2020. Each of these has a unique identifier, was born in a given year (i.e. first appearance), or already there in the first GHSL epoch (1975); and it changes boundaries until its death (i.e. last appearance), or is still present in 2030 (Figure 4).

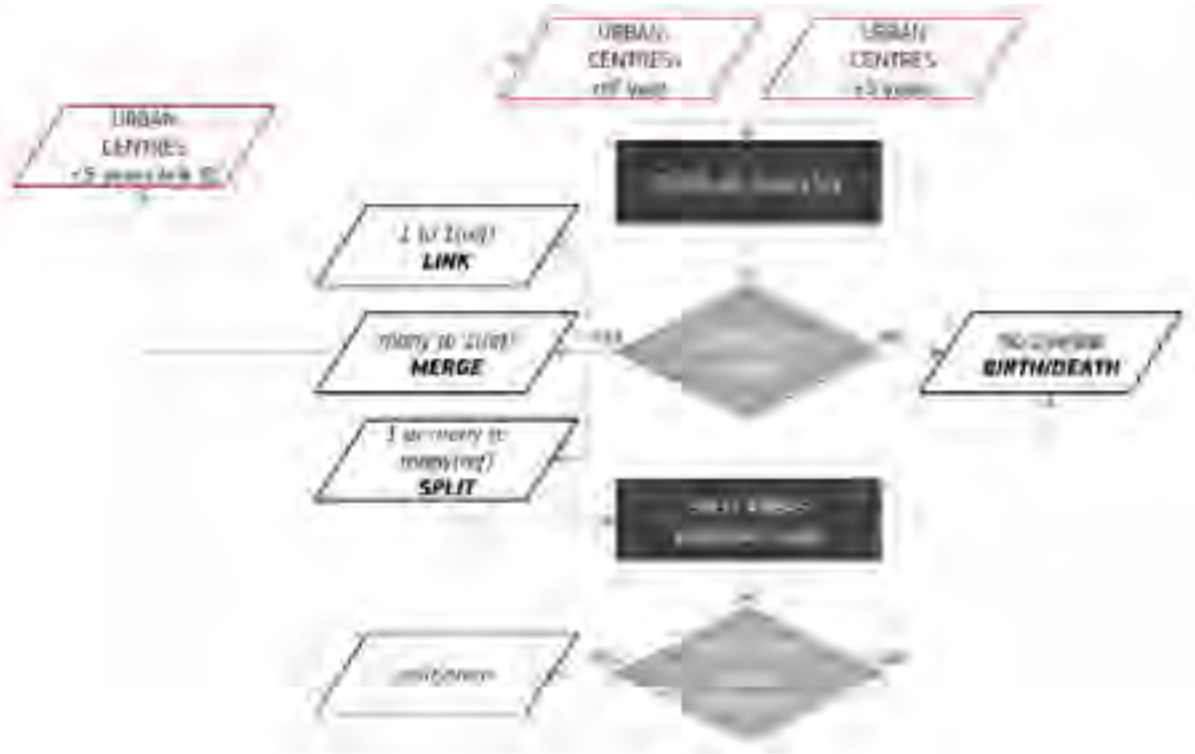


Figure 4 Schema of the MTUC model: starting from the reference year (ref year) 2025 the model analyse the overlaps between urban centre (ref year) and those of the previous epoch (-5 years; the processing is repeated for future starting from 2025 and comparing +5 years). Significative overlaps (i.e. overlaps hosting [A] population >= 50,000 or [B] >= 50% of ref year urban centre population or [C] >= 50% of +-5-years urban centre population) are kept. Four possible cases of relationships (+-5-years to ref year) are identified: (1) 'No overlaps', BIRTH (when comparing -5-years layer) or DEATH (when comparing +5-years layer); (2) 'one to one' relationships, LINK (the ID of ref year is inherited in the +- 5-years layer), (3) 'many to 1', MERGE (all the 'many' boundaries in the +-5-years layer inherit the ref year ID); (4)0 'one or many to many', SPLIT (areas of the +-5-years layer are split according to a maximum potential function computed in each pixel of the areas to be split from all the 'many' urban centres of the ref year; each split area inherit the ID of the ref year urban centre with the highest potential). The set of the new defined IDs it is used as input as ref year for the subsequent epoch analysis (e.g. completing ref year 2025 and -5-year 2020, at next iteration the newly defined 2020 IDs are used as ref year to link the 2015).

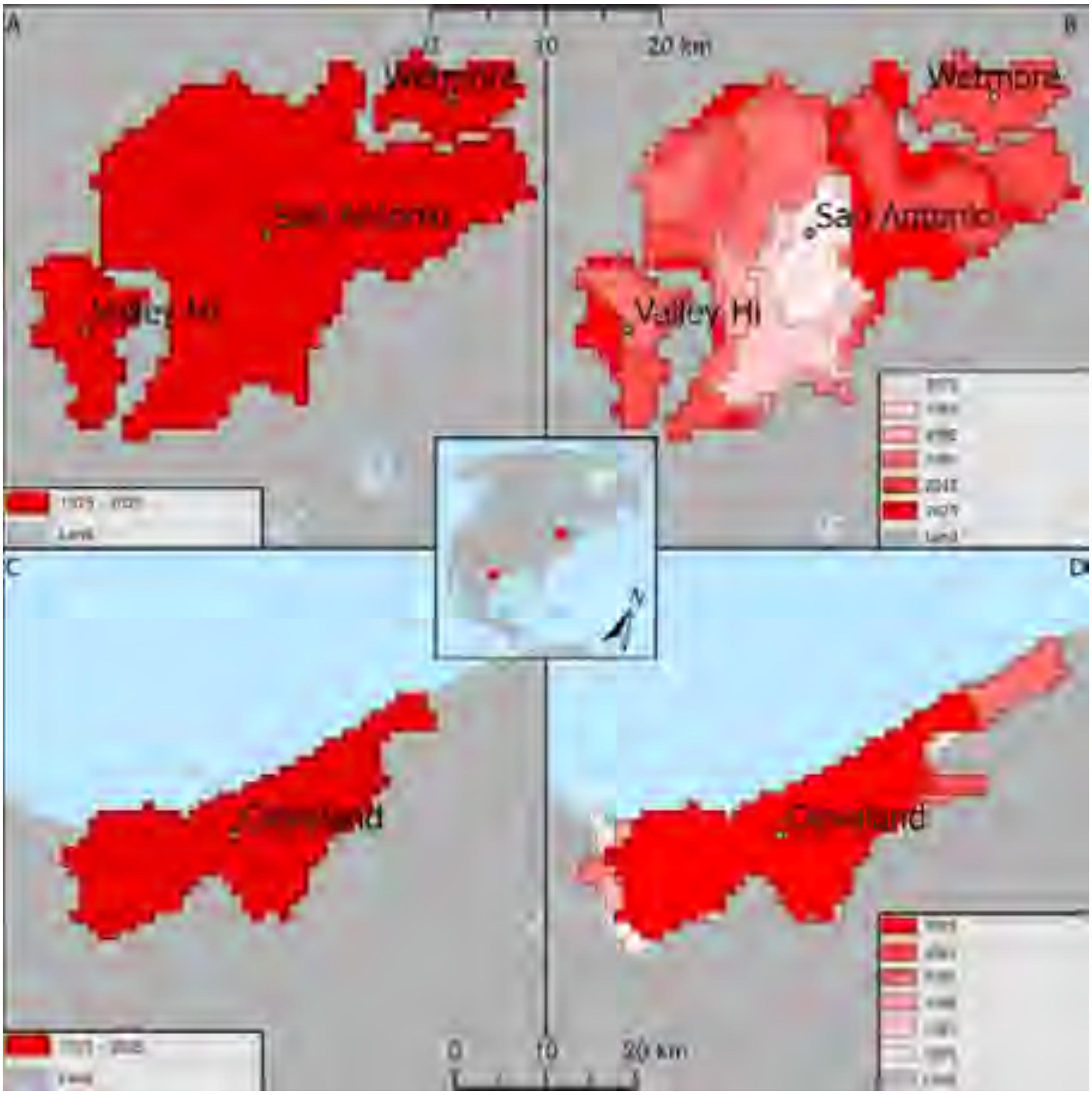


Figure 5 *Comparison of the 'fixed boundary' and the 'multi-temporal boundary' approaches. The 'fixed boundary' (A, C) computes statistics of the GHS-UCDB across all epochs (1975-2030) based on the fixed 2025 boundaries; the 'multi-temporal boundary' approach assign a different boundary to each epoch allowing to follow the urban centre growth (B) and the urban centre shrinkage (D), and computing statistics of each epoch within the relevant boundary.*

2.5 Geospatial data integration

The GHS-UCDB is produced in GIS (Geographic Information System) environment by geospatial data integration of large volume of geospatial data. Geospatial data across the 15 thematic domains are linked to urban centres entities mainly via GIS operations. Most of the attributes are generated with zonal statistics (i.e. sum or average of source data within each urban centre spatial extent).

For example, population data for a specific year (as input value raster) are summed within the urban centre extent 2025 (as zone field) for the fixed boundary dataset, or in the spatial extent of that urban centre ID in the specific year.

Other indicators and attributes are computed with spatial join operations. For example, most of the location variables such as country, geographic region, are obtained using the urban centres as target features, and the spatial delineation of the attribute as join features.

The documentation of specific indicators is contained in the fact sheets section (2.9 and 2.10).

2.6 Quality control of the urban centres

The purpose of the quality control is to assess the plausibility of the 'Urban Centres' (UC) entities included in the GHS-UCDB database. These entities were identified in the GHSL data by applying a set of rules defined by the DEGURBA methodology (Dijkstra et al. 2021; European Commission. Statistical Office of the European Union. 2021). Within this method, a UC is defined in a uniform grid sampling space of 1 km^2 as a connected component with a population density greater than 1500 inhabitants/km^2 and a total population exceeding 50,000 inhabitants. These criteria are referred to as the 'canonical principles' of the UC abstract definition.

A plausibility test model was developed using a data-driven decision ensemble methodology. This ensemble is supported by univariate linear regression, stratified by World Bank Income Group (WBincomeGroup) and by year. The predictors are the total sum per UC of modelled population grids and land use grids, which are independently produced with respect to the Global Human Settlement Population (GHS_POP) and the Global Human Settlement Model (GHS_SMOD), forming the basis for the UCDB.

The objective of the model is to determine the plausibility that the positive occurrences of the UCs reflect true data cases and are not artefacts in the input data. These artefacts may be generated by residual erroneous values in the input census data or erroneous spatial encoding of the input census tracts, leading to misplacement of population information.

The plausibility of each UC occurrence in any given year, supported by the GHSL data, is measured by a voting schema. This ensures that the majority of independent sources corroborate the finding that these UCs align with the 'canonical principles' internationally agreed upon to define the UC abstraction.

A list of nine predictors was selected, including three population raster grids and six land use raster grids. To approximate the residential surface, the non-GHSL land use predictors that do not discriminate between residential (RES) and non-residential (NRES) built-up surfaces were factorized by the residential surface (RS) share of the single UC, as predicted by the GHSL (time-variant).

1. POP: GHS_POP resident population (time-variant)
2. POP: LANDSCAN ambient population (2020)
3. POP: WorldPop constraint UN aligned (2020)
4. LANDUSE: ESRI urban surface (2019-2020) * RS
5. LANDUSE: Copernicus Global Land Cover (CGLC) urban surface (2018-2020) * RS
6. LANDUSE: GHS_BURES = GHS_BUILT - GHS_BUILT_NRES (time-variant)
7. LANDUSE: ESA World Cover urban surface (2020-2021) * RS
8. LANDUSE: WSF2019 settlement footprint surface (2018-2019) * RS
9. LANDUSE: WSF2015v2 settlement footprint surface (2014-2015) * RS

Each predictor was tested using the Pearson Correlation coefficient for each stratum defined by WBincomeGroup and year (1975-2025). A balanced set of the best six predictors (three POP, three LANDUSE), including the GHS_POP, was selected for each stratum.

Consequently, the voting schema may provide from one to six votes. One vote indicates a strong failure, while two votes indicate a mild failure. The implications of three to six votes provide a measure of confidence that we can reject the hypothesis that the UC is an artefact of GHS_POP data or an artefact of the SMOD implementation, which relaxes the UC canonical rules internationally agreed upon (relaxed density criteria, gap filling, smoothing of the UC perimeter).

The model development experimented with various options. The most accurate model, based on the composite of expert opinions in a random sample of 778 UCs, was selected. The chosen model architecture applies a positive boosting factor proportional to one epsilon error, reducing the probability of false alarms in detecting strong failures. Moreover, the selected model architecture exclusively applies the canonical rules of “POP size AND density over LAND” for assessing the UC. In the sampled universe, the model prediction is three times more conservative than the composite of expert opinions in determining a strong failure rate. The vote scores collected by the UC in the various years were finally composed using two alternative strategies: ‘VOTE_AVERAGE’ and ‘VOTE_MAX’. The latter, consistent with the necessity to provide the most conservative fail rate, was selected.

Final decisions based on the voting schema were implemented in the GHS-UCDB data as follows and results in 11,422 entities:

1. GHS-SMOD class 30 entities with VOTE_MAX = 1 were excluded from the database. 264 class 30 entities did not enter the GHS-UCDB as they did not pass the plausibility test
2. GHS-SMOD class 30 entities with VOTE_MAX = 2 were encoded as ‘low plausibility’. 266 urban centres
3. GHS-SMOD class 30 entities with VOTE_MAX = 3 were encoded as ‘medium plausibility’. 304 urban centres
4. GHS-SMOD class 30 entities with VOTE_MAX ≥ 4 were encoded as ‘high plausibility’. 10852 urban centres

2.7 User guide

This section explains with screenshots and step by step guidelines how to open the GHS-UCDB geopackage in different GIS environments.

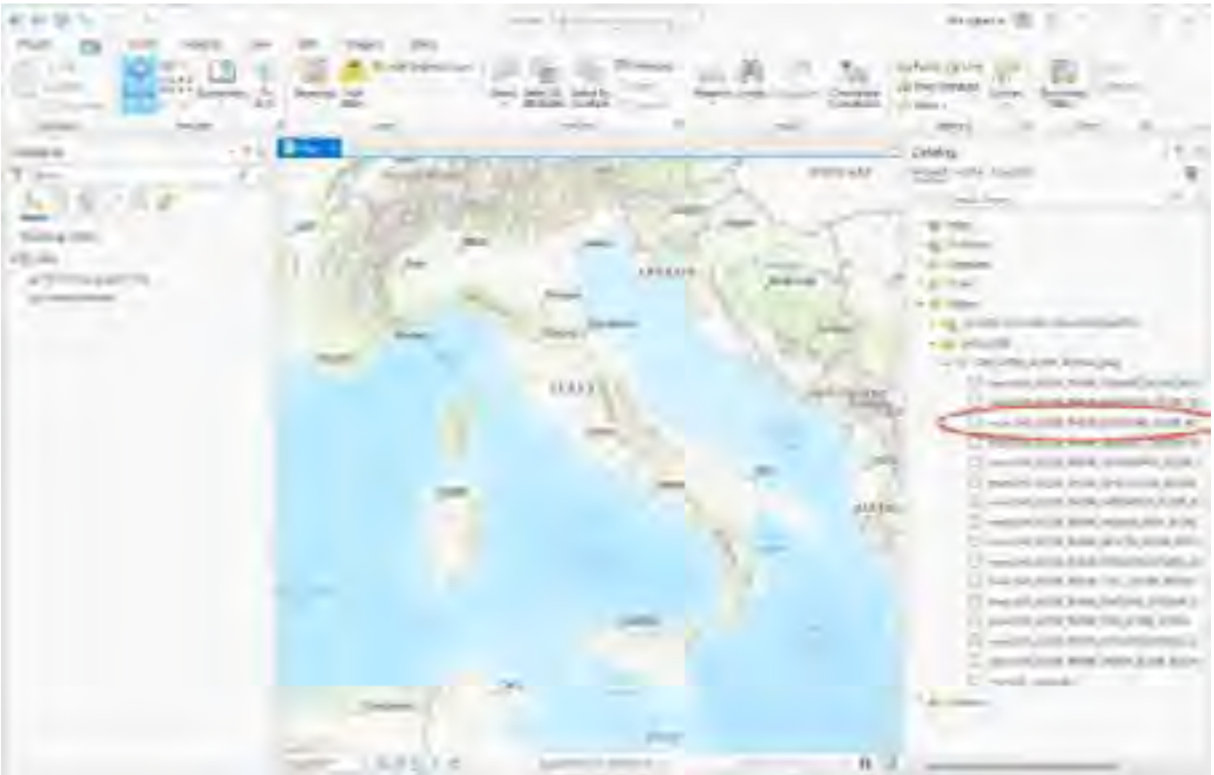
2.7.1 ArcGIS Pro

Full detail about how to import GeoPackage files can be found here:

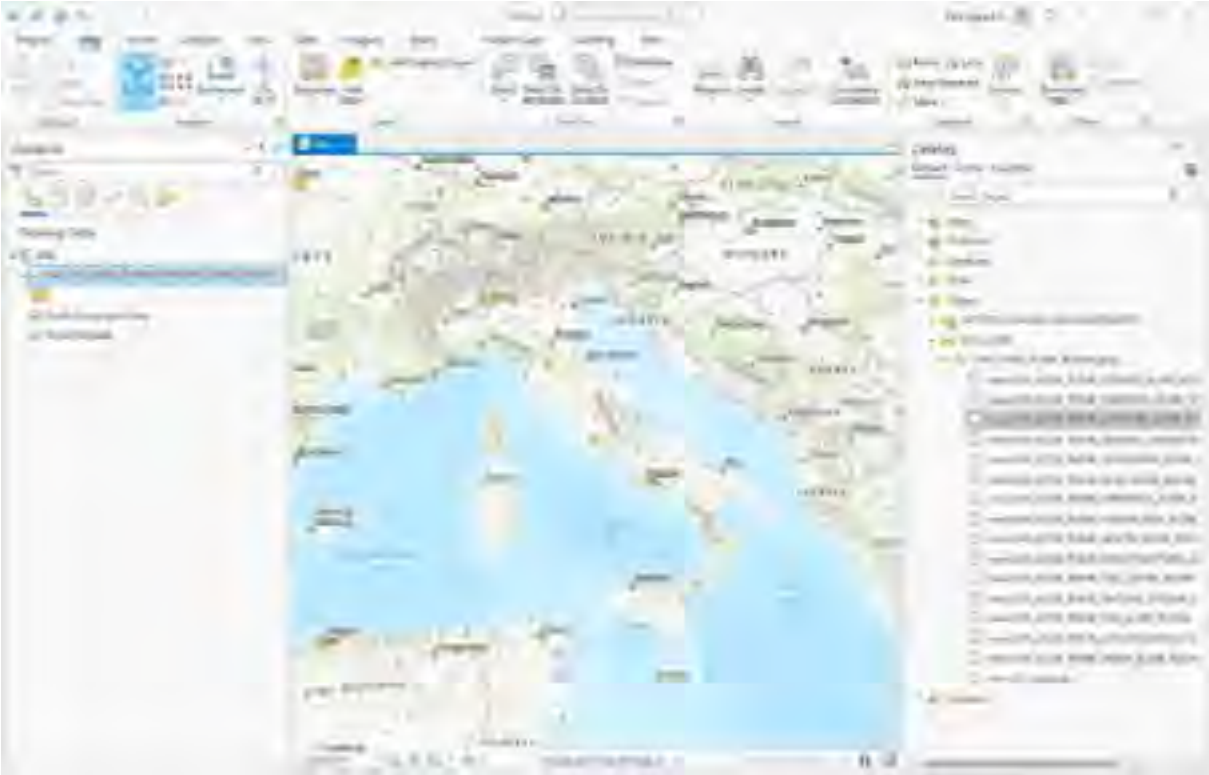
https://pro.arcgis.com/en/pro-app/latest/help/data/databases/work-with-sqlite-databases-in-arcgis-pro.htm

1. Connect to a folder that contains the GHS-UCDB GeoPackage (e.g. “Download/GHS_UCDB”)

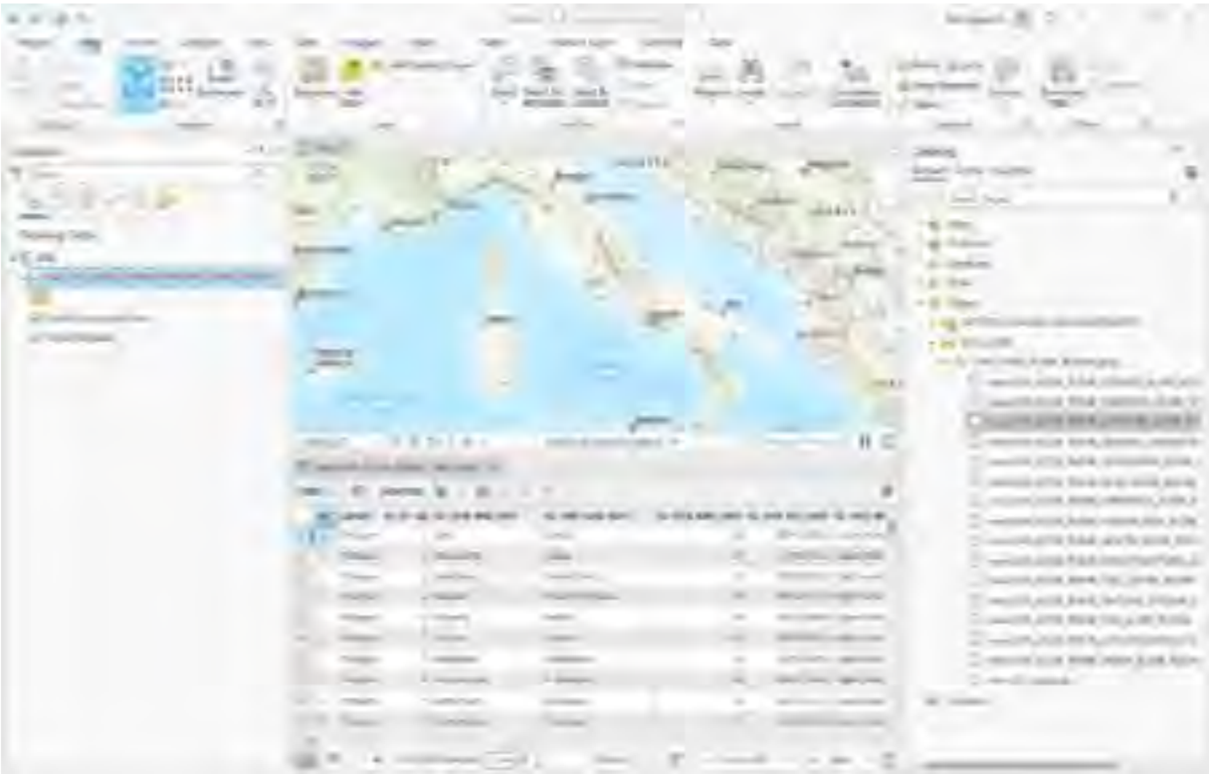
2. In the Catalog panel, browse to the folder to which you connected in the previous step. Browse to the SQLite database or GeoPackage to start using its items.



3. To use the exposure data drag it to the Contents pane

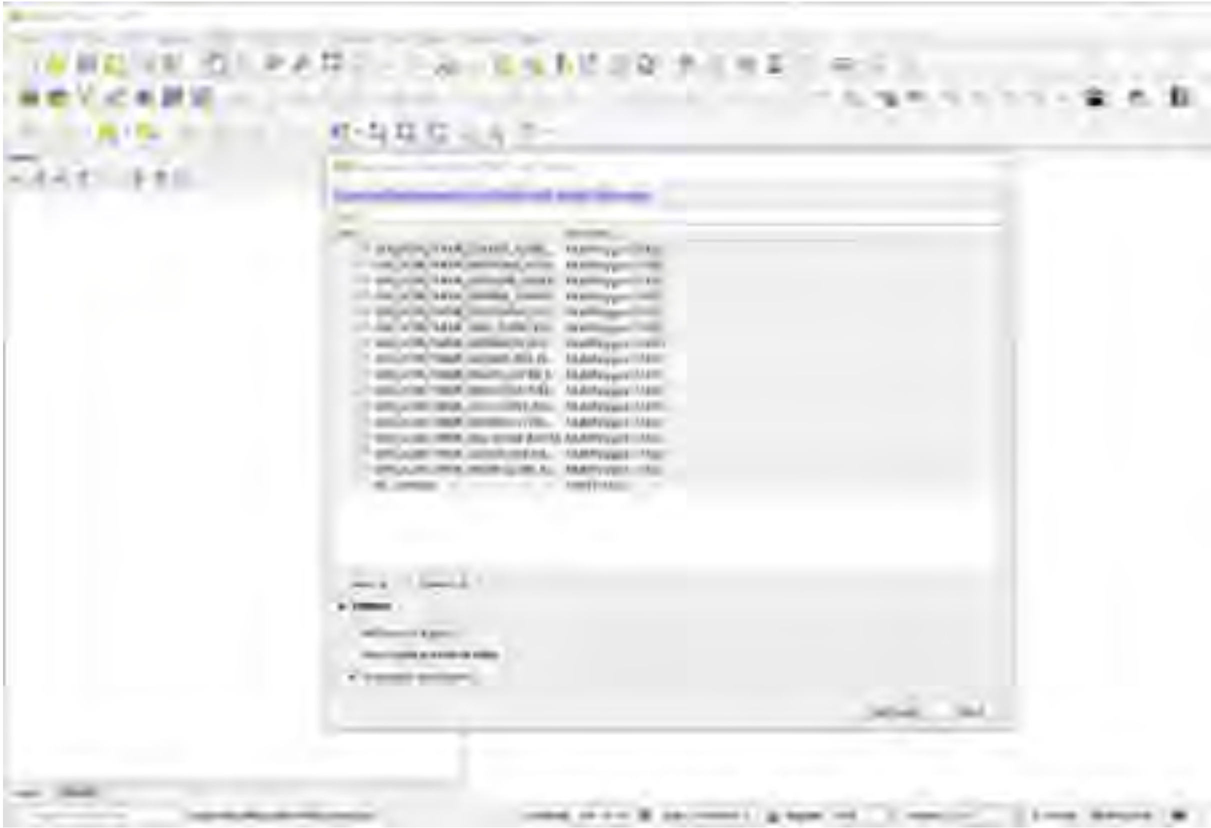


4. Right click on the layer and select “Attribute Table”: the fields view will open and show the table columns and values

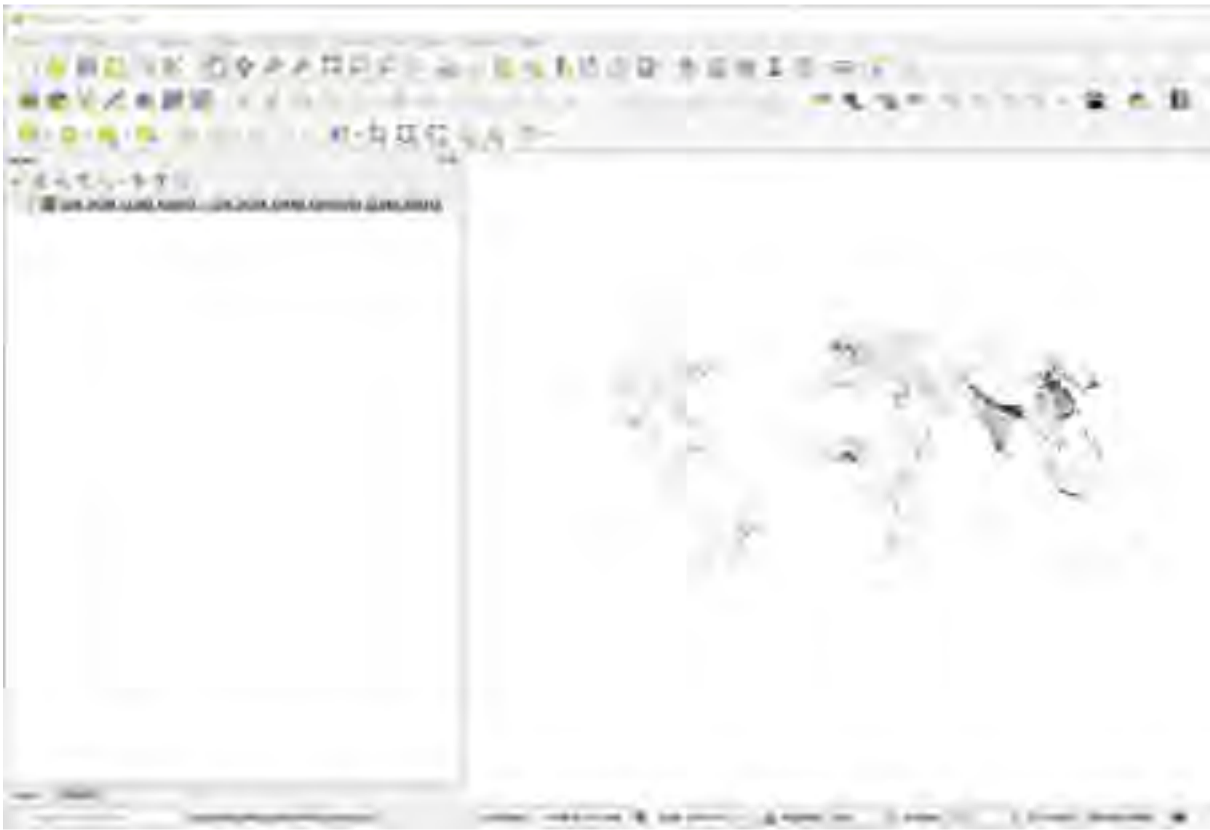


2.7.2 QGIS

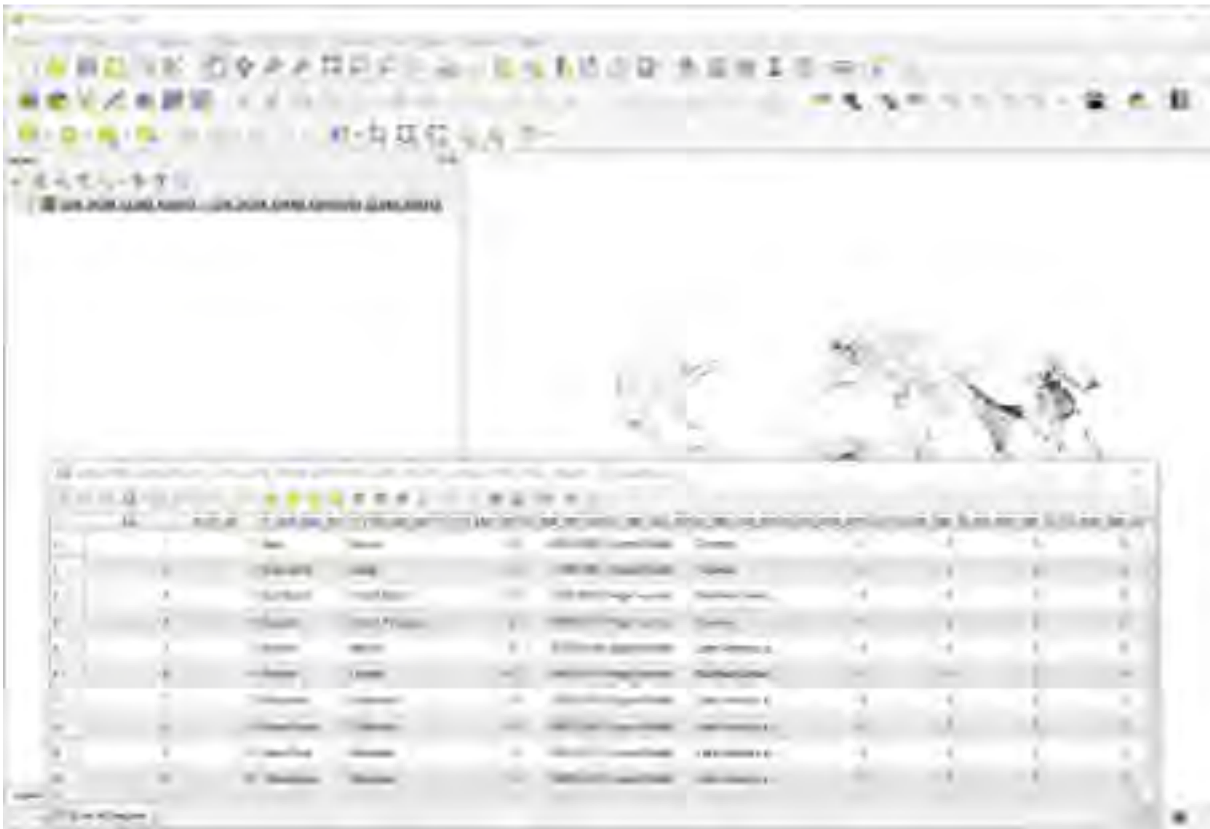
1. Drag and drop the GHS-UCDB GeoPackage file from Windows File Explorer in the Layers panel in QGIS



2. Double click the layer of interest, e.g. the exposure one



3. Right click on the layer and select “Open Attribute Table” to see all fields values



2.8 Fact sheets Specimen

The documentation of the GHS-UCDB entries is based on fact sheets that follow a harmonised template.

Each attribute in the database has a unique identifier based on a 2 + 3 + 3 + 4 characters in the format below:

<thematic area>_<indicator group>_<attribute identifier>_<year>

For example, EX_L10_BUS_2000 corresponds to: built-up surface in Low Elevated Coastal Zones 10m in 2000 and this attribute belongs to the Exposure thematic area.

Table 2 GHS-UCDB Indicator fact sheet specimen with explanation of the fields

Indicator thematic area
The field refers to which of the 15 thematic domains the indicator belongs to
Indicator group
The field refers to the group of single attributes that the indicator contains
Attribute ID
Refers to the unique Identifier of the specific attribute
Indicator Name
Refers to the descriptive name of the indicator
Units
Refers to the unit of measure of the attribute
Data Source
Refers to the source of the processed data
Indicator description
Refers to a short description of the indicator to clarify the meaning, can be the same of the indicator name if self-explanatory
Methodology
Refers to an explanation of the processing workflow and the calculations performed to obtain the attribute
Methodology Short
Refers the geospatial processing or calculations performed
Temporal Coverage
Refers to the years or epochs for the indicator covers
Uncertainties & Best practices
Refers –when available- to disclaimers, limitations, user awareness or best practices for the best use of the indicator

2.9 GHS-UCDB indicator fact sheets – fixed boundary

This section contains the individual indicator fact sheets organised by the 15 thematic domains.

2.9.1 General Characteristics

Indicator thematic area
General Characteristics
Indicator group
Urban center Name
Attribute ID
GC_UCN_MAI_XXXX
Indicator Name
Urban center Main Name
Units
Dimensionless
Data Source
Open Street Maps GISCO WUP 2018
Indicator description
Name of the main city inside the urban center.
Methodology
The urban centres are named using an algorithm that automatically queries the GISCO, the full OpenStreetMap datasets and WUP 2018 (extended unpublished version, with point locations corrected through geocoding and reverse geocoding).
Methodology Short
Geoencoding
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Urban center Name
Attribute ID
GC_UCN_LIS_XXXX
Indicator Name
Urban center List Name
Units
Dimensionless
Data Source
Open Street Maps GISCO WUP 2018
Indicator description
List of names of the all cities inside the urban center.
Methodology
The urban centres are named using an algorithm that automatically queries the GISCO, the full OpenStreetMap datasets and WUP 2018 (extended unpublished version, with point locations corrected through geocoding and reverse geocoding).
Methodology Short
Geoencoding
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Country Name
Attribute ID
GC_CNT_GAD_XXXX
Indicator Name
Country Name
Units
Dimensionless
Data Source
GADM version 4.1, released on 16 July 2022 https://gadm.org/data.html
Indicator description
Country named based on GADM dataset
Methodology
Spatial join of the urban centers and the GADM country layer adapted for GHSL.
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Country Name
Attribute ID
GC_CNT_UNN_XXXX
Indicator Name
Country Name
Units
Dimensionless
Data Source
World Population Prospects 2022 (WPP2022)
Indicator description
Country named based on WPP2022.
Methodology
Merging GADM countries according to WPP2022 notes.
Methodology Short
Spatial join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Area
Attribute ID
GC_UCA_KM2_XXXX
Indicator Name
Urban Centre Area
Units
Km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Urban Centre Area
Methodology
Calculate area (geometry) of the urban centre.
Methodology Short
Area
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Population
Attribute ID
GC_POP_TOT_XXXX
Indicator Name
Total Population in the Urban Centre
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Total population allocated inside of the UC in number of inhabitants.
Methodology
Zonal sum of the GHS-POP R2023A layer pixel values inside the urban centre.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Development
Attribute ID
GC_DEV_WIG_XXXX
Indicator Name
World Bank Income Group
Units
Categorical
Data Source
The World Bank https://datahelpdesk.worldbank.org/knowledgebase/articles/906519
Indicator description
The World Bank income group classification provides a complete list of economies classified by income, region, and World Bank lending status. This table is updated to year 2022.
Methodology
Join by attribute (by country).
Methodology Short
Join by attribute
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Development
Attribute ID
GC_DEV_USR_XXXX
Indicator Name
UN SDG Region
Units
Categorical
Data Source
UN https://unstats.un.org/sdgs/indicators/regional-groups/
Indicator description
Country grouping in geographic regions based on the 2016 Sustainable Development Goals Report and the progress reports on the Millennium Development Goals.
Methodology
Join by attribute (by country)
Methodology Short
Join by attribute
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Plausibility
Attribute ID
GC_PLS_SCR_XXXX
Indicator Name
Plausibility
Units
Categorical
Data Source
Melchiorri Michele; Marí Rivero Inés, Florio Pietro, Uhl Johannes, Krasnodębska Katarzyna, Pesaresi Martino, Politis Pangliotis, Schiavina Marcello, Maffenini Luca, Tommasi Pierpaolo, Carioli Alessandra, Ehrlich Daniele, Crippa Monica, Guizzardi Diego, Pisoni Enrico, Bellis Claudio, Sulis Patrizia, Oom Duarte, Branco Alfredo, Kemper Thomas. Stats in the City –the GHSL Urban Centre Database 2025.Publications Office of the European Union, Luxembourg, 2024. ISBN 978-92-68-21609-5, doi: 10.2760/3046391, JRC139768
Indicator description
The score indicates the plausibility/quality of the modelled urban centre.
Methodology
A plausibility test model was developed using a data-driven decision ensemble methodology. This ensemble is supported by univariate linear regression, stratified by World Bank Income Group (WB Income Group) and by year. The predictors are the total sum per UC of modelled population grids and land use grids, which are independently produced with respect to the Global Human Settlement Population (GHS-POP R2023A) and the Global Human Settlement Model (GHS-SMOD R2023A)
Methodology Short
Data-driven decision
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Urban centre birth
Attribute ID
GC_UCB_YOB _XXXX
Indicator Name
Year of Birth
Units
year
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA European Commission, and Statistical Office of the European Union, 2021 Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons — 2021 edition. Publications Office of the European Union, 2021; ISBN 978-92-76-20306-3 10.2785/706535
Indicator description
Indicates the year in the multitemporal series GHS-SMOD R2023A, the cells reach the conditions to be classified as urban centre.
Methodology
The methodology to classify the urban centres is described in “Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons —“.
Methodology Short
Modelled
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

The DEGURBA model considers data only from 1975 to 2030, cities born in 1975 should be considered as born in 1975 or earlier, and cities death in 2030 should be considered as death on 2030 or later

Indicator thematic area
General Characteristics
Indicator group
Urban centre death
Attribute ID
GC_UCB_YOD _XXXX
Indicator Name
Year of Death
Units
year
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA European Commission, and Statistical Office of the European Union, 2021 Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons — 2021 edition. Publications Office of the European Union, 2021; ISBN 978-92-76-20306-3 10.2785/706535
Indicator description
Indicates weather an urban centre is projected to be a urban centre in 2030 or 'dies' (doesn't reach the conditions to be a urban centre) in 2030.
Methodology
The methodology to classify the urban centres is described in "Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons —".
Methodology Short
Modelled
Temporal Coverage
2025, 2030
Uncertainties & Best practices

The DEGURBA model considers data only from 1975 to 2030, cities born in 1975 should be considered as born in 1975 or earlier, and cities death in 2030 should be considered as death on 2030 or later

Indicator thematic area
General Characteristics
Indicator group
Urban centre municipality
Attribute ID
GC_UCM_CAP_XXXX
Indicator Name
Capital city
Units
Boolean (yes/no)
Data Source
Wikipedia GoogleMaps
Indicator description
Indicates weather an urban centre is the capital city.
Methodology
Nation capitals are flagged by retrieving the information about name on Wikipedia.org and location with Geocoding on GoogleMaps. When information retrieved provide multiple capitals: (1) 'de jure' is preferred over 'de facto'; 'legislative' is preferred over others (e.g. 'royal', 'administrative', 'executive', etc.). Value 0 indicates no capital city and value 1 indicates Capital City)
Methodology Short
Geocoding
Temporal Coverage
2025
Uncertainties & Best practices

2.9.2 GHSL

Indicator thematic area
GHSL
Indicator group
Population
Attribute ID
GH_POP_TOT_XXXX
Indicator Name
Total Population
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Total population allocated inside of the UC in number of inhabitants.
Methodology
Zonal sum of the GHS-POP R2023A layer pixel values inside the urban centre.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Population
Attribute ID
GH_POP_CAG_XXXX
Indicator Name
Population Compound Annual Growth Rate
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Compound annual growth rate of the total population allocated inside of the UC in percentage.
Methodology
$$CAGR = \left(\left(\frac{value_{t1}}{value_{t0}} \right)^{1/_{t1-t0}} - 1 \right) \times 100$$
Methodology Short
Compound annual growth rate
Temporal Coverage
1975-1980, 1980-1985, 1985-1990, 1990-1995, 1995-2000, 2000-2005, 2005-2010, 2010-2015, 2015-2020, 2020-2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up surface
Attribute ID
GH_BUS_TOT_XXXX
Indicator Name
Total Built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Total built-up area of the UC in square meters
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban centre.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up surface
Attribute ID
GH_BUS_NRE_XXXX
Indicator Name
Non-Residential Built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Non-residential built-up area of the UC in square meters
Methodology
Zonal sum of the GHS-BUILT-S-NRES R2023A pixel values inside the urban centre.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up surface
Attribute ID
GH_BUS_RES_XXXX
Indicator Name
Residential Built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Residential built-up area of the UC in square meters
Methodology
Subtraction of the non-residential built-up in a urban centre from the total built-up.
Methodology Short
Subtraction
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up per capita
Attribute ID
GH_BPC_TOT_XXXX
Indicator Name
Total built-up per capita
Units
m^2/person
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Total built-up area per capita in the urban centre
Methodology
Total built-up area divided by total population
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Values bellow 1 m^2/person and above 600 m^2/person are excluded from the data set.

Indicator thematic area
GHSL
Indicator group
Built-up per capita
Attribute ID
GH_BPC_NRE_XXXX
Indicator Name
Non-residential built-up per capita
Units
m^2/person
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE

Indicator description
Non-residential built-up area per capita in the urban centre
Methodology
Non-residential built-up area divided by total population
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Values above 600 m^2/person are excluded from the data set.

Indicator thematic area
GHSL
Indicator group
Built-up per capita
Attribute ID
GH_BPC_RES_XXXX
Indicator Name
Residential built-up per capita
Units
m^2/person
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Residential built-up area per capita in the urban centre
Methodology
Residential built-up area divided by total population
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Values bellow 1 m^2/person and above 600 m^2/person are excluded from the data set.

Indicator thematic area
GHSL
Indicator group
Built-up volume
Attribute ID
GH_BUV_TOT_XXXX
Indicator Name
Total built-up volume
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283
Indicator description
Total built-up volume in the urban centre
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up volume
Attribute ID
GH_BUV_NRE_XXXX
Indicator Name
Non-residential built-up volume
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283
Indicator description
Non-residential built-up volume in the urban centre
Methodology
Zonal statistics (sum) of the GHS-BUILT-V-NRES R2023A pixel values inside the urban centre.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up volume
Attribute ID
GH_BUV_RES_XXXX
Indicator Name
Residential built-up volume
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283
Indicator description
Residential built-up volume in the urban centre
Methodology
Subtraction of the non-residential volume from the total volume for each urban centre.
Methodology Short
Subtraction
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up height
Attribute ID
GH_BUH_AVG_XXXX
Indicator Name
Average built-up height
Units
m
Data Source
Pesaresi, M.; Politis, P. (2023): GHS-BUILT-H R2023A - GHS building height, derived from AW3D30, SRTM30, and Sentinel2 composite (2018).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/85005901-3a49-48dd-9d19-6261354f56fe, doi:10.2905/85005901-3A49-48DD-9D19-6261354F56FE
Indicator description
Average of the values inside the urban centre of the average height of the built surfaces in a 100 m pixel.
Methodology
Zonal statistics (average) of the GHS-BUILT-H R2023A pixel values inside the urban centre.
Methodology Short
Zonal statistics (average)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up height
Attribute ID
GH_BUH_STD_XXXX
Indicator Name
Average built-up height
Units
m
Data Source
Pesaresi, M.; Politis, P. (2023): GHS-BUILT-H R2023A - GHS building height, derived from AW3D30, SRTM30, and Sentinel2 composite (2018).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/85005901-3a49-48dd-9d19-6261354f56fe, doi:10.2905/85005901-3A49-48DD-9D19-6261354F56FE
Indicator description
Standard deviation of the values inside the urban centre of the average height of the built surfaces in a 100 m pixel.
Methodology
Zonal statistics (standard deviation) of the GHS-BUILT-H R2023A pixel values inside the urban centre.
Methodology Short
Zonal statistics (standard deviation)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up height
Attribute ID
GH_BUH_MAX_XXXX
Indicator Name
Average built-up height
Units
m
Data Source
Pesaresi, M.; Politis, P. (2023): GHS-BUILT-H R2023A - GHS building height, derived from AW3D30, SRTM30, and Sentinel2 composite (2018).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/85005901-3a49-48dd-9d19-6261354f56fe, doi:10.2905/85005901-3A49-48DD-9D19-6261354F56FE
Indicator description
Maximum of the values inside the urban centre of the average height of the built surfaces in a 100 m pixel.
Methodology
Zonal statistics (maximum) of the GHS-BUILT-H R2023A pixel values inside the urban centre.
Methodology Short
Zonal statistics (maximum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_P11_XXXX
Indicator Name
Population living in residential prevalent 1-2 floors built-up
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Total population inside the built-up in the urban centre classified as residential prevalent 1-2 floors.
Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as built-up type class 11 (residential prevalent 1-2 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area

GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_P12_XXXX
Indicator Name
Population living in residential prevalent 3-7 floors built-up
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Total population inside the built-up in the urban centre classified as residential prevalent 3-7 floors.
Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as built-up type class 12 (residential prevalent 3-7 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL

Indicator group
Built-up type
Attribute ID
GH_BUT_P13_XXXX
Indicator Name
Population living in residential prevalent >8 floors built-up
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Total population inside the built-up in the urban centre classified as residential prevalent >8 floors.
Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as built-up type class 13 (residential prevalent >8 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL

Indicator group
Built-up type
Attribute ID
GH_BUT_P21_XXXX
Indicator Name
Population living in non-residential prevalent 1-2 floors built-up
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Total population inside the built-up in the urban centre classified as non-residential prevalent 1-2 floors.
Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as built-up type class 21 (non-residential prevalent 1-2 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL

Indicator group
Built-up type
Attribute ID
GH_BUT_P22_XXXX
Indicator Name
Population living in non-residential prevalent 3-7 floors built-up
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Total population inside the built-up in the urban centre classified as non-residential prevalent 3-7 floors.
Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as built-up type class 22 (non-residential prevalent 3-7 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices
Indicator thematic area
GHSL
Indicator group

Built-up type
Attribute ID
GH_BUT_P23_XXXX
Indicator Name
Population living in non-residential prevalent >8 floors built-up
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Total population inside the built-up in the urban centre classified as non-residential prevalent >8 floors.
Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as built-up type class 23 (non-residential prevalent >8 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices
Indicator thematic area
GHSL
Indicator group
Built-up type

Attribute ID
GH_BUT_S11_XXXX
Indicator Name
Built-up surface in residential prevalent 1-2 floors built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up surface of the built-up in the urban centre classified as residential prevalent 1-2 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built-up type class 11 (residential prevalent 1-2 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_S12_XXXX
Indicator Name
Built-up surface in residential prevalent 3-7 floors built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID:http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up surface of the built-up in the urban centre classified as residential prevalent 3-7 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built-up type class 12 (residential prevalent 3-7 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_S13_XXXX
Indicator Name
Built-up surface in residential prevalent >8 floors built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID:http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up surface of the built-up in the urban centre classified as residential prevalent >8 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built-up type class 13 (residential prevalent >8 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_S21_XXXX
Indicator Name
Built-up surface in non-residential prevalent 1-2 floors built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID:http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up surface of the built-up in the urban centre classified as non-residential prevalent 1-2 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built-up type class 21 (non-residential prevalent 1-2 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_S22_XXXX
Indicator Name
Built-up surface in non-residential prevalent 3-7 floors built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID:http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up surface of the built-up in the urban centre classified as non-residential prevalent 3-7 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built-up type class 22 (non-residential prevalent 3-7 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_S23_XXXX
Indicator Name
Built-up surface in non-residential prevalent >8 floors built-up
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID:http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up surface of the built-up in the urban centre classified as non-residential prevalent >8 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built-up type class 23 (non-residential prevalent >8 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_V11_XXXX
Indicator Name
Built-up volume in residential prevalent 1-2 floors built-up
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up volume of the built-up in the urban centre classified as residential prevalent 1-2 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as built-up type class 11 (residential prevalent 1-2 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_V12_XXXX
Indicator Name
Built-up volume in residential prevalent 3-7 floors built-up
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up volume of the built-up in the urban centre classified as residential prevalent 3-7 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as built-up type class 12 (residential prevalent 3-7 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_V13_XXXX
Indicator Name
Built-up volume in residential prevalent >8 floors built-up
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up volume of the built-up in the urban centre classified as residential prevalent >8 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as built-up type class 13 (residential prevalent >8 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices
Indicator thematic area

GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_V21_XXXX
Indicator Name
Built-up volume in non-residential prevalent 1-2 floors built-up
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up volume of the built-up in the urban centre classified as non-residential prevalent 1-2 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as built-up type class 21 (non-residential prevalent 1-2 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area

GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_V22_XXXX
Indicator Name
Built-up volume in non-residential prevalent 3-7 floors built-up
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up volume of the built-up in the urban centre classified as non-residential prevalent 3-7 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as built-up type class 22 (non-residential prevalent 3-7 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up type
Attribute ID
GH_BUT_V23_XXXX
Indicator Name
Built-up volume in non-residential prevalent >8 floors built-up
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., … Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454
Indicator description
Built-up volume of the built-up in the urban centre classified as non-residential prevalent >8 floors.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as built-up type class 23 (non-residential prevalent >8 floors).
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up Age (Temporal Domain)
Attribute ID
GH_AGE_S75_XXXX
Indicator Name
Share of BU surface in temporal dominant before 1975
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Uhl, J.H., Pesaresi, M., Politis, P., Krasnodębska, K., Florio, P., Kemper, T. (2024). GHS-AGE: Characterizing settlement age at planetary scale using the Global Human Settlement Layer (forthcoming).
Indicator description
Share of the built-up surface in the urban centre classified as built-up before 1975 over total built-up in the urban centre.
Methodology
Ratio of the sum of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built before 1975 and the total built-up in the urban centre.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up Age (Temporal Domain)
Attribute ID
GH_AGE_S85_XXXX
Indicator Name
Share of BU surface in temporal dominant between 1975 and 1985
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Uhl, J.H., Pesaresi, M., Politis, P., Krasnodębska, K., Florio, P., Kemper, T. (2024). GHS-AGE: Characterizing settlement age at planetary scale using the Global Human Settlement Layer (forthcoming).
Indicator description
Share of the built-up surface in the urban centre classified as built-up between 1975 and 1985 over total built-up in the urban centre.
Methodology
Ratio of the sum of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built between 1975 and 1985 and the total built-up in the urban centre.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area

GHSL
Indicator group
Built-up Age (Temporal Domain)
Attribute ID
GH_AGE_S95_XXXX
Indicator Name
Share of BU surface in temporal dominant between 1985 and 1995
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Uhl, J.H., Pesaresi, M., Politis, P., Krasnodębska, K., Florio, P., Kemper, T. (2024). GHS-AGE: Characterizing settlement age at planetary scale using the Global Human Settlement Layer (forthcoming).
Indicator description
Share of the built-up surface in the urban centre classified as built-up between 1985 and 1995 over total built-up in the urban centre.
Methodology
Ratio of the sum of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built between 1985 and 1995 and the total built-up in the urban centre.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up Age (Temporal Domain)
Attribute ID
GH_AGE_S05_XXXX
Indicator Name
Share of BU surface in temporal dominant between 1995 and 2005
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Uhl, J.H., Pesaresi, M., Politis, P., Krasnodębska, K., Florio, P., Kemper, T. (2024). GHS-AGE: Characterizing settlement age at planetary scale using the Global Human Settlement Layer (forthcoming).
Indicator description
Share of the built-up surface in the urban centre classified as built-up between 1995 and 2005 over total built-up in the urban centre.
Methodology
Ratio of the sum of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built between 1995 and 2005 and the total built-up in the urban centre.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up Age (Temporal Domain)
Attribute ID
GH_AGE_S15_XXXX
Indicator Name
Share of BU surface in temporal dominant between 2005 and 2015
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Uhl, J.H., Pesaresi, M., Politis, P., Krasnodębska, K., Florio, P., Kemper, T. (2024). GHS-AGE: Characterizing settlement age at planetary scale using the Global Human Settlement Layer (forthcoming).
Indicator description
Share of the built-up surface in the urban centre classified as built-up between 2005 and 2015 over total built-up in the urban centre.
Methodology
Ratio of the sum of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built between 2005 and 2015 and the total built-up in the urban centre.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Built-up Age (Temporal Domain)
Attribute ID
GH_AGE_S25_XXXX
Indicator Name
Share of BU surface in temporal dominant between 2015 and 2025
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Uhl, J.H., Pesaresi, M., Politis, P., Krasnodębska, K., Florio, P., Kemper, T. (2024). GHS-AGE: Characterizing settlement age at planetary scale using the Global Human Settlement Layer (forthcoming).
Indicator description
Share of the built-up surface in the urban centre classified as built-up between 2015 and 2025 over total built-up in the urban centre.
Methodology
Ratio of the sum of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as built between 2015 and 2025 and the total built-up in the urban centre.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up surface
Attribute ID
GH_XST_S11_XXXX
Indicator Name
Built-up surface within the Degree of Urbanisation Classification class 11 (very low density)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up surface in cells classified as very low density (DoU class 11) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as class 11 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up surface
Attribute ID
GH_XST_S12_XXXX
Indicator Name
Built-up surface within the Degree of Urbanisation Classification class 12 (low density rural)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up surface in cells classified as low density rural (DoU class 12) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as class 12 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up surface
Attribute ID
GH_XST_S13_XXXX
Indicator Name
Built-up surface within the Degree of Urbanisation Classification class 13 (rural cluster)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up surface in cells classified as rural cluster (DoU class 13) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as class 13 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up surface
Attribute ID
GH_XST_S21_XXXX
Indicator Name
Built-up surface within the Degree of Urbanisation Classification class 21 (suburban)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up surface in cells classified as suburban (DoU class 21) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as class 21 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up surface
Attribute ID
GH_XST_S22_XXXX
Indicator Name
Built-up surface within the Degree of Urbanisation Classification class 22 (semi dense urban cluster)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up surface in cells classified as semi dense urban cluster (DoU class 22) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as class 22 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up surface
Attribute ID
GH_XST_S23_XXXX
Indicator Name
Built-up surface within the Degree of Urbanisation Classification class 23 (dense urban cluster)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up surface in cells classified as dense urban cluster (DoU class 23) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as class 23 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up surface
Attribute ID
GH_XST_S30_XXXX
Indicator Name
Built-up surface within the Degree of Urbanisation Classification class 30 (urban centre)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up surface in cells classified as urban centre (DoU class 30) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-S R2023A pixel values inside the urban centre classified as class 30 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up volume
Attribute ID
GH_XST_V11_XXXX
Indicator Name
Built-up volume within the Degree of Urbanisation Classification class 11 (very low density)
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up volume in cells classified as very low density (DoU class 11) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as class 11 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up volume
Attribute ID
GH_XST_V12_XXXX
Indicator Name
Built-up volume within the Degree of Urbanisation Classification class 12 (low density rural)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up volume in cells classified as low density rural (DoU class 12) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as class 12 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up volume
Attribute ID
GH_XST_V13_XXXX
Indicator Name
Built-up volume within the Degree of Urbanisation Classification class 13 (rural cluster)
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up volume in cells classified as rural cluster (DoU class 13) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as class 13 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices
Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up volume
Attribute ID
GH_XST_V21_XXXX
Indicator Name
Built-up volume within the Degree of Urbanisation Classification class 21 (suburban)
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up volume in cells classified as suburban (DoU class 21) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as class 21 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up volume
Attribute ID
GH_XST_V22_XXXX
Indicator Name
Built-up volume within the Degree of Urbanisation Classification class 22 (semi dense urban cluster)
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up volume in cells classified as semi dense urban cluster (DoU class 22) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as class 22 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up volume
Attribute ID
GH_XST_V23_XXXX
Indicator Name
Built-up volume within the Degree of Urbanisation Classification class 23 (dense urban cluster)
Units
m^3
Data Source
Pesaresi M., Politis P. (2023):GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up volume in cells classified as dense urban cluster (DoU class 23) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as class 23 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Built-up volume
Attribute ID
GH_XST_V30_XXXX
Indicator Name
Built-up volume within the Degree of Urbanisation Classification class 30 (urban centre)
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283 Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Built-up volume in cells classified as urban centre (DoU class 30) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-BUILT-V R2023A pixel values inside the urban centre classified as class 30 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Area
Attribute ID
GH_XST_A11_XXXX
Indicator Name
Area within the Degree of Urbanisation Classification class 11 (very low density)
Units
km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Area of the cells classified as very low density (DoU class 11) within the urban centre boundary.
Methodology
Zonal statistics (count) of the pixels inside the urban centre classified as class 11 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Area
Attribute ID
GH_XST_A12_XXXX
Indicator Name
Area within the Degree of Urbanisation Classification class 12 (low density rural)
Units
km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Area of the cells classified as low density rural (DoU class 12) within the urban centre boundary.
Methodology
Zonal statistics (count) of the pixels inside the urban centre classified as class 12 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Area
Attribute ID
GH_XST_A13_XXXX
Indicator Name
Area within the Degree of Urbanisation Classification class 13 (rural cluster)
Units
km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Area of the cells classified as rural cluster (DoU class 13) within the urban centre boundary.
Methodology
Zonal statistics (count) of the pixels inside the urban centre classified as class 13 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Area
Attribute ID
GH_XST_A21_XXXX
Indicator Name
Area within the Degree of Urbanisation Classification class 21 (suburban)
Units
km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Area of the cells classified as suburban (DoU class 21) within the urban centre boundary.
Methodology
Zonal statistics (count) of the pixels inside the urban centre classified as class 21 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Area
Attribute ID
GH_XST_A22_XXXX
Indicator Name
Area within the Degree of Urbanisation Classification class 22 (semi dense urban cluster)
Units
km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Area of the cells classified as semi dense urban cluster (DoU class 22) within the urban centre boundary.
Methodology
Zonal statistics (count) of the pixels inside the urban centre classified as class 22 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Area
Attribute ID
GH_XST_A23_XXXX
Indicator Name
Area within the Degree of Urbanisation Classification class 23 (dense urban cluster)
Units
km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Area of the cells classified as dense urban cluster (DoU class 23) within the urban centre boundary.
Methodology
Zonal statistics (count) of the pixels inside the urban centre classified as class 23 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Area
Attribute ID
GH_XST_A30_XXXX
Indicator Name
Area within the Degree of Urbanisation Classification class 30 (urban centre)
Units
km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Area of the cells classified as urban centre (DoU class 30) within the urban centre boundary.
Methodology
Zonal statistics (count) of the pixels inside the urban centre classified as class 30 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage

1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population
Attribute ID
GH_XST_P11_XXXX
Indicator Name
Population within the Degree of Urbanisation Classification class 11 (very low density)
Units
inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population in the cells classified as very low density (DoU class 11) within the urban centre boundary.
Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as class 11 in the corresponding year.
Methodology Short

Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population
Attribute ID
GH_XST_P12_XXXX
Indicator Name
Population within the Degree of Urbanisation Classification class 12 (low density rural)
Units
inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population in the cells classified as low density rural (DoU class 12) within the urban centre boundary.
Methodology

Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as class 12 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population
Attribute ID
GH_XST_P13_XXXX
Indicator Name
Population within the Degree of Urbanisation Classification class 13 (rural cluster)
Units
inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population in the cells classified as rural cluster (DoU class 13) within the urban centre boundary.
Methodology

Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as class 13 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population
Attribute ID
GH_XST_P21_XXXX
Indicator Name
Population within the Degree of Urbanisation Classification class 21 (suburban)
Units
inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population in the cells classified as suburban (DoU class 21) within the urban centre boundary.
Methodology

Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as class 21 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population
Attribute ID
GH_XST_ P22 _XXXX
Indicator Name
Population within the Degree of Urbanisation Classification class 22 (semi dense urban cluster)
Units
inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population in the cells classified as semi dense urban cluster (DoU class 22) within the urban centre boundary.
Methodology

Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as class 22 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population
Attribute ID
GH_XST_ P23 _XXXX
Indicator Name
Population within the Degree of Urbanisation Classification class 23 (dense urban cluster)
Units
inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population in the cells classified as dense urban cluster (DoU class 23) within the urban centre boundary.

Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as class 23 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population
Attribute ID
GH_XST_ P30 _XXXX
Indicator Name
Population
Units
inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population in the cells classified as urban centre (DoU class 30) within the urban centre boundary.

Methodology
Zonal statistics (sum) of the GHS-POP R2023A pixel values inside the urban centre classified as class 30 in the corresponding year.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population density
Attribute ID
GH_XST_D11_XXXX
Indicator Name
Population density within the Degree of Urbanisation Classification class 11 (very low density)
Units
Inhabitants/km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description

Population density of the cells classified as very low density (DoU class 11) within the urban centre boundary.
Methodology
Population divided by the land area, both inside the urban centre classified as class 11 in the corresponding year.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population density
Attribute ID
GH_XST_D12_XXXX
Indicator Name
Population density within the Degree of Urbanisation Classification class 12 (low density rural)
Units
Inhabitants/km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA

Indicator description
Population density of the cells classified as low density rural (DoU class 12) within the urban centre boundary.
Methodology
Population divided by the land area, both inside the urban centre classified as class 12 in the corresponding year.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population density
Attribute ID
GH_XST_P13_XXXX
Indicator Name
Population density within the Degree of Urbanisation Classification class 13 (rural cluster)
Units
Inhabitants/km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC)

PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population density of the cells classified as rural cluster (DoU class 13) within the urban centre boundary.
Methodology
Population divided by the land area, both inside the urban centre classified as class 13 in the corresponding year.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population density
Attribute ID
GH_XST_D21_XXXX
Indicator Name
Population density within the Degree of Urbanisation Classification class 21 (suburban)
Units
Inhabitants/km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC)

PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population density of the cells classified as suburban (DoU class 21) within the urban centre boundary.
Methodology
Population divided by the land area, both inside the urban centre classified as class 21 in the corresponding year.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population density
Attribute ID
GH_XST_D22_XXXX
Indicator Name
Population density within the Degree of Urbanisation Classification class 22 (semi dense urban cluster)
Units
Inhabitants/km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE

Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population density of the cells classified as semi dense urban cluster (DoU class 22) within the urban centre boundary.
Methodology
Population divided by the land area, both inside the urban centre classified as class 22 in the corresponding year.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population density
Attribute ID
GH_XST_D23_XXXX
Indicator Name
Population density within the Degree of Urbanisation Classification class 23 (dense urban cluster)
Units
Inhabitants/km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE

Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population density of the cells classified as dense urban cluster (DoU class 23) within the urban centre boundary.
Methodology
Population divided by the land area, both inside the urban centre classified as class 23 in the corresponding year.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Population density
Attribute ID
GH_XST_D30_XXXX
Indicator Name
Population density
Units
Inhabitants/km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE

Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Population density of the cells classified as urban centre (DoU class 30) within the urban centre boundary.
Methodology
Population divided by the land area, both inside the urban centre classified as class 30 in the corresponding year.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Land Area
Attribute ID
GH_XST_L30_XXXX
Indicator Name
Land Area in the Urban Centre
Units
km^2
Data Source
Pesaresi M., Politis P. (2022): GHS-LAND R2022A - Land fraction as derived from Sentinel2 image composite (2018) and OSM data. PID: http://data.europa.eu/89h/ab7ad451-5ed5-44a6-a4d0-9f7a4e848ceeEuropean Commission, Joint Research Centre (JRC)

PID: https://doi.org/10.2905/AB7AD451-5ED5-44A6-A4D0-9F7A4E848CEE, doi:10.2905/AB7AD451-5ED5-44A6-A4D0-9F7A4E848CEE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Land surface of the cells classified as urban centre (DoU class 30) within the urban centre boundary.
Methodology
Zonal statistics (count) of the GHS-LAND R2022A pixels (when the value identifies land surface) inside the urban centre classified as class 30 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage
2025
Uncertainties & Best practices
Indicator thematic area
GHSL
Indicator group
Cross statistics with DoU: Water Area
Attribute ID
GH_XST_W30_XXXX
Indicator Name
Water Area in the Urban Centre
Units
km^2
Data Source
Pesaresi M., Politis P. (2022): GHS-LAND R2022A - Land fraction as derived from Sentinel2 image composite (2018) and OSM data. PID: http://data.europa.eu/89h/ab7ad451-5ed5-44a6-a4d0-9f7a4e848ceeEuropean

Commission, Joint Research Centre (JRC) PID: https://doi.org/10.2905/AB7AD451-5ED5-44A6-A4D0-9F7A4E848CEE, doi:10.2905/AB7AD451-5ED5-44A6-A4D0-9F7A4E848CEE Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Water surface of the cells classified as urban centre (DoU class 30) within the urban centre boundary.
Methodology
Zonal statistics (count) of the GHS-LAND R2022A pixels (when the value identifies water surface) inside the urban centre classified as class 30 in the corresponding year.
Methodology Short
Zonal statistics (count)
Temporal Coverage
2025
Uncertainties & Best practices

2.9.3 Socioeconomic

Indicator thematic area
Socioeconomic
Indicator Group
GDP
Attribute ID
SC_SEC_GDP_XXXX
Indicator Name
Total Gross Domestic Product
Units
PPP
Data Source

Matti Kummu, Maria Kosonen, Sina Masoumzadeh Sayyar et al. Downscaled gridded global dataset for Gross Domestic Product (GDP) per capita PPP over 1990-2022, 29 April 2024, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-4321741/v1]
Indicator description
Average of GDP value in the urban center
Methodology
Zonal average of the GDP layer pixel values inside the urban center.
Methodology Short
Zonal Statistics (average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices

Indicator thematic area
Socioeconomic
Indicator Group
Population distribution
Attribute ID
SC_SEC_PCF_XXXX
Indicator Name
Percentage of female population
Units
%
Data Source
Tatem, A. WorldPop, open data for spatial demography. *Sci Data* **4**, 170004 (2017). https://doi.org/10.1038/sdata.2017.4 https://www.worldpop.org/
Indicator description
Percentage of female population
Methodology
Percentage of the sum of female population data inside the urban center polygon by total population (sum of female and male)
Methodology Short
Ratio
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Do not use this indicator to calculate number of inhabitants. Socioeconomic indicators based on WorldPop cannot be compared with population indicators based on GHSL data in statistical analysis.

Indicator thematic area
Socioeconomic
Indicator Group
Population distribution
Attribute ID
SC_SEC_PCM_XXXX
Indicator Name
Percentage of male population
Units
%
Data Source
Tatem, A. WorldPop, open data for spatial demography. *Sci Data* **4**, 170004 (2017). https://doi.org/10.1038/sdata.2017.4 https://www.worldpop.org/
Indicator description
Percentage of male population
Methodology
Percentage of the sum of male population data inside the urban center polygon by total population (sum of female and male)
Methodology Short
Ratio
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Do not use this indicator to calculate number of inhabitants. Socioeconomic indicators based on WorldPop cannot be compared with population indicators based on GHSL data in statistical analysis.

Indicator thematic area
Socioeconomic
Indicator Group
Population distribution
Attribute ID
SC_SEC_PCY_XXXX
Indicator Name
Percentage of young population
Units
%
Data Source
Tatem, A. WorldPop, open data for spatial demography. *Sci Data* **4**, 170004 (2017). https://doi.org/10.1038/sdata.2017.4 https://www.worldpop.org/
Indicator description
Percentage of young population (0 to 14 years)
Methodology
Percentage of the sum of total population younger than 14 years old data inside the urban center polygon by total population (all years).
Methodology Short
Ratio
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Do not use this indicator to calculate number of inhabitants. Socioeconomic indicators based on WorldPop cannot be compared with population indicators based on GHSL data in statistical analysis.

Indicator thematic area
Socioeconomic
Indicator Group
Population distribution
Attribute ID
SC_SEC_PCA_XXXX
Indicator Name
Percentage of adult population
Units
%
Data Source
Tatem, A. WorldPop, open data for spatial demography. *Sci Data* **4**, 170004 (2017). https://doi.org/10.1038/sdata.2017.4 https://www.worldpop.org/
Indicator description
Percentage of adult population (15 to 64 years)
Methodology
Percentage of the sum of total population older than 15 and younger than 64 years old data inside the urban center polygon by total population (all years).
Methodology Short
Ratio
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Do not use this indicator to calculate number of inhabitants. Socioeconomic indicators based on WorldPop cannot be compared with population indicators based on GHSL data in statistical analysis.

Indicator thematic area
Socioeconomic
Indicator Group
Population distribution
Attribute ID
SC_SEC_PCO_XXXX
Indicator Name
Percentage of older population
Units
%
Data Source
Tatem, A. WorldPop, open data for spatial demography. *Sci Data* **4**, 170004 (2017). https://doi.org/10.1038/sdata.2017.4 https://www.worldpop.org/
Indicator description
Percentage of older population (more than 65 years)
Methodology
Percentage of the sum of total population older than 65 years old data inside the urban center polygon by total population (all years).
Methodology Short
Ratio
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Do not use this indicator to calculate number of inhabitants. Socioeconomic indicators based on WorldPop cannot be compared with population indicators based on GHSL data in statistical analysis.

Indicator thematic area
Socioeconomic
Indicator Group
Human Development Index
Attribute ID
SC_SEC_HDI_XXXX
Indicator Name
Human Development Index
Units
Dimensionless
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019). https://hdr.undp.org/data-center/human-development-index#/indicies/HDI
Indicator description
Human Development Index at subnational level based on the UNDP's official HDI.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Gender Development Index
Attribute ID
SC_SEC_GDI_XXXX
Indicator Name
Gender Development Index
Units
Dimensionless
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019). https://hdr.undp.org/gender-development-index#/indicies/GDI
Indicator description
Gender Development Index at subnational level based on the UNDP's official GDI.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Gender Development Index
Attribute ID
SC_SEC_GDF_XXXX
Indicator Name
Female Gender Development Index
Units
Dimensionless
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019). https://hdr.undp.org/gender-development-index#/indicies/GDI
Indicator description
Female Gender Development Index at subnational level based on the UNDP's official GDI.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Gender Development Index
Attribute ID
SC_SEC_GDM_XXXX
Indicator Name
Male Gender Development Index
Units
Dimensionless
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019). https://hdr.undp.org/gender-development-index#/indicies/GDI
Indicator description
Male Gender Development Index at subnational level based on the UNDP's official GDI.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Life Expectancy
Attribute ID
SC_SEC_LET_XXXX
Indicator Name
Life Expectancy
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Number of years newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Life Expectancy
Attribute ID
SC_SEC_LEF_XXXX
Indicator Name
Female Life Expectancy
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Number of years female newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Life Expectancy
Attribute ID
SC_SEC_LEM_XXXX
Indicator Name
Male Life Expectancy
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Number of years male newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Expected years of Schooling
Attribute ID
SC_SEC_SET_XXXX
Indicator Name
Expected years of Schooling
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Number of years of schooling a child of school entrance age can expect to receive, if prevailing patterns of age-specific enrolment rates persist throughout the child's schooling life.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Expected years of Schooling
Attribute ID
SC_SEC_SEF_XXXX
Indicator Name
Female Expected years of Schooling
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Number of years of schooling a female child of school entrance age can expect to receive, if prevailing patterns of age-specific enrolment rates persist throughout the child's schooling life.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Expected years of Schooling
Attribute ID
SC_SEC_SEM_XXXX
Indicator Name
Male Expected years of Schooling
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Number of years of schooling a male child of school entrance age can expect to receive, if prevailing patterns of age-specific enrolment rates persist throughout the child's schooling life.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Mean years of Schooling
Attribute ID
SC_SEC_SYT_XXXX
Indicator Name
Mean years of Schooling of adults aged 25+
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Average years of schooling for the population aged 25 or more years.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Mean years of Schooling
Attribute ID
SC_SEC_SYF_XXXX
Indicator Name
Mean years of Schooling of female adults aged 25+
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Average years of schooling for the female population aged 25 or more years.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Mean years of Schooling
Attribute ID
SC_SEC_SYM_XXXX
Indicator Name
Mean years of Schooling of male adults aged 25+
Units
Number of years
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
Average years of schooling for the male population aged 25 or more years.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Gross national income per capita
Attribute ID
SC_SEC_GIT_XXXX
Indicator Name
(Log of) Gross national income per capita
Units
US$
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
(Log of) Sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary *income* (compensation of employees and property *income*) from abroad.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Gross national income per capita
Attribute ID
SC_SEC_GIF_XXXX
Indicator Name
(Log of) Gross national income per female capita
Units
US$
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
(Log of) Sum of value added by female resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary *income* (compensation of employees and property *income*) from abroad.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Gross national income per capita
Attribute ID
SC_SEC_GIM_XXXX
Indicator Name
(Log of) Gross national income per male capita
Units
US$
Data Source
Data retrieved from the Subnational HDI Database of the Global Data Lab, https://globaldatalab.org/shdi/, version v7.0. Smits, J. and Permanyer, I. The Subnational Human Development Database. Sci. Data. 6:190038 https://www.nature.com/articles/sdata201938 (2019).
Indicator description
(Log of) Sum of value added by male resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary *income* (compensation of employees and property *income*) from abroad.
Methodology
Overlaying urban centers' polygons with the Subnational Human Development Database layer. Calculate the weighted average of the overlaid polygons for each UC falling into more than one subnational region.
Methodology Short
Zonal Statistics (weighted average)
Temporal Coverage
1990, 1995, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
The index is constant through the urban centers located in the same subnational division.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_DSF_XXXX
Indicator Name
Average download speed fixed
Units
Mbps
Data Source
Speedtest by Ookla
Indicator description
Average download speed for the fixed network.
Methodology
Zonal Statistics (weighted average)
Methodology short
Zonal Statistics (weighted average)
Temporal Coverage
2020, 2021, 2022, 2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_DSF_XXXX
Indicator Name
Average download speed mobile
Units
Mbps
Data Source
Speedtest by Ookla
Indicator description
Average download speed for the mobile network.
Methodology
Zonal Statistics (weighted average)
Methodology short
Zonal Statistics (weighted average)
Temporal Coverage
2020 -2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_USF_XXXX
Indicator Name
Average upload speed fixed
Units
Mbps
Data Source
Speedtest by Ookla
Indicator description
Average upload speed for the fixed network.
Methodology
Zonal Statistics (weighted average)
Methodology short
Zonal Statistics (weighted average)
Temporal Coverage
2020, 2021, 2022, 2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_USM_XXXX
Indicator Name
Average upload speed mobile
Units
Mbps
Data Source
Speedtest by Ookla
Indicator description
Average upload speed for the mobile network.
Methodology
Zonal Statistics (weighted average)
Methodology short
Zonal Statistics (weighted average)
Temporal Coverage
2020, 2021, 2022, 2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_ALF_XXXX
Indicator Name
Average latency fixed
Units
ms
Data Source
Speedtest by Ookla
Indicator description
Average latency for the fixed network.
Methodology
Zonal Statistics (weighted average)
Methodology short
Zonal Statistics (weighted average)
Temporal Coverage
2020, 2021, 2022, 2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_ALM_XXXX
Indicator Name
Average latency mobile
Units
ms
Data Source
Speedtest by Ookla
Indicator description
Average latency for the mobile network.
Methodology
Zonal Statistics (weighted average)
Methodology short
Zonal Statistics (weighted average)
Temporal Coverage
2020, 2021, 2022, 2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_NDF_XXXX
Indicator Name
Number of unique devices fixed
Units
Number of devices
Data Source
Speedtest by Ookla
Indicator description
Number of devices measuring the fixed network performance through the app.
Methodology
Zonal Statistics (sum)
Methodology short
Zonal Statistics (sum)
Temporal Coverage
2020, 2021, 2022, 2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

Indicator thematic area
Socioeconomic
Indicator Group
Connectivity
Attribute ID
SC_CON_NDM_XXXX
Indicator Name
Number of unique devices mobile
Units
Number of devices
Data Source
Speedtest by Ookla
Indicator description
Number of devices measuring the mobile network performance through the app.
Methodology
Zonal Statistics (sum)
Methodology short
Zonal Statistics (sum)
Temporal Coverage
2020, 2021, 2022, 2023
Uncertainties & Best practices
Network performance is measured via users through the Speedtest app. Therefore, information is missing for areas where no users is actively testing the network performance.

2.9.4 Land Use Land Cover

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_020_XXXX
Indicator Name
Shrubs land cover area
Units
Hectares
Data Source
Buchhorn, M. ; Lesiv, M. ; Tsendbazar, N. - E. ; Herold, M. ; Bertels, L. ; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Shrubs (woody perennial plants with persistent and woody stems and without any defined main stem being less than 5 m tall) total area inside the urban center
Methodology
Sum of the pixels' area classified as shrub (class 20) that overlay the urban center.
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_030_XXXX
Indicator Name
Herbaceous vegetation land cover area
Units
Hectares
Data Source
Buchhorn, M. ; Lesiv, M. ; Tsendbazar, N. - E. ; Herold, M. ; Bertels, L. ; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description (xxx max words)
Herbaceous vegetation (plants without persistent stem or shoots above ground and lacking definite firm structure) total area inside the urban center
Methodology
Sum of the pixels' area classified as herbaceous vegetation (class 30) that overlay the urban center.
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_040_XXXX
Indicator Name
Cultivated and managed vegetation / agriculture land use area
Units
Hectares
Data Source
Buchhorn, M. ; Lesiv, M. ; Tsendbazar, N. - E. ; Herold, M. ; Bertels, L. ; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Cultivated and managed vegetation / agriculture (lands covered with temporary crops followed by harvest and a bare soil period) total area inside the urban center.
Methodology
Sum of the pixels' area classified as cultivated and managed vegetation / agriculture (class 40) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_050_XXXX
Indicator Name
Buildings and other man-made structures land use area
Units
Hectares
Data Source
Buchhorn, M. ; Lesiv, M. ; Tsendbazar, N. - E. ; Herold, M. ; Bertels, L. ; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description (xxx max words)
Total area of land covered by buildings and other man-made structures inside the urban center.
Methodology
Sum of the pixels' area classified as urban / built (class 50) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_060_XXXX
Indicator Name
Bare / sparse vegetation land cover area
Units
hectares
Data Source
Buchhorn, M. ; Lesiv, M. ; Tsendbazar, N. - E. ; Herold, M. ; Bertels, L. ; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description (xxx max words)
Bare / sparse vegetation (lands with exposed soil, sand, or rocks and never has more than 10 % vegetated cover during any time of the year) total area inside the urban center.
Methodology
Sum of the pixels' area classified bare / sparse vegetation (class 60) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_070_XXXX
Indicator Name
Snow and ice land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description (xxx max words)
Snow and ice land cover (lands with exposed soil, sand, or rocks and never has more than 10 % vegetated cover during any time of the year) total area inside the urban center.
Methodology
Sum of the pixels' area classified as snow and ice land cover (class 70) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_080_XXXX
Indicator Name
Permanent water bodies land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description (xxx max words)
Permanent water bodies (lakes, reservoirs, and rivers - can be either fresh or salt-water bodies -) total area inside the urban center.
Methodology
Sum of the pixels' area classified as permanent water bodies (class 80) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_090_XXXX
Indicator Name
Herbaceous wetland land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Herbaceous wetland (lands with a permanent mixture of water and herbaceous or woody vegetation; the vegetation can be present in either salt, brackish, or fresh water) total area inside the urban center.
Methodology
Sum of the pixels' area classified as herbaceous wetland (class 90) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_100_XXXX
Indicator Name
Moss and lichen land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description (xxx max words)
Moss and lichen total area inside the urban center.
Methodology
Sum of the pixels' area classified as moss and lichen (class 100) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_111_XXXX
Indicator Name
Closed forest, evergreen needle leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description (xxx max words)
Closed forest, evergreen needle leaf (tree canopy >70 %, almost all needle leaf trees remain green all year; canopy is never without green foliage) total area inside the urban center.
Methodology
Sum of the pixels' area classified as closed forest (class 111) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_112_XXXX
Indicator Name
Closed forest, evergreen broad leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Closed forest, evergreen broad leaf (tree canopy >70 %, almost all broadleaf trees remain green year round; canopy is never without green foliage) total area inside the urban center.
Methodology
Sum of the pixels' area classified as closed forest (class 112) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_113_XXXX
Indicator Name
Closed forest, deciduous needle leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Closed forest, deciduous needle leaf (tree canopy >70 %, consists of seasonal needle leaf tree communities with an annual cycle of leaf-on and leaf-off periods) total area inside the urban center.
Methodology
Sum of the pixels' area classified as closed forest (class 113) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_114_XXXX
Indicator Name
Closed forest, deciduous broad leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Closed forest, deciduous broad leaf (tree canopy >70 %, consists of seasonal broadleaf tree communities with an annual cycle of leaf-on and leaf-off periods) total area inside the urban center.
Methodology
Sum of the pixels' area classified as closed forest (class 114) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_115_XXXX
Indicator Name
Closed forest (mixed) land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Closed forest (mixed) total area inside the urban center.
Methodology
Sum of the pixels' area classified as closed forest (class 115) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_116_XXXX
Indicator Name
Closed forest (other) land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Closed forest (other) total area inside the urban center.
Methodology
Sum of the pixels' area classified as closed forest (class 116) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_121_XXXX
Indicator Name
Open forest, evergreen needle leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Open forest, evergreen needle leaf (top layer- trees 15-70 % and second layer- mixed of shrubs and grassland, almost all needle leaf trees remain green all year; canopy is never without green foliage) total area inside the urban center.
Methodology
Sum of the pixels' area classified as open forest (class 121) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_122_XXXX
Indicator Name
Open forest, evergreen broad leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Open forest, evergreen broad leaf (top layer- trees 15-70 % and second layer- mixed of shrubs and grassland, almost all broadleaf trees remain green year round; canopy is never without green foliage) total area inside the urban center.
Methodology
Sum of the pixels' area classified as open forest (class 122) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_123_XXXX
Indicator Name
Open forest, deciduous needle leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Open forest, deciduous needle leaf (top layer- trees 15-70 % and second layer- mixed of shrubs and grassland, consists of seasonal needle leaf tree communities with an annual cycle of leaf-on and leaf-off periods) total area inside the urban center.
Methodology
Sum of the pixels' area classified as open forest (class 123) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_124_XXXX
Indicator Name
Open forest, deciduous broad leaf land cover area
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Open forest, deciduous broad leaf (top layer- trees 15-70 % and second layer- mixed of shrubs and grassland, consists of seasonal broadleaf tree communities with an annual cycle of leaf-on and leaf-off periods) total area inside the urban center.
Methodology
Sum of the pixels' area classified as open forest (class 124) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_125_XXXX
Indicator Name
Open forest (mixed)
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Open forest (mixed) total area inside the urban center.
Methodology
Sum of the pixels' area classified as open forest (class 125) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

Indicator thematic area
Land Use Land Cover
Indicator group
Land Use Land Cover
Attribute ID
LU_HEC_126_XXXX
Indicator Name
Open forest (other)
Units
Hectares
Data Source
Buchhorn, M.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Bertels, L.; Smets, B. Copernicus Global Land Cover Layers-Collection 2. Remote Sensing 2020, 12Volume 108, 1044. doi:10.3390/rs12061044
Indicator description
Open forest (other) total area inside the urban center.
Methodology
Sum of the pixels' area classified as open forest (class 126) that overlay the urban center
Methodology short
Area
Temporal Coverage
2015, 2019
Uncertainties & Best practices

2.9.5 Exposure

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_010_POP_XXXX
Indicator Name
People exposed to floods (10 years return period)
Units
number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Number of people exposed to floods (10 years return period)
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center, masked by the 10 yrp flood hazard map (1 - flood, 0 - no flood).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_100_POP_XXXX
Indicator Name
People exposed to floods (100 years return period)
Units
number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Number of people exposed to floods (100 years return period)
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center, masked by the 100 yrp flood hazard map (1 - flood, 0 - no flood).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_010_SHP_XXXX
Indicator Name
Share of People exposed to floods (100 years return period)
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Share of people exposed to floods (10 years return period) over the total urban center population
Methodology
Percentage of population exposed over total population in the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_100_SHP_XXXX
Indicator Name
Share of People exposed to floods (10 years return period)
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Share of people exposed to floods (100 years return period) over the total urban center population
Methodology
Percentage of population exposed over total population in the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_010_BUS_XXXX
Indicator Name
Built-up surface exposed to floods (10 years return period)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Built-up surface exposed to floods (10 years return period)
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center, masked by the 10 yrp flood hazard map (1 - flood, 0 - no flood).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_100_BUS_XXXX
Indicator Name
Built-up surface exposed to floods (100 years return period)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Built-up surface exposed to floods (100 years return period)
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center, masked by the 100 yrp flood hazard map (1 - flood, 0 - no flood).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_010_SHB_XXXX
Indicator Name
Share of built-up surface exposed to floods (10 years return period)
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Share of built-up surface exposed to floods (10 years return period) over the total urban center built-up surface
Methodology
Percentage of built-up surface exposed over total built-up in the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_100_SHB_XXXX
Indicator Name
Share of built-up surface exposed to floods (100 years return period)
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Share of built-up surface exposed to floods (100 years return period) over the total urban center built-up surface
Methodology
Percentage of built-up surface exposed over total built-up in the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_010_NRE_XXXX
Indicator Name
Non-residential built-up surface exposed to floods (10 years return period)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Non-residential built-up surface exposed to floods (10 years return period)
Methodology
Zonal sum of the GHS-BUILT-S-NRES R2023A pixel values inside the urban center, masked by the 10 yrp flood hazard map (1 - flood, 0 - no flood).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_100_NRE_XXXX
Indicator Name
Non-residential built-up surface exposed to floods (100 years return period)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Non-residential built-up surface exposed to floods (100 years return period)
Methodology
Zonal sum of the GHS-BUILT-S-NRE R2023A pixel values inside the urban center, masked by the 100 yrp flood hazard map (1 - flood, 0 - no flood).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_010_SNR_XXXX
Indicator Name
Share of non-residential built-up surface exposed to floods (10 years return period)
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Share of non-residential built-up surface exposed to floods (10 years return period) over the urban center non-residential built-up surface
Methodology
Percentage of non-residential built-up surface exposed over non-residential built-up in the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Floods
Attribute ID
EX_100_SNR_XXXX
Indicator Name
Share of non-residential built-up surface exposed to floods (100 years return period)
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Francesco, Dottori; Neal, Jeffrey; Prudhomme; Christe; Salamon, Peter (2024): Modelled flood inundation for different return period scenarios at the global scale. European Commission, Joint Research Centre (JRC) https://jeodpp.jrc.ec.europa.eu/ftp/jrc-opendata/CEMS-GLOFAS/flood_hazard/
Indicator description
Share of non-residential built-up surface exposed to floods (100 years return period) over the l urban center non-residential built-up surface
Methodology
Percentage of non-residential built-up surface exposed over non-residential built-up in the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E01_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 1 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 1 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 1MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E02_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 2-3 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 2-3 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 2-3 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E04_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 4 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 4 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 4 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E05_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 5 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 5 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 5 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E06_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 6 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 6 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 6 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E07_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 7 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 7 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 7 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E08_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 8 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 8 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 8 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E09_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 9 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 9 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 9 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E10_POP_XXXX
Indicator Name
Population exposed to earthquakes (class 10 MMI)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Population exposed to earthquakes (class 10 MMI)
Methodology
Zonal statistics (sum) of GHS-POP R2023A inside the urban center affected by seismic hazard class 10 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_SHA_POP_XXXX
Indicator Name
Share of population exposed to earthquakes (class equal or greater than 6 MMI)
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Share of population exposed to earthquakes (class equal or greater than 6 MMI)
Methodology
Percentage of population exposed to earthquakes (class equal or greater than 6 MMI) over the total population of the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E01_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 1 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 1 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 1 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E02_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 2-3 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 2-3 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 2-3 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E04_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 4 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 4 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 4 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E05_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 5 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 5 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 5 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E06_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 6 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 6 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 6 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E07_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 7 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 7 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 7 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E08_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 8 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 8 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 8 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E09_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 9 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 9 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 9 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E10_BUS_XXXX
Indicator Name
Total built-up exposed to earthquakes (class 10 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Built-up exposed to earthquakes (class 10 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S R2023A inside the urban center affected by seismic hazard class 10 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_SHA_BUS_XXXX
Indicator Name
Share of total built-up exposed to earthquakes (class equal or greater than 6 MMI)
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Share of total built-up exposed to earthquakes (class equal or greater than 6 MMI)
Methodology
Percentage of total built-up exposed to earthquakes (class equal or greater than 6 MMI) over the total built-up of the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E01_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 1 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 1 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 1 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E02_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 2-3 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 2-3 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard classes 2-3 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E04_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 4 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 4 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 4 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E05_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 5 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 5 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 5 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E06_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 6 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 6 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 6 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E07_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 7 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 7 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 7 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E08_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 8 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 8 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 8 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E09_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 9 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 9 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 9 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_E10_NRE_XXXX
Indicator Name
Non-residential built-up exposed to earthquakes (class 10 MMI)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Non-residential built-up exposed to earthquakes (class 10 MMI)
Methodology
Zonal statistics (sum) of GHS-BUILT-S-NRES R2023A inside the urban center affected by seismic hazard class 10 MMI
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Earthquake
Attribute ID
EX_SHA_RES_XXXX
Indicator Name
Share of non-residential built-up exposed to earthquakes (class equal or greater than 6 MMI)
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA GEM GLOBAL SEISMIC HAZARD MAP version 2023.1 K. Johnson, M. Villani, K. Bayliss, C. Brooks, S. Chandrasekhar, T. Chartier, Y. Chen, J. Garcia-Pelaez, R. Gee, R. Styron, A. Rood, M. Simionato, M. Pagani (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023), DOI: https://doi.org/10.5281/zenodo.8409647
Indicator description
Share of non-residential built-up exposed to earthquakes (class equal or greater than 6 MMI)
Methodology
Percentage of non-residential built-up exposed to earthquakes (class equal or greater than 6 MMI) over the total built-up of the urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_POP_XXXX
Indicator Name
Population living below 5 m LECZ
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in the areas of the urban center which elevation is 5 m above the sea level
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the LECZ layer (5 m above the sea level).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_POP_XXXX
Indicator Name
Population living between 5 and 10 m LECZ
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in the areas of the urban center which elevation is between 5 and 10m above the sea level
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the LECZ layer (10 m above the sea level).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_SHP_XXXX
Indicator Name
Share of population living below 5 m LECZ
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of population living in the areas of the urban center which elevation is 5 m above the sea level
Methodology
Percentage of population living inside the urban center area situated 5 m above the sea level over the total urban center population.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_SHP_XXXX
Indicator Name
Share of population living between 5 and 10 m LECZ
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of population living in the areas of the urban center which elevation is between 5 and 10 m above the sea level
Methodology
Percentage of population living inside the urban center area situated between 5 and 10 m above the sea level over the total urban center population.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_LEC_SHP_XXXX
Indicator Name
Share of population living below 10 m LECZ
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of population living in the areas of the urban center which elevation is below 10 m above the sea level.
Methodology
Percentage of population living inside the urban center area situated below 10 m above the sea level over the total urban center population.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_BUS_XXXX
Indicator Name
Total Built-up situated below 5 m LECZ
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up area in the areas of the urban center which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the LECZ layer (5 m above the sea level).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_BUS_XXXX
Indicator Name
Total Built-up situated between 5 and 10m LECZ
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: [http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA](http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea) Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up area in the areas of the urban center which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the LECZ layer (10 m above the sea level).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_SHB_XXXX
Indicator Name
Share of total built-up below 5 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of total built-up in the areas of the urban center which elevation is below 5 m above the sea level.
Methodology
Percentage of total built-up in the urban center area situated below 5 m above the sea level over the total urban center built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_SHB_XXXX
Indicator Name
Share of total built-up between 5 and 10 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of total built-up in the areas of the urban center which elevation is between 5 and 10 m above the sea level.
Methodology
Percentage of total built-up in the urban center area situated between 5 and 10 m above the sea level over the total urban center built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_LEC_SHB_XXXX
Indicator Name
Share of total built-up below 10 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of total built-up in the areas of the urban center which elevation is below 10 m above the sea level.
Methodology
Percentage of total built-up in the urban center area situated below 10 m above the sea level over the total urban center built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_NRE_XXXX
Indicator Name
Non-residential Built-up situated below 5 m LECZ
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Non-residential built-up area in the areas of the urban center which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S-NRES R2023A pixel values inside the urban center masked by the LECZ layer (5 m above the sea level).
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area	
Exposure	
Indicator group	
Low elevated coastal Zones (LECZ)	
Attribute ID	
EX_L10_NRE_XXXX	
Indicator Name	
Non-residential built-up situated between 5 and 10m LECZ	
Units	
m^2	
Data Source	
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.	
Indicator description	
Non-residential built-up area in the areas of the urban center which elevation is between 5 and 10m above the sea level.	
Methodology	
Zonal sum of the GHS-BUILT-S-NRES R2023A pixel values inside the urban center masked by the LECZ layer (10 m above the sea level).	
Methodology Short	
Zonal Statistics (sum)	
Temporal Coverage	
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030	
Uncertainties & Best practices	

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_SNR_XXXX
Indicator Name
Share of non-residential built-up below 5 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of non-residential built-up in the areas of the urban center which elevation is below 5 m above the sea level.
Methodology
Percentage of non-residential built-up in the urban center area situated below 5 m above the sea level over the total urban center non-residential built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_SNR_XXXX
Indicator Name
Share of non-residential built-up between 5 and 10 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: [http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA](http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea) Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of non-residential built-up in the areas of the urban center which elevation is between 5 and 10 m above the sea level.
Methodology
Percentage of non-residential built-up in the urban center area situated between 5 and 10 m above the sea level over the total urban center non-residential built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_LEC_SNR_XXXX
Indicator Name
Share of non-residential built-up below 10 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of non-residential built-up in the areas of the urban center which elevation is below 10 m above the sea level.
Methodology
Percentage of non-residential built-up in the urban center area situated below 10 m above the sea level over the total urban center non-residential built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_RES_XXXX
Indicator Name
Residential Built-up situated below 5 m LECZ
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Residential built-up area in the areas of the urban center which elevation is below 5m above the sea level.
Methodology
Subtraction total built-up in LECZ (5m above the sea level) minus non-residential built-up in LECZ (5m above the sea level)
Methodology Short
Subtraction
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_NRE_XXXX
Indicator Name
Residential built-up situated between 5 and 10m LECZ
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Non-residential built-up area in the areas of the urban center which elevation is between 5 and 10m above the sea level.
Methodology
Subtraction total built-up in LECZ (10 m above the sea level) minus non-residential built-up in LECZ (10 m above the sea level)
Methodology Short
Subtraction
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_SHR_XXXX
Indicator Name
Share of residential built-up below 5 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of residential built-up in the areas of the urban center which elevation is below 5 m above the sea level.
Methodology
Percentage of residential built-up in the urban center area situated below 5 m above the sea level over the total urban center residential built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_SHR_XXXX
Indicator Name
Share of non-residential built-up between 5 and 10 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: [http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA](http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea) Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of residential built-up in the areas of the urban center which elevation is between 5 and 10 m above the sea level.
Methodology
Percentage of residential built-up in the urban center area situated between 5 and 10 m above the sea level over the total urban center residential built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_LEC_SHR_XXXX
Indicator Name
Share of residential built-up below 10 m LECZ
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: [http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA](http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea) Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Share of residential built-up in the areas of the urban center which elevation is below 10 m above the sea level.
Methodology
Percentage of residential built-up in the urban center area situated below 10 m above the sea level over the total urban center residential built-up.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_P11_XXXX
Indicator Name
Population living in BUTYPE 11 (residential prevalent 1-2 floors) in LECZ (below 5m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 11 (residential prevalent 1-2 floors) which elevation is 5 m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 11 and the LECZ layer (5 m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_P12_XXXX
Indicator Name
Population living in BUTYPE 12 (residential prevalent 3-7 floors) in LECZ (below 5m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 12 (residential prevalent 3-7 floors) which elevation is 5 m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 12 and the LECZ layer (5 m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_P13_XXXX
Indicator Name
Population living in BUTYPE 13 (residential prevalent > 8 floors) in LECZ (below 5m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 13 (residential prevalent > 8 floors) which elevation is 5 m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 13 and the LECZ layer (5 m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_P21_XXXX
Indicator Name
Population living in BUTYPE 21 (non-residential prevalent 1-2 floors) in LECZ (below 5m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 21 (non-residential prevalent 1-2 floors) which elevation is 5 m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 21 and the LECZ layer (5 m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_P22_XXXX
Indicator Name
Population living in BUTYPE 22 (non-residential prevalent 3-7 floors) in LECZ (below 5m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 22 (non-residential prevalent 3-7 floors) which elevation is 5 m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 22 and the LECZ layer (5 m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_P23_XXXX
Indicator Name
Population living in BUTYPE 23 (non-residential prevalent >8 floors) in LECZ (below 5m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 23 (non-residential prevalent >8 floors) which elevation is 5 m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 23 and the LECZ layer (5 m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_P11_XXXX
Indicator Name
Population living in BUTYPE 11 (residential prevalent 1-2 floors) in LECZ (between 5 and 10m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 11 (residential prevalent 1-2 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 11 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_P12_XXXX
Indicator Name
Population living in BUTYPE 12 (residential prevalent 3-7 floors) in LECZ (between 5 and 10m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 12 (residential prevalent 3-7 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 12 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_P13_XXXX
Indicator Name
Population living in BUTYPE 13 (residential prevalent > 8 floors) in LECZ (between 5 and 10m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 13 (residential prevalent > 8 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 13 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_P21_XXXX
Indicator Name
Population living in BUTYPE 21 (non-residential prevalent 1-2 floors) in LECZ (between 5 and 10m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 21 (non-residential prevalent 1-2 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 21 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_P22_XXXX
Indicator Name
Population living in BUTYPE 22 (non-residential prevalent 3-7 floors) in LECZ (between 5 and 10m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 22 (non-residential prevalent 3-7 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 22 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_P23_XXXX
Indicator Name
Population living in BUTYPE 23 (non-residential prevalent >8 floors) in LECZ (between 5 and 10m)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Population living in BUTYPE class 23 (non-residential prevalent >8 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the BUTYPE layer class 23 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_B11_XXXX
Indicator Name
Total built-up in BUTYPE 11 (residential prevalent 1-3 floors) in LECZ (below 5m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 11 (residential prevalent 1-3 floors) which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 11 and the LECZ layer (below 5m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_B12_XXXX
Indicator Name
Total built-up in BUTYPE 12 (residential prevalent 3-7 floors) in LECZ (below 5m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 12 (residential prevalent 3-7 floors) which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 12 and the LECZ layer (below 5m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_B13_XXXX
Indicator Name
Total built-up in BUTYPE 13 (residential prevalent >8 floors) in LECZ (below 5m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 13 (residential prevalent >8 floors) which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 13 and the LECZ layer (below 5m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_B21_XXXX
Indicator Name
Total built-up in BUTYPE 21 (non-residential prevalent 1-3 floors) in LECZ (below 5m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 21 (non-residential prevalent 1-3 floors) which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 21 and the LECZ layer (below 5m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_B22_XXXX
Indicator Name
Total built-up in BUTYPE 22 (non-residential prevalent 3-7 floors) in LECZ (below 5m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 22 (non-residential prevalent 3-7 floors) which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 22 and the LECZ layer (below 5m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L05_B23_XXXX
Indicator Name
Total built-up in BUTYPE 23 (non-residential prevalent >8 floors) in LECZ (below 5m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 23 (non-residential prevalent >8 floors) which elevation is below 5m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 23 and the LECZ layer (below 5m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_B11_XXXX
Indicator Name
Total built-up in BUTYPE 11 (residential prevalent 1-3 floors) in LECZ (between 5 and 10m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 11 (residential prevalent 1-3 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 11 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_B12_XXXX
Indicator Name
Total built-up in BUTYPE 12 (residential prevalent 3-7 floors) in LECZ (between 5 and 10m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 12 (residential prevalent 3-7 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 12 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_B13_XXXX
Indicator Name
Total built-up in BUTYPE 13 (residential prevalent >8 floors) in LECZ (between 5 and 10m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 13 (residential prevalent >8 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 13 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_B21_XXXX
Indicator Name
Total built-up in BUTYPE 21 (non-residential prevalent 1-3 floors) in LECZ (between 5 and 10m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 21 (non-residential prevalent 1-3 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 21 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_B22_XXXX
Indicator Name
Total built-up in BUTYPE 22 (non-residential prevalent 3-7 floors) in LECZ (between 5 and 10m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 22 (non-residential prevalent 3-7 floors) which elevation is below between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 22 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Low elevated coastal Zones (LECZ)
Attribute ID
EX_L10_B23_XXXX
Indicator Name
Total built-up in BUTYPE 23 (non-residential prevalent >8 floors) in LECZ (between 5 and 10m)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Pesaresi, M., Schiavina, M., Politis, P., Freire, S., Krasnodębska, K., Uhl, J. H., Alessandra Carioli, Christina Corbane, Lewis Dijkstra, Pietro Florio, Hannah K. Friedrich, Jing Gao, Stefan Leyk, Linlin Lu, Luca Maffenini, Ines Mari-Rivero, Michele Melchiorri, Vasileios Syrris, Jamon Van Den Hoek & Kemper, T. (2024). Advances on the Global Human Settlement Layer by joint assessment of Earth Observation and population survey data. International Journal of Digital Earth, 17(1). https://doi.org/10.1080/17538947.2024.2390454 Center for International Earth Science Information Network (CIESIN), Columbia University, and CUNY Institute for Demographic Research (CIDR), City University of New York. 2021. Low Elevation Coastal Zone (LECZ) Urban-Rural Population and Land Area Estimates, Version 3. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/d1x1-d702. Accessed 18/05/2021.
Indicator description
Total built-up in BUTYPE class 23 (non-residential prevalent >8 floors) which elevation is between 5 and 10m above the sea level.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the BUTYPE layer class 23 and the LECZ layer (between 5 and 10m above the sea level).
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_020_S1P_XXXX
Indicator Name
Population exposed to cyclone wind 20 yrp (wind speed classes 1-2)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Population exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 20 yrp.
Methodology
Zonal sum of the GHS- POP R2023A pixel values inside the urban center masked by the cyclone layer 20 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_100_S1P_XXXX
Indicator Name
Population exposed to cyclone wind 100 yrp (wind speed classes 1-2)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Population exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 100 yrp.
Methodology
Zonal sum of the GHS- POP R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_400_S1P_XXXX
Indicator Name
Population exposed to cyclone wind 400 yrp (wind speed classes 1-2)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Population exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 400 yrp.
Methodology
Zonal sum of the GHS- POP R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_400_S3P_XXXX
Indicator Name
Population exposed to cyclone wind 400 yrp (wind speed classes 3-5)
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU. ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Population exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 400 yrp.
Methodology
Zonal sum of the GHS- POP R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis. There is population exposed only to classes 3-5 for 400 yrp cyclone wind

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_020_S1B_XXXX
Indicator Name
Total built-up exposed to cyclone wind 20 yrp (wind speed classes 1-2)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Total built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 20 yrp.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the cyclone layer 20 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_100_S1B_XXXX
Indicator Name
Total built-up exposed to cyclone wind 100 yrp (wind speed classes 1-2)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Total built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 100 yrp.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_400_S1B_XXXX
Indicator Name
Total built-up exposed to cyclone wind 400 yrp (wind speed classes 1-2)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Total built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 400 yrp.
Methodology
Zonal sum of the GHS- BUILT-S R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_400_S3P_XXXX
Indicator Name
Total built-up exposed to cyclone wind 400 yrp (wind speed classes 3-5)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Total built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 400 yrp.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis. There is built-up exposed only to classes 3-5 for 400 yrp cyclone wind

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_020_S1N_XXXX
Indicator Name
Non-residential built-up exposed to cyclone wind 20 yrp (wind speed classes 1-2)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Non-residential built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 20 yrp.
Methodology
Zonal sum of the GHS-BUILT-S-NRES R2023A pixel values inside the urban center masked by the cyclone layer 20 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_100_S1N_XXXX
Indicator Name
Non-residential built-up exposed to cyclone wind 100 yrp (wind speed classes 1-2)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Non-residential built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 100 yrp.
Methodology
Zonal sum of the GHS-BUILT-S-NRES R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_400_S1N_XXXX
Indicator Name
Non-residential built-up exposed to cyclone wind 400 yrp (wind speed classes 1-2)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Non-residential built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 400 yrp.
Methodology
Zonal sum of the GHS- BUILT-S-NRES R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

Indicator thematic area
Exposure
Indicator group
Cyclone wind
Attribute ID
EX_400_S3N_XXXX
Indicator Name
Non-residential built-up exposed to cyclone wind 400 yrp (wind speed classes 3-5)
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Bloemendaal, N., Haigh, I.D., de Moel, H. et al. Generation of a global synthetic tropical cyclone hazard dataset using STORM. Sci Data 7, 40 (2020). https://www.nature.com/articles/s41597-020-0381-2 Bloemendaal, Nadia; de Moel, H. (Hans); Muis, S; Haigh, I.D. (Ivan); Aerts, J.C.J.H. (Jeroen) (2023): STORM tropical cyclone wind speed return periods. Version 4. 4TU.ResearchData. dataset. https://doi.org/10.4121/12705164.v4
Indicator description
Non-residential built-up exposed to cyclone wind classes 1-2 (category 1-2 Saffir-Simpson Hurricane Wind Scale) for a 400 yrp.
Methodology
Zonal sum of the GHS-BUILT-S-NRES R2023A pixel values inside the urban center masked by the cyclone layer 100 yrp classes 1-2
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses tropical cyclone maximum wind speed return periods, generated using the Synthetic Tropical cyclOne geneRation Model (STORM). Input TC data are extracted from the

International Best Track Archive for Climate Stewardship (IBTrACS) dataset (1980–2018). Comparison between the TC characteristics from the IBTrACS dataset to those generated by STORM shows that the STORM dataset performs sufficiently to be used for TC risk assessments and TC hazard analyses. The STORM model does not distinguish between tropical and extratropical systems. Therefore, TCs with extratropical nature in higher latitudes are not considered in our TC-related analysis.

There is built-up exposed only to classes 3-5 for 400 yrp cyclone wind

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF2_POP_XXXX
Indicator Name
Population exposed to coastal floods 20 yrp
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Population exposed to coastal floods (20 yrp).
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the coastal flood layer 20 yrp
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF1_POP_XXXX
Indicator Name
Population exposed to coastal floods 100 yrp
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4 Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Population exposed to coastal floods (100 yrp).
Methodology
Zonal sum of the GHS-POP R2023A pixel values inside the urban center masked by the coastal flood layer 100 yrp
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF2_BUS_XXXX
Indicator Name
Built-up exposed to coastal floods 20 yrp
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Total built-up exposed to coastal floods (20 yrp).
Methodology
Zonal sum of the GHS- BUILT-S R2023A pixel values inside the urban center masked by the coastal flood layer 20 yrp
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF1_BUS_XXXX
Indicator Name
Built-up exposed to coastal floods 100 yrp
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Total built-up exposed to coastal floods (100 yrp).
Methodology
Zonal sum of the GHS- BUILT-S R2023A pixel values inside the urban center masked by the coastal flood layer 100 yrp
Methodology Short
Zonal statistics (sum)

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF2_NRE_XXXX
Indicator Name
Non-residential built-up exposed to coastal floods 20 yrp
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Non-residential built-up exposed to coastal floods (20 yrp).
Methodology
Zonal sum of the GHS- BUILT-S-NRES R2023A pixel values inside the urban center masked by the coastal flood layer 20 yrp
Methodology Short
Zonal statistics (sum)
Temporal Coverage

1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF1_NRE_XXXX
Indicator Name
Non-residential built-up exposed to coastal floods 100 yrp
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Non-residential built-up exposed to coastal floods (100 yrp).
Methodology
Zonal sum of the GHS- BUILT-S-NRES R2023A pixel values inside the urban center masked by the coastal flood layer 100 yrp
Methodology Short
Zonal statistics (sum)
Temporal Coverage

1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF2_SHP_XXXX
Indicator Name
Share of population exposed to coastal floods 20 yrp
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Share of population exposed to coastal floods (20 yrp).
Methodology
Percentage of population exposed to coastal floods (20yrp) over total population in urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF1_SHP_XXXX
Indicator Name
Share of population exposed to coastal floods 100 yrp
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Share of population exposed to coastal floods (100 yrp).
Methodology
Percentage of population exposed to coastal floods (100yrp) over total population in urban center.
Methodology Short
Ratio
Temporal Coverage

1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF2_SHB_XXXX
Indicator Name
Share of built-up exposed to coastal floods 20 yrp
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Share of total built-up exposed to coastal floods (20 yrp).
Methodology
Percentage of total built-up exposed to coastal floods (20yrp) over total built-up in urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF1_SHB_XXXX
Indicator Name
Share of built-up exposed to coastal floods 100 yrp
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Share of total built-up exposed to coastal floods (100 yrp).
Methodology
Percentage of total built-up exposed to coastal floods (100yrp) over total built-up in urban center.
Methodology Short
Ratio
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030

Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF2_SNR_XXXX
Indicator Name
Share of non-residential built-up exposed to coastal floods 20 yrp
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Share of non-residential built-up exposed to coastal floods (20 yrp).
Methodology
Percentage of non-residential built-up exposed to coastal floods (20yrp) over non-residential built-up in urban center.
Methodology Short
Ratio

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

Indicator thematic area
Exposure
Indicator group
Coastal flood
Attribute ID
EX_CF1_SNR_XXXX
Indicator Name
Share of non-residential built-up exposed to coastal floods 100 yrp
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030)European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L.P., Feyen, L., 2018. Global probabilistic projections of extreme sea levels show intensification of coastal flood hazard. Nat. Commun. 9, 2360. https://doi.org/10.1038/s41467-018-04692-w. Vousdoukas, M.I., Mentaschi, L., Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L.,2018. Climatic and socioeconomic controls of future coastal flood risk in Europe. Nat. Clim. Change. 89 (8), 776–780. https://doi.org/10.1038/s41558-018-0260-4. Dottori, F., Salamon, P., Bianchi, A., Alfieri, L., Hirpa, F.A., Feyen, L., 2016. Development and evaluation of a framework for global flood hazard mapping. Adv. Water Resour. 94, 87–102. https://doi.org/10.1016/j.advwatres.2016.05.002.
Indicator description
Share of non-residential built-up exposed to coastal floods (100 yrp).
Methodology
Percentage of non-residential built-up exposed to coastal floods (100yrp) over non-residential built-up in urban center.
Methodology Short
Ratio

Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
DRMKC (JRC) team uses the coastal flood extent which is estimated by the JRC LISFLOOD-FP numerical model and derived by the various design return periods of the total water level. The extreme total water level describes the contribution of the mean sea level, tides and extreme episodic water level variations (storm surges and waves), without considering the non-linear interactions between the hydrodynamic components. Although the episodic offshore water level has been validated with tide gauge and wave buoy records, uncertainties of the derived inundation extent may arise due to the performance skill of the utilized hydrodynamic numerical models, in the absence of high resolution and accurate nearshore topobathy data, especially in locations with complex morphology.

2.9.6 Hazards

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_VAC_XXXX
Indicator Name
Number of event type 'violence against civilians'
Units
Number of events
Data Source
ACLED dataset. Published on: 25 October 2023 | Last updated: 29 November 2023. Last complete ACLED download on 2023-09-26 10:10:29
Indicator description
Count of numbers of events in the urban center classified as 'violence against civilians'
Methodology
Zonal count of point-based ACLED data where violence type is 'violence against civilians'. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
https://acleddata.com/knowledge-base/how-does-acled-code-and-review-data-to-ensure-quality/

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_BAT_XXXX
Indicator Name
Number of event type 'battles'
Units
Number of events
Data Source
ACLED dataset. Published on: 25 October 2023 | Last updated: 29 November 2023. Last complete ACLED download on 2023-09-26 10:10:29
Indicator description
Count of numbers of events in the urban center classified as 'battles'
Methodology
Zonal count of point-based ACLED data where violence type is 'battles'. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
https://acleddata.com/knowledge-base/how-does-acled-code-and-review-data-to-ensure-quality/

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_SDV_XXXX
Indicator Name
Number of event type ‘Strategic Developments’
Units
Number of events
Data Source
ACLED dataset. Published on: 25 October 2023 | Last updated: 29 November 2023. Last complete ACLED download on 2023-09-26 10:10:29
Indicator description
Count of numbers of events in the urban center classified as ‘Strategic Developments’
Methodology
Zonal count of point-based ACLED data where violence type is ‘Strategic Developments’. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
https://acleddata.com/knowledge-base/how-does-acled-code-and-review-data-to-ensure-quality/

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_RIO_XXXX
Indicator Name
Number of event type ‘riots’
Units
Number of events
Data Source
ACLED dataset. Published on: 25 October 2023 | Last updated: 29 November 2023. Last complete ACLED download on 2023-09-26 10:10:29
Indicator description
Count of numbers of events in the urban center classified as ‘riots’
Methodology
Zonal count of point-based ACLED data where violence type is ‘riots’. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
https://acleddata.com/knowledge-base/how-does-acled-code-and-review-data-to-ensure-quality/

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_PRO_XXXX
Indicator Name
Number of event type ‘protests’
Units
Number of events
Data Source
ACLED dataset. Published on: 25 October 2023 | Last updated: 29 November 2023. Last complete ACLED download on 2023-09-26 10:10:29
Indicator description
Count of numbers of events in the urban center classified as ‘protests’
Methodology
Zonal count of point-based ACLED data where violence type is ‘protests’. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
https://acleddata.com/knowledge-base/how-does-acled-code-and-review-data-to-ensure-quality/

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_ERV_XXXX
Indicator Name
Number of event type ‘explosions or remote violence’
Units
Number of events
Data Source
ACLED dataset. Published on: 25 October 2023 | Last updated: 29 November 2023. Last complete ACLED download on 2023-09-26 10:10:29
Indicator description
Count of numbers of events in the urban center classified as ‘explosions or remote violence’
Methodology
Zonal count of point-based ACLED data where violence type is ‘explosions or remote violence’. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
https://acleddata.com/knowledge-base/how-does-acled-code-and-review-data-to-ensure-quality/

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_TOT_XXXX
Indicator Name
Total number of events
Units
Number of events
Data Source
Sundberg, Ralph, and Erik Melander, 2013, "Introducing the UCDP Georeferenced Event Dataset", Journal of Peace Research, vol.50, no.4, 523-532. Download on 2023-08-22 15:00:27. Includes the following versions: 23.1, 23.01.23.06, 23.0.7
Indicator description
Count of total number of events in the urban center
Methodology
Zonal count of point-based UCDP GED event data. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Högbladh Stina, 2023, "UCDP GED Codebook version 23.1", Department of Peace and Conflict Research, Uppsala University https://ucdp.uu.se/downloads/ged/ged231.pdf

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_SBC_XXXX
Indicator Name
Number of state-based-conflict
Units
Number of events
Data Source
Sundberg, Ralph, and Erik Melander, 2013, "Introducing the UCDP Georeferenced Event Dataset", Journal of Peace Research, vol.50, no.4, 523-532. Download on 2023-08-22 15:00:27. Includes the following versions: 23.1, 23.01.23.06, 23.0.7
Indicator description
Count of state-based-conflict events in the urban center
Methodology
Zonal count of point-based UCDP GED event data when the event type is 'state-based-conflict'. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Högbladh Stina, 2023, "UCDP GED Codebook version 23.1", Department of Peace and Conflict Research, Uppsala University https://ucdp.uu.se/downloads/ged/ged231.pdf

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_NSC_XXXX
Indicator Name
Number of non-state-conflict
Units
Number of events
Data Source
Sundberg, Ralph, and Erik Melander, 2013, "Introducing the UCDP Georeferenced Event Dataset", Journal of Peace Research, vol.50, no.4, 523-532. Download on 2023-08-22 15:00:27. Includes the following versions: 23.1, 23.01.23.06, 23.0.7
Indicator description
Count of non-state-conflict events in the urban center
Methodology
Zonal count of point-based UCDP GED event data when the event type is 'non-state-conflict'. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Högbladh Stina, 2023, "UCDP GED Codebook version 23.1", Department of Peace and Conflict Research, Uppsala University https://ucdp.uu.se/downloads/ged/ged231.pdf

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_OSV_XXXX
Indicator Name
Number of one-sided violence
Units
Number of events
Data Source
Sundberg, Ralph, and Erik Melander, 2013, "Introducing the UCDP Georeferenced Event Dataset", Journal of Peace Research, vol.50, no.4, 523-532. Download on 2023-08-22 15:00:27. Includes the following versions: 23.1, 23.01.23.06, 23.0.7
Indicator description
Count of one-sided violence events in the urban center
Methodology
Zonal count of point-based UCDP GED event data when the event type is 'one-sided violence'. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Högbladh Stina, 2023, "UCDP GED Codebook version 23.1", Department of Peace and Conflict Research, Uppsala University https://ucdp.uu.se/downloads/ged/ged231.pdf

Indicator thematic area
Hazard and Risk
Indicator group
Conflicts
Attribute ID
HZ_CON_FAT_XXXX
Indicator Name
Number of fatalities
Units
Number of fatalities
Data Source
Sundberg, Ralph, and Erik Melander, 2013, "Introducing the UCDP Georeferenced Event Dataset", Journal of Peace Research, vol.50, no.4, 523-532. Download on 2023-08-22 15:00:27. Includes the following versions: 23.1, 23.01.23.06, 23.0.7
Indicator description
Count of one-sided violence events in the urban center
Methodology
Zonal count of point-based UCDP GED number of fatalities data. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices
Högbladh Stina, 2023, "UCDP GED Codebook version 23.1", Department of Peace and Conflict Research, Uppsala University https://ucdp.uu.se/downloads/ged/ged231.pdf

Indicator thematic area
Hazard and Risk
Indicator group
Wildfires
Attribute ID
HZ_WLF_NUM_XXXX
Indicator Name
Accumulate number of wildfires
Units
Number of wildfires
Data Source
San-Miguel-Ayanz, J., Houston Durrant, T., Boca, R., Libertà, G., Branco, A., de Rigo, D., Ferrari, D., Maianti, P., Artés Vivancos, T., Schulte, E., Loffler, P., Benchikha, A., Abbas, M., Humer, F., Konstantinov, V., Pešut, I., Petkoviček, S., Papageorgiou, K., Toumasis, I., Kütt, V., Kõiv, K., Ruuska, R., Anastasov, T., Timovska, M., Michaut, P., Joannelle, P., Lachmann, M., Pavlidou, K., Debreceni, P., Nagy, D., Nugent, C., Di Fonzo, M., Leisavnieks, E., Jaunķiķis, Z., Mitri, G., Repšienė, S., Assali, F., Mharzi Alaoui, H., Botnen, D., Piwnicki, J., Szczygieł, R., Janeira, M., Borges, A., Sbirnea, R., Mara, S., Eritsov, A., Longauerová, V., Jakša, J., Enriquez, E., Lopez, A., Sandahl, L., Reinhard, M., Conedera, M., Pezzatti, B., Dursun, K. T., Baltaci, U., Moffat, A., 2017. Forest fires in Europe, Middle East and North Africa 2016. Publications Office of the European Union, Luxembourg. ISBN:978-92-79-71292-0, https://doi.org/10.2760/17690 Goldammer, J. G., Mangeon, S., Keywood, M., Kaiser, J. W., de Groot, W. J., Gunawan, D., Gan, C., Field, R., Sofiev, M., Baklanov, A., 2018. Vegetation Fire and Smoke Pollution Warning and Advisory System (VFSP-WAS): concept note and expert recommendations. Vol. 235 of GAW Report series. World Meteorological Organization, Geneva, Switzerland. https://library.wmo.int/doc_num.php?explnum_id=4519 Giglio, L., Boschetti, L., Roy, D., Humber, M., Justice, C.O., The Collection 6 MODIS Burned Area Mapping Algorithm and Product. Remote Sensing of Environment (submitted June 2018). https://data.jrc.ec.europa.eu/dataset/e6f7a4e7-1f64-4ba9-9363-6bc864ab4666
Indicator description
Accumulate number of wildfires
Methodology
Zonal count of wildfires occurred inside the urban center.
Methodology Short
Zonal Statistics (count)
Temporal Coverage

2015, 2020, 2024
Uncertainties & Best practices
The accumulate periods are the following: 2012-2015 for the year 2015, 2016-2020 for the year 2020 and 2020-2024 for the year 2024

Indicator thematic area
Hazard and Risk
Indicator group
Wildfires
Attribute ID
HZ_WLF_BHA_XXXX
Indicator Name
Accumulate burnt area
Units
hectares
Data Source
San-Miguel-Ayanz, J., Houston Durrant, T., Boca, R., Libertà, G., Branco, A., de Rigo, D., Ferrari, D., Maianti, P., Artés Vivancos, T., Schulte, E., Loffler, P., Benchikha, A., Abbas, M., Humer, F., Konstantinov, V., Pešut, I., Petkoviček, S., Papageorgiou, K., Toumasis, I., Kütt, V., Kõiv, K., Ruuska, R., Anastasov, T., Timovska, M., Michaut, P., Joannelle, P., Lachmann, M., Pavlidou, K., Debreceni, P., Nagy, D., Nugent, C., Di Fonzo, M., Leisavnieks, E., Jaunķiķis, Z., Mitri, G., Repšienė, S., Assali, F., Mharzi Alaoui, H., Botnen, D., Piwnicki, J., Szczygieł, R., Janeira, M., Borges, A., Sbirnea, R., Mara, S., Eritsov, A., Longauerová, V., Jakša, J., Enriquez, E., Lopez, A., Sandahl, L., Reinhard, M., Conedera, M., Pezzatti, B., Dursun, K. T., Baltaci, U., Moffat, A., 2017. Forest fires in Europe, Middle East and North Africa 2016. Publications Office of the European Union, Luxembourg. ISBN:978-92-79-71292-0, https://doi.org/10.2760/17690 Goldammer, J. G., Mangeon, S., Keywood, M., Kaiser, J. W., de Groot, W. J., Gunawan, D., Gan, C., Field, R., Sofiev, M., Baklanov, A., 2018. Vegetation Fire and Smoke Pollution Warning and Advisory System (VFSP-WAS): concept note and expert recommendations. Vol. 235 of GAW Report series. World Meteorological Organization, Geneva, Switzerland. https://library.wmo.int/doc_num.php?explnum_id=4519 Giglio, L., Boschetti, L., Roy, D., Humber, M., Justice, C.O., The Collection 6 MODIS Burned Area Mapping Algorithm and Product. Remote Sensing of Environment (submitted June 2018). https://data.jrc.ec.europa.eu/dataset/e6f7a4e7-1f64-4ba9-9363-6bc864ab4666
Indicator description
Accumulate burnt area due to wildfires
Methodology
Zonal sum of the burnt area due to wildfires inside the urban center.
Methodology Short
Zonal Statistics (count)

Temporal Coverage
2015, 2020, 2024
Uncertainties & Best practices
The accumulate periods are the following: 2012-2015 for the year 2015, 2016-2020 for the year 2020 and 2020-2024 for the year 2024

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_TEV_XXXX
Indicator Name
Total number of events
Units
Number of events
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of events
Methodology
Spatial join and count of the events (1 event has 1 or multiple hazards) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_THZ_XXXX
Indicator Name
Total number of hazards
Units
Number of hazards
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards
Methodology
Spatial join and count of the hazards (1 hazards can happen more than once during an event and in multiple events) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_EAR_XXXX
Indicator Name
Earthquakes occurrence
Units
Number of hazards type earthquakes
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type earthquakes
Methodology
Spatial join and count of the hazards (when hazard is classified as earthquakes) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_EWI_XXXX
Indicator Name
Extreme wind occurrence
Units
Number of hazards type extreme wind
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type extreme wind
Methodology
Spatial join and count of the hazards (when hazard is classified as extreme wind) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_TSU_XXXX
Indicator Name
Tsunami occurrence
Units
Number of hazards type extreme wind
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type tsunami
Methodology
Spatial join and count of the hazards (when hazard is classified as tsunami) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_HEW_XXXX
Indicator Name
Heatwaves occurrence
Units
Number of hazards type heatwaves
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type heatwaves
Methodology
Spatial join and count of the hazards (when hazard is classified as heatwave) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_DRO_XXXX
Indicator Name
Droughts occurrence
Units
Number of hazards type drought
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type drought
Methodology
Spatial join and count of the hazards (when hazard is classified as drought) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_FLO_XXXX
Indicator Name
Floods occurrence
Units
Number of hazards type flood
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type flood
Methodology
Spatial join and count of the hazards (when hazard is classified as flood) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_TCY_XXXX
Indicator Name
Tropical Cyclones occurrence
Units
Number of hazards type tropical cyclones
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type tropical cyclones
Methodology
Spatial join and count of the hazards (when hazard is classified as tropical cyclones) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_VOL_XXXX
Indicator Name
Volcanic eruptions occurrence
Units
Number of hazards type volcanic eruption
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type volcanic eruption
Methodology
Spatial join and count of the hazards (when hazard is classified as volcano) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_LAN_XXXX
Indicator Name
Landslide occurrence
Units
Number of hazards type landslide
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type landslide
Methodology
Spatial join and count of the hazards (when hazard is classified as landslide) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_COW_XXXX
Indicator Name
Cold wave occurrence
Units
Number of hazards type cold wave
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type cold wave
Methodology
Spatial join and count of the hazards (when hazard is classified as cold wave) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_WLF_XXXX
Indicator Name
Wildfire occurrence
Units
Number of hazards type wildfire
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Total number of hazards type wildfire
Methodology
Spatial join and count of the hazards (when hazard is classified as wildfire) that overlay the urban center. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

Indicator thematic area
Hazard and Risk
Indicator group
Combined events
Attribute ID
HZ_CEV_MHZ_XXXX
Indicator Name
Maximum number of hazards per event
Units
Maximum number of hazards per event
Data Source
Claassen, J.N., Ward, P.J., Daniell, J. et al. A new method to compile global multi-hazard event sets. Sci Rep 13, 13808 (2023). https://doi.org/10.1038/s41598-023-40400-5 MYRIAD – Hazard Event Sets (MYRIAD-HES) https://zenodo.org/records/8269680
Indicator description
Maximum number of hazards per event
Methodology
Spatial join and count of the number of hazards per event that overlay the urban center. Selection of the maximum number. The total number corresponds to the previous year, the precedent year and the next year.
Methodology Short
Spatial join
Temporal Coverage
2005, 2010, 2015
Uncertainties & Best practices

2.9.7 SDGs

Indicator thematic area
SDG
Indicator group
Land Use efficiency
Attribute ID
SD_LUE_LPR_XXXX_YYYY
Indicator Name
Land Use Efficiency
Units
Dimensionless
Data Source
Melchiorri, M.; Pesaresi, M.; Florczyk, A.J.; Corbane, C.; Kemper, T. Principles and Applications of the Global Human Settlement Layer as Baseline for the Land Use Efficiency Indicator—SDG 11.3.1. ISPRS Int. J. Geo-Inf. 2019, 8, 96. https://doi.org/10.3390/ijgi8020096 SDG indicator metadata (Harmonized metadata template - format version 1.1), Metadata-11-03-01.pdf (un.org)
Indicator description
Land Use efficiency is the ratio between the Land Consumption Rate and the Population Growth Rate
Methodology
$$LUE = \frac{Land\ Consumption\ rate}{Population\ Growth\ rate}$$
Methodology Short
Definition formula
Temporal Coverage
1975-1980, 1980-1990, 1990-2000, 2000-2010, 2010-2020, 2020-2030, 1975-2020, 1990-2020, 2000-2020
Uncertainties & Best practices
Values less than -5 are indicated as '< -5' and values greater than 5 are indicated as '>5' in the dataset.

Indicator thematic area
SDG
Indicator group
Land Use Efficiency
Attribute ID
SD_LUE_LCR_XXXX_YYYY
Indicator Name
Land Consumption Rate
Units
Dimensionless
Data Source
Melchiorri, M.; Pesaresi, M.; Florczyk, A.J.; Corbane, C.; Kemper, T. Principles and Applications of the Global Human Settlement Layer as Baseline for the Land Use Efficiency Indicator—SDG 11.3.1. ISPRS Int. J. Geo-Inf. 2019, 8, 96. https://doi.org/10.3390/ijgi8020096 SDG indicator metadata (Harmonized metadata template - format version 1.1), Metadata-11-03-01.pdf (un.org)
Indicator description
Land Consumption Rate is defined as the share of the difference between total built-up in two years over the total built-up in the past year, divided by the difference between the two years. The total built-up is calculated as total built-up in the urban center.
Methodology
$$LCR = \frac{BU\_TOT_t - BU\_TOT_{t-n}}{BU\_TOT_{t-n}} \times \frac{1}{n}$$
Methodology Short
Definition formula
Temporal Coverage
1975-1980, 1980-1990, 1990-2000, 2000-2010, 2010-2020, 2020-2030, 1975-2020, 1990-2020, 2000-2020
Uncertainties & Best practices
Values less than -5 are indicated as ‘< -5’ and values greater than 5 are indicated as ‘>5’ in the dataset.

Indicator thematic area
SDG
Indicator group
Land Use Efficiency
Attribute ID
SD_LUE_PGR_XXXX_YYYY
Indicator Name
Population Growth Rate
Units
Dimensionless
Data Source
Melchiorri, M.; Pesaresi, M.; Florczyk, A.J.; Corbane, C.; Kemper, T. Principles and Applications of the Global Human Settlement Layer as Baseline for the Land Use Efficiency Indicator—SDG 11.3.1. ISPRS Int. J. Geo-Inf. 2019, 8, 96. https://doi.org/10.3390/ijgi8020096 SDG indicator metadata (Harmonized metadata template - format version 1.1), Metadata-11-03-01.pdf (un.org)
Indicator description
Population Growth Rate is defined as logarithm of the fraction between of the total population in the current year and the total population in the past year, divided by the difference between the two years. The total population is calculated as total built-up in the urban center.
Methodology
$$LCR = \ln\left(\frac{POP\_TOT_t}{POP\_TOT_{t-n}}\right) \times \frac{1}{n}$$
Methodology Short
Definition formula
Temporal Coverage
1975-1980, 1980-1990, 1990-2000, 2000-2010, 2010-2020, 2020-2030, 1975-2020, 1990-2020, 2000-2020
Uncertainties & Best practices

Values less than -5 are indicated as ‘< -5’ and values greater than 5 are indicated as ‘>5’ in the dataset.

Indicator thematic area
SDG
Indicator group
Open Green Space
Attribute ID
SD_POP_HGR_XXXX
Indicator Name
Share of the Urban Centre population living in area of high greenness
Units
%
Data Source
United Nations Human Settlement Programme (UN-Habitat), Global Urban Indicators Database 2024 USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Share of the Urban Centre population living in area of high greenness for the corresponding year
Methodology
Sequence of masking and zonal statistics. 300m buffering of the built-up domain, masking of the built-up and population grid with 3 years average NDVI (greater equal than threshold); zonal statistics of the population in the obtained mask; ratio between zonal statistics population and

urban centre population. Thresholds for high greenness are estimated by UN-Habitat for agro-ecological-zones, from a sample of 700 cities. Agro-ecological zone values are obtained by averaging observations within the cities in each zone.
Methodology Short
Zonal Statistics (sum), ratio
Temporal Coverage
1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

2.9.8 Climate

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B01_CUR_XXXX
Attribute ID
Annual Mean Temperature in the decade (reanalysis data)
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Annual Mean Temperature in the decade (reanalysis data)
Methodology
Zonal average of the Annual Mean Temperature pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
1970, 1980, 1990, 2000, 2010
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B01_P45_XXXX
Attribute ID
Annual Mean Temperature in the decade (projection rcp 4.5 data)
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Annual Mean Temperature in the decade (projection rcp 4.5 data)
Methodology
Zonal average of the Annual Mean Temperature pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B01_P85_XXXX
Attribute ID
Annual Mean Temperature in the decade (projection rcp 8.5 data)
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Annual Mean Temperature in the decade (projection rcp 8.5 data)
Methodology
Zonal average of the Annual Mean Temperature pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B04_CUR_XXXX
Attribute ID
Temperature Seasonality (standard deviation ×100) - reanalysis data
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Temperature Seasonality (standard deviation ×100) - reanalysis data
Methodology
Zonal average of the Temperature Seasonality pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
1970, 1980, 1990, 2000, 2010
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B04_P45_XXXX
Attribute ID
Temperature Seasonality (standard deviation ×100) - projection rcp 4.5 data
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Temperature Seasonality (standard deviation ×100) - projection rcp 4.5 data
Methodology
Zonal average of the Temperature Seasonality pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B04_P85_XXXX
Attribute ID
Temperature Seasonality (standard deviation ×100) - projection rcp 8.5 data
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Temperature Seasonality (standard deviation ×100) - projection rcp 8.5 data
Methodology
Zonal average of the Temperature Seasonality pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B07_CUR_XXXX
Attribute ID
Temperature Annual Range - reanalysis data
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Temperature Annual Range - reanalysis data
Methodology
Zonal average of the Temperature Annual Range pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
1970, 1980, 1990, 2000, 2010
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B07_P45_XXXX
Attribute ID
Temperature Annual Range - projection rcp 4.5 data
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Temperature Annual Range - projection rcp 4.5 data
Methodology
Zonal average of the Temperature Annual Range pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B07_P85_XXXX
Attribute ID
Temperature Annual Range - projection rcp 8.5 data
Units
°C
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Temperature Annual Range - projection rcp 8.5 data
Methodology
Zonal average of the Temperature Annual Range pixels values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B12_CUR_XXXX
Attribute ID
Annual Precipitation mean in the decade - reanalysis data
Units
mm year^{-1}
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: [10.24381/cds.bce175f0](https://doi.org/10.24381/cds.bce175f0) (Accessed on 07-August-2024)
Indicator description
Annual Precipitation mean in the decade - reanalysis data
Methodology
Zonal average of the Annual Precipitation mean in the decade pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
1970, 1980, 1990, 2000, 2010
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B12_P45_XXXX
Attribute ID
Annual Precipitation mean in the decade - projection rcp 4.5 data
Units
mm year^{-1}
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Annual Precipitation mean in the decade - projection rcp 4.5 data
Methodology
Zonal average of the Annual Precipitation mean in the decade pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Bioclimatic indicators
Indicator Code
CL_B12_P85_XXXX
Attribute ID
Annual Precipitation mean in the decade - projection rcp 8.5 data
Units
mm year^{-1}
Data Source
Wouters, H., (2021): Global bioclimatic indicators from 1979 to 2018 derived from reanalysis. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.bce175f0 (Accessed on 07-August-2024)
Indicator description
Annual Precipitation mean in the decade - projection rcp 8.5 data
Methodology
Zonal average of the Annual Precipitation mean in the decade pixels values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions for projections: temperature averages between models 'access1_0', 'bcc_csm1_1_m', 'gfdl_esm2m', 'hadgem2_cc', 'ipsl_cm5a_lr', 'noresm1_m', with ensemble members r1i1p1

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_CUR_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - current conditions
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - current conditions
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_119_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - projection ssp 119
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - projection ssp 119
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2040, 2070
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_126_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - projection ssp 126
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - projection ssp 126
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2040, 2070
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_245_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - projection ssp 245
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - projection ssp 245
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2040, 2070
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_370_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - projection ssp 370
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - projection ssp 370
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2040, 2070
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_434_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - projection ssp 434
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - projection ssp 434
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2040, 2070
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_460_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - projection ssp 460
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - projection ssp 460
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2040, 2070
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Climate classification
Indicator Code
CL_KOP_585_XXXX
Attribute ID
Köppen-Geiger classification of the majority of UC surface - projection ssp 585
Units
categorical
Data Source
Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214
Indicator description
Köppen-Geiger classification of the majority of UC surface - projection ssp 585
Methodology
Spatial join of the Köppen-Geiger classification layer. The classification covering the greater area of the urban center is considered as the indicator value.
Methodology Short
Spatial join
Temporal Coverage
2040, 2070
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Renewable potential
Indicator Code
CL_REN_PVO_XXXX
Attribute ID
Average daily PV potential
Units
kWh/kWp
Data Source
Photovoltaic power potential obtained from the "Global Solar Atlas 2.0, a free, web-based application is developed and operated by the company Solargis s.r.o. on behalf of the World Bank Group, utilizing Solargis data, with funding provided by the Energy Sector Management Assistance Program (ESMAP). For additional information: https://globalsolaratlas.info. Access 21/06/2024
Indicator description
Average daily PV potential
Methodology
Zonal average of the Photovoltaic power potential layer in the decade pixels values touching the urban center
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Renewable potential
Indicator Code
CL_REN_W01_XXXX
Attribute ID
Mean wind speed at 10 m above ground
Units
m/s
Data Source
Neil N. Davis, Jake Badger, Andrea N. Hahmann, Brian O. Hansen, Niels G. Mortensen, Mark Kelly, Xiaoli G. Larsén, Bjarke T. Olsen, Rogier Floors, Gil Lizcano, Pau Casso, Oriol Lacave, Albert Bosch, Ides Bauwens, Oliver James Knight, Albertine Potter van Loon, Rachel Fox, Tigran Parvanyan, Søren Bo Krohn Hansen, Duncan Heathfield, Marko Onninen, Ray Drummond; *The Global Wind Atlas: A high-resolution dataset of climatologies and associated web-based application*; Bulletin of the American Meteorological Society, Volume 104: Issue 8, Pages E1507-E1525, August 2023, DOI: https://doi.org/10.1175/BAMS-D-21-0075.1 Global Wind Speed obtained from the Global Wind Atlas version 3.3, a free, web-based application developed, owned and operated by the Technical University of Denmark (DTU). The Global Wind Atlas version 3.3 is released in partnership with the World Bank Group, utilizing data provided by Vortex, using funding provided by the Energy Sector Management Assistance Program (ESMAP). For additional information: https://globalwindatlas.info.
Indicator description
Mean wind speed at 10 m above ground
Methodology
Zonal average of wind speed at 10 m layer in the decade pixels values touching the urban center
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Renewable potential
Indicator Code
CL_REN_W05_XXXX
Attribute ID
Mean wind speed at 50 m above ground
Units
m/s
Data Source
Neil N. Davis, Jake Badger, Andrea N. Hahmann, Brian O. Hansen, Niels G. Mortensen, Mark Kelly, Xiaoli G. Larsén, Bjarke T. Olsen, Rogier Floors, Gil Lizcano, Pau Casso, Oriol Lacave, Albert Bosch, Ides Bauwens, Oliver James Knight, Albertine Potter van Loon, Rachel Fox, Tigran Parvanyan, Søren Bo Krohn Hansen, Duncan Heathfield, Marko Onninen, Ray Drummond; *The Global Wind Atlas: A high-resolution dataset of climatologies and associated web-based application*; Bulletin of the American Meteorological Society, Volume 104: Issue 8, Pages E1507-E1525, August 2023, DOI: https://doi.org/10.1175/BAMS-D-21-0075.1 Global Wind Speed obtained from the Global Wind Atlas version 3.3, a free, web-based application developed, owned and operated by the Technical University of Denmark (DTU). The Global Wind Atlas version 3.3 is released in partnership with the World Bank Group, utilizing data provided by Vortex, using funding provided by the Energy Sector Management Assistance Program (ESMAP). For additional information: https://globalwindatlas.info.
Indicator description
Mean wind speed at 50 m above ground
Methodology
Zonal average of wind speed at 50 m layer in the decade pixels values touching the urban center
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Renewable potential
Indicator Code
CL_REN_W10_XXXX
Attribute ID
Mean wind speed at 100 m above ground
Units
m/s
Data Source
Neil N. Davis, Jake Badger, Andrea N. Hahmann, Brian O. Hansen, Niels G. Mortensen, Mark Kelly, Xiaoli G. Larsén, Bjarke T. Olsen, Rogier Floors, Gil Lizcano, Pau Casso, Oriol Lacave, Albert Bosch, Ides Bauwens, Oliver James Knight, Albertine Potter van Loon, Rachel Fox, Tigran Parvanyan, Søren Bo Krohn Hansen, Duncan Heathfield, Marko Onninen, Ray Drummond; *The Global Wind Atlas: A high-resolution dataset of climatologies and associated web-based application*; Bulletin of the American Meteorological Society, Volume 104: Issue 8, Pages E1507-E1525, August 2023, DOI: https://doi.org/10.1175/BAMS-D-21-0075.1 Global Wind Speed obtained from the Global Wind Atlas version 3.3, a free, web-based application developed, owned and operated by the Technical University of Denmark (DTU). The Global Wind Atlas version 3.3 is released in partnership with the World Bank Group, utilizing data provided by Vortex, using funding provided by the Energy Sector Management Assistance Program (ESMAP). For additional information: https://globalwindatlas.info.
Indicator description
Mean wind speed at 100 m above ground
Methodology
Zonal average of wind speed at 100 m layer in the decade pixels values touching the urban center
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Renewable potential
Indicator Code
CL_REN_W15_XXXX
Attribute ID
Mean wind speed at 150 m above ground
Units
m/s
Data Source
Neil N. Davis, Jake Badger, Andrea N. Hahmann, Brian O. Hansen, Niels G. Mortensen, Mark Kelly, Xiaoli G. Larsén, Bjarke T. Olsen, Rogier Floors, Gil Lizcano, Pau Casso, Oriol Lacave, Albert Bosch, Ides Bauwens, Oliver James Knight, Albertine Potter van Loon, Rachel Fox, Tigran Parvanyan, Søren Bo Krohn Hansen, Duncan Heathfield, Marko Onninen, Ray Drummond; *The Global Wind Atlas: A high-resolution dataset of climatologies and associated web-based application*; Bulletin of the American Meteorological Society, Volume 104: Issue 8, Pages E1507-E1525, August 2023, DOI: https://doi.org/10.1175/BAMS-D-21-0075.1 Global Wind Speed obtained from the Global Wind Atlas version 3.3, a free, web-based application developed, owned and operated by the Technical University of Denmark (DTU). The Global Wind Atlas version 3.3 is released in partnership with the World Bank Group, utilizing data provided by Vortex, using funding provided by the Energy Sector Management Assistance Program (ESMAP). For additional information: https://globalwindatlas.info.
Indicator description
Mean wind speed at 150 m above ground
Methodology
Zonal average of wind speed at 150 m layer in the decade pixels values touching the urban center
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Renewable potential
Indicator Code
CL_REN_W20_XXXX
Attribute ID
Mean wind speed at 200 m above ground
Units
m/s
Data Source
Neil N. Davis, Jake Badger, Andrea N. Hahmann, Brian O. Hansen, Niels G. Mortensen, Mark Kelly, Xiaoli G. Larsén, Bjarke T. Olsen, Rogier Floors, Gil Lizcano, Pau Casso, Oriol Lacave, Albert Bosch, Ides Bauwens, Oliver James Knight, Albertine Potter van Loon, Rachel Fox, Tigran Parvanyan, Søren Bo Krohn Hansen, Duncan Heathfield, Marko Onninen, Ray Drummond; *The Global Wind Atlas: A high-resolution dataset of climatologies and associated web-based application*; Bulletin of the American Meteorological Society, Volume 104: Issue 8, Pages E1507-E1525, August 2023, DOI: https://doi.org/10.1175/BAMS-D-21-0075.1 Global Wind Speed obtained from the Global Wind Atlas version 3.3, a free, web-based application developed, owned and operated by the Technical University of Denmark (DTU). The Global Wind Atlas version 3.3 is released in partnership with the World Bank Group, utilizing data provided by Vortex, using funding provided by the Energy Sector Management Assistance Program (ESMAP). For additional information: https://globalwindatlas.info.
Indicator description
Mean wind speed at 200 m above ground
Methodology
Zonal average of wind speed at 200 m layer in the decade pixels values touching the urban center
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Warm Days
Indicator Code
CL_WDS_CUR_XXXX
Attribute ID
Percentage of days with maximum temperature - reanalysis data
Units
%
Data Source
Sandstad, M., Schwingshackl, C., Iles, C., (2022): Climate extreme indices and heat stress indicators derived from CMIP6 global climate projections. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.776e08bd (Accessed on 29-August-2024)
Indicator description
Percentage of days with maximum temperature above the corresponding calendar day 90th percentile of maximum temperature for a 5-day moving window in the base period 1961-1990 - reanalysis data
Methodology
Zonal average of the data layer pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
1970, 1980, 1990, 2000, 2010
Uncertainties & Best practices
Assumptions: model 'ec_earth3', with ensemble members r1i1p1f1

Indicator thematic area
Climate
Indicator group
Warm Days
Indicator Code
CL_WDS_126_XXXX
Attribute ID
Percentage of days with maximum temperature - projection ssp 126
Units
%
Data Source
Sandstad, M., Schwingshackl, C., Iles, C., (2022): Climate extreme indices and heat stress indicators derived from CMIP6 global climate projections. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.776e08bd (Accessed on 29-August-2024)
Indicator description
Percentage of days with maximum temperature above the corresponding calendar day 90th percentile of maximum temperature for a 5-day moving window in the base period 1961-1990 - projection ssp 126
Methodology
Zonal average of the data layer pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions: model 'ec_earth3', with ensemble members r1i1p1f1

Indicator thematic area
Climate
Indicator group
Warm Days
Indicator Code
CL_WDS_245_XXXX
Attribute ID
Percentage of days with maximum temperature - projection ssp 245
Units
%
Data Source
Sandstad, M., Schwingshackl, C., Iles, C., (2022): Climate extreme indices and heat stress indicators derived from CMIP6 global climate projections. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.776e08bd (Accessed on 29-August-2024)
Indicator description
Percentage of days with maximum temperature above the corresponding calendar day 90th percentile of maximum temperature for a 5-day moving window in the base period 1961-1990 - projection ssp 245
Methodology
Zonal average of the data layer pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions: model 'ec_earth3', with ensemble members r1i1p1f1

Indicator thematic area
Climate
Indicator group
Warm Days
Indicator Code
CL_WDS_370_XXXX
Attribute ID
Percentage of days with maximum temperature - projection ssp 370
Units
%
Data Source
Sandstad, M., Schwingshackl, C., Iles, C., (2022): Climate extreme indices and heat stress indicators derived from CMIP6 global climate projections. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.776e08bd (Accessed on 29-August-2024)
Indicator description
Percentage of days with maximum temperature above the corresponding calendar day 90th percentile of maximum temperature for a 5-day moving window in the base period 1961-1990 - projection ssp 370
Methodology
Zonal average of the data layer pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions: model 'ec_earth3', with ensemble members r1i1p1f1

Indicator thematic area
Climate
Indicator group
Warm Days
Indicator Code
CL_WDS_585_XXXX
Attribute ID
Percentage of days with maximum temperature - projection ssp 585
Units
%
Data Source
Sandstad, M., Schwingshackl, C., Iles, C., (2022): Climate extreme indices and heat stress indicators derived from CMIP6 global climate projections. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). DOI: 10.24381/cds.776e08bd (Accessed on 29-August-2024)
Indicator description
Percentage of days with maximum temperature above the corresponding calendar day 90th percentile of maximum temperature for a 5-day moving window in the base period 1961-1990 - projection ssp 585
Methodology
Zonal average of the data layer pixel values touching the urban center.
Methodology Short
Zonal Statistics (avg)
Temporal Coverage
2020, 2030
Uncertainties & Best practices
Assumptions: model 'ec_earth3', with ensemble members r1i1p1f1

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A01_XXXX
Attribute ID
Share of urban center area in “compact highrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “compact highrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “compact highrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A02_XXXX
Attribute ID
Share of urban center area in “compact midrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “compact midrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “compact midrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A03_XXXX
Attribute ID
Share of urban center area in “compact lowrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “compact lowrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “compact lowrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A04_XXXX
Attribute ID
Share of urban center area in “open highrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “open highrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “open highrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A05_XXXX
Attribute ID
Share of urban center area in “open midrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “open midrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “open midrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A06_XXXX
Attribute ID
Share of urban center area in “open lowrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “open lowrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “open lowrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A07_XXXX
Attribute ID
Share of urban center area in “lightweight lowrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/   Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b)   doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “lightweight lowrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “lightweight lowrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A08_XXXX
Attribute ID
Share of urban center area in “large lowrise” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “large lowrise” Local Climate Zone
Methodology
Share of area of the urban center classified as “large lowrise” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A09_XXXX
Attribute ID
Share of urban center area in "sparsely built" Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as "sparsely built" Local Climate Zone
Methodology
Share of area of the urban center classified as "sparsely built" over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A10_XXXX
Attribute ID
Share of urban center area in “heavy industry” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/   Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b)   doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “heavy industry” Local Climate Zone
Methodology
Share of area of the urban center classified as “heavy industry” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A11_XXXX
Attribute ID
Share of urban center area in “dense trees” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/   Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b)   doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “dense trees” Local Climate Zone
Methodology
Share of area of the urban center classified as “dense trees” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A12_XXXX
Attribute ID
Share of urban center area in “scattered trees” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “scattered trees” Local Climate Zone
Methodology
Share of area of the urban center classified as “scattered trees” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A13_XXXX
Attribute ID
Share of urban center area in “bush, scrub” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “bush, scrub” Local Climate Zone
Methodology
Share of area of the urban center classified as “bush, scrub” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A14_XXXX
Attribute ID
Share of urban center area in “low plants” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “low plants” Local Climate Zone
Methodology
Share of area of the urban center classified as “low plants” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A15_XXXX
Attribute ID
Share of urban center area in “bare rock or paved” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/   Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b)   doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “bare rock or paved” Local Climate Zone
Methodology
Share of area of the urban center classified as “bare rock or paved” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A16_XXXX
Attribute ID
Share of urban center area in “bare soil or sand” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “bare soil or sand” Local Climate Zone
Methodology
Share of area of the urban center classified as “bare soil or sand” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Climate
Indicator group
Local climate Zone
Indicator Code
CL_LCZ_A17_XXXX
Attribute ID
Share of urban center area in “water” Local Climate Zone
Units
Categorical
Data Source
Demuzere M, Kittner J, Martilli A, et al. A global map of local climate zones to support earth system modelling and urban-scale environmental science. Earth Syst Sci Data. 2022a; 14(8):3835-3873. doi:10.5194/essd-14-3835-2022. https://essd.copernicus.org/articles/14/3835/2022/ Demuzere M, Kittner J, Martilli A, et al. Global Local Climate Zone map. Zenodo (2022b) doi:10.5281/zenodo.6364594. https://zenodo.org/records/8419340
Indicator description
Share of urban center area that is classified as “water” Local Climate Zone
Methodology
Share of area of the urban center classified as “water” over total urban center area.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

2.9.9 Emissions

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_CO2_AGR_XXXX
Indicator Name
Total CO2 emissions in agriculture sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total CO2 emissions in agriculture sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_CO2_ENE_XXXX
Indicator Name
Total CO2 emissions in the energy sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total CO2 emissions in the energy sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_CO2_IND_XXXX
Indicator Name
Total CO2 emissions in the industry sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total CO2 emissions in the industry sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_CO2_RES_XXXX
Indicator Name
Total CO2 emissions in residential sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total CO2 emissions in residential sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_CO2_TRA_XXXX
Indicator Name
Total CO2 emissions in transport sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total CO2 emissions in transport sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_CO2_WAS_XXXX
Indicator Name
Total CO2 emissions in waste sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total CO2 emissions in waste sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_GHG_AGR_XXXX
Indicator Name
Total GHG emissions in agriculture sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total GHG emissions in agriculture sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_GHG_ENE_XXXX
Indicator Name
Total GHG emissions in the energy sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total GHG emissions in the energy sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_GHG_IND_XXXX
Indicator Name
Total GHG emissions in the industry sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total GHG emissions in the industry sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_GHG_RES_XXXX
Indicator Name
Total GHG emissions in residential sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total GHG emissions in residential sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_GHG_TRA_XXXX
Indicator Name
Total GHG emissions in transport sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total GHG emissions in transport sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly inside / partly outside a polygon, the % of the cell's area belonging to the polygon is computed, and applied to allocate a fraction of the grid emissions to that polygon.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_GHG_WAS_XXXX
Indicator Name
Total GHG emissions in waste sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total GHG emissions in waste sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_NOX_AGR_XXXX
Indicator Name
Total NOx emissions in agriculture sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total NOx emissions in agriculture sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_NOX_ENE_XXXX
Indicator Name
Total NOx emissions in the energy sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total NOx emissions in the energy sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_NOX_IND_XXXX
Indicator Name
Total NOx emissions in the industry sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total NOx emissions in the industry sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_NOX_RES_XXXX
Indicator Name
Total NOx emissions in residential sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total NOx emissions in residential sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_NOX_TRA_XXXX
Indicator Name
Total NOx emissions in transport sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total NOx emissions in transport sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_NOX_WAS_XXXX
Indicator Name
Total NOx emissions in waste sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total NOx emissions in waste sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_PM2_AGR_XXXX
Indicator Name
Total PM2.5 emissions in agriculture sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total PM2.5 emissions in agriculture sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_PM2_ENE_XXXX
Indicator Name
Total PM2.5 emissions in the energy sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total PM2.5 emissions in the energy sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_PM2_IND_XXXX
Indicator Name
Total PM2.5 emissions in the industry sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total PM2.5 emissions in the industry sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_PM2_RES_XXXX
Indicator Name
Total PM2.5 emissions in residential sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total PM2.5 emissions in residential sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_PM2_TRA_XXXX
Indicator Name
Total PM2.5 emissions in transport sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total PM2.5 emissions in transport sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance and sector
Attribute ID
EM_PM2_WAS_XXXX
Indicator Name
Total PM2.5 emissions in waste sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total PM2.5 emissions in waste sector
Methodology
Zonal statistics (sum) of the EDGAR gridded emissions (with a resolution of 0.1x0.1 degree) and the urban centres polygons. If a cell is fully inside a polygon, the 100% of emissions of that cell is allocated to the polygon itself. If a cell is partly ins
Methodology Short
Zonal statistics (sum)
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per sector
Attribute ID
EM_AGR_TOT_XXXX
Indicator Name
Total emissions in agriculture sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total emissions in agriculture sector
Methodology
Sum of the emissions per substance in agricultural sector
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per sector
Attribute ID
EM_ENE_TOT_XXXX
Indicator Name
Total emissions in energy sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total emissions in energy sector
Methodology
Sum of the emissions per substance in energy sector
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per sector
Attribute ID
EM_IND_TOT_XXXX
Indicator Name
Total emissions in industry sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total emissions in industry sector
Methodology
Sum of the emissions per substance in industry sector
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per sector
Attribute ID
EM_RES_TOT_XXXX
Indicator Name
Total emissions in residential sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total emissions in residential sector
Methodology
Sum of the emissions per substance in residential sector
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per sector
Attribute ID
EM_TRA_TOT_XXXX
Indicator Name
Total emissions in transport sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total emissions in transport sector
Methodology
Sum of the emissions per substance in transport sector
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per sector
Attribute ID
EM_WAS_TOT_XXXX
Indicator Name
Total emissions in waste sector
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total emissions in waste sector
Methodology
Sum of the emissions per substance in waste sector
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance
Attribute ID
EM_CO2_TOT_XXXX
Indicator Name
Total CO2 emissions in all sectors
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total CO2 emissions in all sectors
Methodology
Sum of the CO2 emissions in all sectors
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance
Attribute ID
EM_GHG_TOT_XXXX
Indicator Name
Total GHG emissions in all sectors
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total GHG emissions in all sectors
Methodology
Sum of the GHG emissions in all sectors
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance
Attribute ID
EM_NOX_TOT_XXXX
Indicator Name
Total NOx emissions in all sectors
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total NOx emissions in all sectors
Methodology
Sum of the NOx emissions in all sectors
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Total emissions per substance
Attribute ID
EM_PM2_TOT_XXXX
Indicator Name
Total PM2.5 emissions in all sectors
Units
ton/year
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Total PM2.5 emissions in all sectors
Methodology
Sum of the PM2.5 emissions in all sectors
Methodology Short
Sum
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per substance
Attribute ID
EM_CO2_PER_XXXX
Indicator Name
Share of CO2 emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of CO2 emissions over total emissions
Methodology
Ratio between CO2 emissions (in all sectors) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per substance
Attribute ID
EM_GHG_PER_XXXX
Indicator Name
Share of GHG emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of GHG emissions over total emissions
Methodology
Ratio between GHG emissions (in all sectors) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per substance
Attribute ID
EM_NOX_PER_XXXX
Indicator Name
Share of NOX emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of NOX emissions over total emissions
Methodology
Ratio between NOX emissions (in all sectors) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per substance
Attribute ID
EM_PM2_PER_XXXX
Indicator Name
Share of PM2 emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of PM2 emissions over total emissions
Methodology
Ratio between PM2 emissions (in all sectors) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per sector
Attribute ID
EM_AGR_PER_XXXX
Indicator Name
Share of agricultural emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of agricultural emissions over total emissions
Methodology
Ratio between agricultural emissions (all substances) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per sector
Attribute ID
EM_ENE_PER_XXXX
Indicator Name
Share of energy emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of energy emissions over total emissions
Methodology
Ratio between energy emissions (all substances) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per sector
Attribute ID
EM_IND_PER_XXXX
Indicator Name
Share of industry emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of industry emissions over total emissions
Methodology
Ratio between industry emissions (all substances) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per sector
Attribute ID
EM_RES_PER_XXXX
Indicator Name
Share of residential emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of residential emissions over total emissions
Methodology
Ratio between residential emissions (all substances) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per sector
Attribute ID
EM_TRA_PER_XXXX
Indicator Name
Share of transport emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of transport emissions over total emissions
Methodology
Ratio between transport emissions (all substances) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Share of emissions per sector
Attribute ID
EM_WAS_PER_XXXX
Indicator Name
Share of waste emissions over total emissions
Units
%
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024.
Indicator description
Share of waste emissions over total emissions
Methodology
Ratio between waste emissions (all substances) and total emissions (for all substances and sectors)
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020, 2022
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Emissions per capita
Attribute ID
EM_CO2_PEC_XXXX
Indicator Name
CO2 emissions per capita
Units
ton year^{-1} inhabitant^{-1}
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024. Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
CO2 emissions per capita
Methodology
Ration between CO2 emissions and total population in the urban centre.
Methodology Short
Ratio
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Emissions per capita
Attribute ID
EM_GHG_PEC_XXXX
Indicator Name
GHG emissions per capita
Units
ton $year^{-1}$ $inhabitant^{-1}$
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024. Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
GHG emissions per capita
Methodology
Ration between GHG emissions and total population in the urban centre.
Methodology Short
Ratio
Temporal Coverage
1975, 1990, 2000, 2005, 2010, 2015, 2020

Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Emissions per capita
Attribute ID
EM_NOX_PEC_XXXX
Indicator Name
NOX emissions per capita
Units
ton $year^{-1}$ $inhabitant^{-1}$
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024. Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
NOX emissions per capita
Methodology
Ration between NOX emissions and total population in the urban centre.
Methodology Short
Ratio
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices

Indicator thematic area
Emissions
Indicator Group
Emissions per capita
Attribute ID
EM_PM2_PEC_XXXX
Indicator Name
PM 2.5 emissions per capita
Units
ton year^{-1} inhabitant^{-1}
Data Source
EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets). https://edgar.jrc.ec.europa.eu/report_2023, https://edgar.jrc.ec.europa.eu/dataset_ghg80 EDGAR v8.1 air pollutant emissions: https://edgar.jrc.ec.europa.eu/dataset_ap81 Crippa, M., Guizzardi, D., Pagani, F., Schiavina, M., Melchiorri, M., Pisoni, E., Graziosi, F., Muntean, M., Maes, J., Dijkstra, L., Van Damme, M., Clarisse, L., and Coheur, P.: Insights into the spatial distribution of global, national, and subnational greenhouse gas emissions in the Emissions Database for Global Atmospheric Research (EDGAR v8.0), Earth Syst. Sci. Data, 16, 2811–2830, doi:10.5194/essd-16-2811-2024, 2024. Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
PM 2.5 emissions per capita
Methodology
Ration between PM 2.5 emissions and total population in the urban centre.
Methodology Short
Ratio
Temporal Coverage

1975, 1990, 2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices

Indicator Group
Emissions
Indicator Type
Concentrations
Indicator Code
EM_PM2_CON_XXXX
Indicator Name
PM2.5 population weighted average concentrations
Units
$\mu g/m^3$
Data Source
Shen, S. Li, C. van Donkelaar, A. Jacobs, N. Wang, C. Martin, R. V.: Enhancing Global Estimation of Fine Particulate Matter Concentrations by Including Geophysical a Priori Information in Deep Learning. (2024) ACS ES&T Air. DOI: 10.1021/acsestair.3c00054 https://pubmed.ncbi.nlm.nih.gov/38751607/ Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Yearly population weighted average PM2.5 concentrations
Methodology
Estimated annual ground-level fine particulate matter (PM2.5) for 2000-2020 as provided at https://sites.wustl.edu/acag/datasets/surface-pm2-5/#V6.GL.02. The dataset is produced combining Aerosol Optical Depth (AOD) retrievals from the NASA MODIS, MISR, SeaWIFS, and VIIRS with the GEOS-Chem chemical transport model, and subsequently calibrating to global ground-based observations using a residual Convolutional Neural Network (CNN). Dataset version V6.GL.02.02. The dataset (at 1km resolution) is overlapped with the GHSL 1km global population (GHS_POP_GLOBE_R2023A) and the UCDB, to compute population weighted PM2.5 concentrations.
Methodology Short
Modelled

Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices

Indicator Group
Emissions
Indicator Type
Mortality
Indicator Code
EM_PM2_MOR_XXXX
Indicator Name
Premature deaths due to PM2.5 concentrations
Units
Number of premature deaths
Data Source
WHO mortality database: https://www.who.int/data/data-collection-tools/who-mortality-database Murray, C.J.L. et al., 2020. Global burden of 87 risk factors in 204 countries and territories, 1990 - 2013;2019: a systematic analysis for the Global Burden of Disease Study 2019. The Lancet 396:1223-1249. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30752-2/fulltext Belis, C.A., Matkovic, V., Ballocci, M., Jevtic, M., Millo, G., Mata, E., Van Dingenen, R., 2023. Assessment of health impacts and costs attributable to air pollution in urban areas using two different approaches. A case study in the Western Balkans. Environment International 182, 108347. https://doi.org/10.1016/j.envint.2023.108347 Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
PM2.5 related premature deaths
Methodology
Estimation of the premature deaths according to integrated exposure response curves (IER) from the Global Burden of Disease methodology (Murray et al., 2020) as implemented in the JRC FAst Scenario Screening Tool (FASST, Belis et al., 2023); Premature deaths attributable to PM2.5 were estimated starting from PM2.5 concentrations, city population and country mortality rates from WHO mortality database.
Methodology Short
Modelled

Temporal Coverage
2000, 2005, 2010, 2015, 2020
Uncertainties & Best practices

2.9.10 Natural Systems

Indicator thematic area
Natural Systems
Indicator group
Protected areas
Attribute ID
NS_TPA_PER_ XXXX
Indicator Name
Share of Terrestrial Protected Areas
Units
%
Data Source
UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [Online], May 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Download data 19/06/2024
Indicator description
Share of the urban center area covered by terrestrial protected areas over the total urban center area.
Methodology
Share of the urban center area covered by terrestrial protected areas. The protected areas were overlapped with the urban centers to calculate total area overlapping.
Methodology Short
Spatial Join, ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Protected areas
Attribute ID
NS_MPA_PER_ XXXX
Indicator Name
Share of Marine Protected Areas
Units
%
Data Source
UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [Online], May 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Download data 19/06/2024
Indicator description
Share of the urban center area covered by marine protected areas over the total urban center area.
Methodology
Share of the urban center area covered by marine protected areas. The protected areas were overlapped with the urban centers to calculate total area overlapping.
Methodology Short
Spatial Join, ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Protected areas
Attribute ID
NS_TPA_NAM_ XXXX
Indicator Name
Name of Terrestrial Protected Areas
Units
Categorical
Data Source
UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [Online], May 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Download data 19/06/2024
Indicator description
List of the names of the terrestrial protected areas overlaying the urban center area.
Methodology
The protected areas were overlaid with the urban centers to list the names of the protected areas.
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Protected areas
Attribute ID
NS_MPA_NAM_ XXXX
Indicator Name
Name of Marine Protected Areas
Units
Categorical
Data Source
UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [Online], May 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Download data 19/06/2024
Indicator description
List of the names of the marine protected areas overlaying the urban center area.
Methodology
The protected areas were overlaid with the urban centers to list the names of the protected areas.
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Protected areas
Attribute ID
NS_TPA_DES_ XXXX
Indicator Name
Designation of Terrestrial Protected Areas
Units
Categorical
Data Source
UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [Online], May 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Download data 19/06/2024
Indicator description
List of the terrestrial protected areas designation overlaying the urban center area.
Methodology
The protected areas were overlaid with the urban centers to list the designations of the protected areas.
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Protected areas
Attribute ID
NS_MPA_DES_ XXXX
Indicator Name
Designation of Marine Protected Areas
Units
Categorical
Data Source
UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [Online], May 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Download data 19/06/2024
Indicator description
List of the marine protected areas designation overlaying the urban center area.
Methodology
The protected areas were overlaid with the urban centers to list the designations of the protected areas.
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_BIO_ XXXX
Indicator Name
Biointegrity transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of biointegrity transgressions inside the urban center
Methodology
Zonal statistics (sum) of the biointegrity transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_GWA_ XXXX
Indicator Name
Groundwater transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of groundwater transgressions inside the urban center
Methodology
Zonal statistics (sum) of the groundwater transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_NIT_ XXXX
Indicator Name
Nitrogen transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of nitrogen transgressions inside the urban center
Methodology
Zonal statistics (sum) of the nitrogen transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_PHO_ XXXX
Indicator Name
Phosphorus transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of phosphorus transgressions inside the urban center
Methodology
Zonal statistics (sum) of the phosphorus transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_P25_ XXXX
Indicator Name
PM2.5 transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8   Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of PM2.5 transgressions inside the urban center
Methodology
Zonal statistics (sum) of the PM2.5 transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_SLR_ XXXX
Indicator Name
Sea level rise transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of sea level rise transgressions inside the urban center
Methodology
Zonal statistics (sum) of the sea level rise transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_SWA_ XXXX
Indicator Name
Surface water transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of surface water transgressions inside the urban center
Methodology
Zonal statistics (sum) of the surface water transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_WET_ XXXX
Indicator Name
Wet bulb temperature transgression
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Number of wet bulb transgressions inside the urban center
Methodology
Zonal statistics (sum) of the wet bulb transgression layer.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_MIN_ XXXX
Indicator Name
Minimum number of total transgressions
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Minimum number of total transgressions inside the urban center
Methodology
Zonal statistics (min) of the total transgression layer.
Methodology Short
Zonal statistics (min)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Natural Systems
Indicator group
Earth Boundaries System
Attribute ID
NS_ESB_MAX_ XXXX
Indicator Name
Maximum number of total transgressions
Units
Number of transgressions
Data Source
Rockström, J., Gupta, J., Qin, D. *et al.* Safe and just Earth system boundaries. *Nature* **619**, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8 Abrams, Jesse (2022). Transgression map. figshare. Dataset. https://doi.org/10.6084/m9.figshare.20079200.v2
Indicator description
Maximum number of total transgressions inside the urban center
Methodology
Zonal statistics (max) of the total transgression layer.
Methodology Short
Zonal statistics (max)
Temporal Coverage
2025
Uncertainties & Best practices

2.9.11 Health

Indicator thematic area
Health
Indicator group
Number of facilities
Attribute ID
HL_FCL_HOS_XXXX
Indicator Name
Number of hospitals
Units
Units of facilities
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))
Indicator description
Number of health facilities (hospitals) in the urban center.
Methodology
Zonal count of the points and polygons. Point and polygon data are compared to exclude duplicates; any feature class which attribute contains the word 'hospital' is reclassified as hospital facility.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2024
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area

Health
Indicator group
Number of facilities
Attribute ID
HL_FCL_PHA_XXXX
Indicator Name
Number of pharmacies
Units
Units of facilities
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))
Indicator description
Number of health facilities (pharmacies) in the urban center.
Methodology
Zonal count of the points and polygons. Point and polygon data are compared to exclude duplicates; any feature class which attribute contains the word 'pharmacy' but not 'hospital' is reclassified as pharmacy facility.
Methodology Short
Zonal Statistics (count)
Temporal Coverage
2024
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Number of facilities per capita
Attribute ID
HL_FPC_HOS_XXXX
Indicator Name
Number of hospitals per capita
Units
Number of facilities per 1000000 inhabitants
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))   Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Number of health facilities (hospitals) per capita in the urban center.
Methodology
Ratio between the number of facilities and total population in the urban center.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Number of facilities per capita
Attribute ID
HL_FPC_PHA_XXXX
Indicator Name
Number of pharmacies per capita
Units
Number of facilities per 1000000 inhabitants
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))   Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Number of health facilities (pharmacies) per capita in the urban center.
Methodology
Ratio between the number of facilities and total population in the urban center.
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Facilities density
Attribute ID
HL_FDE_HOS_XXXX
Indicator Name
Hospitals density
Units
Units of facilities per squared kilometer
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))
Indicator description
Number of health facilities (hospitals) per urban center area.
Methodology
Ratio between the number of facilities and the total area of the urban center (in squared kilometers).
Methodology Short
Ratio
Temporal Coverage
2024
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Facilities density
Attribute ID
HL_FDE_PHA_XXXX
Indicator Name
Pharmacies density
Units
Units of facilities per squared kilometer
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))
Indicator description
Number of health facilities (pharmacies) per urban center area.
Methodology
Ratio between the number of facilities and the total area of the urban center (in squared kilometers).
Methodology Short
Ratio
Temporal Coverage
2024
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Population with access to facilities
Attribute ID
HL_POP_HOS_XXXX
Indicator Name
Population with access to hospitals
Units
Number of inhabitants
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))   Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Population living within a kilometer buffer of a hospital facility, inside the urban center.
Methodology
Zonal statistics (sum) of the population within a 1 km buffer of a hospital facility, inside the urban center.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Population with access to facilities
Attribute ID
HL_POP_PHA_XXXX
Indicator Name
Population with access to pharmacies
Units
Number of inhabitants
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))   Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Population living within a kilometer buffer of a pharmacy facility, inside the urban center.
Methodology
Zonal statistics (sum) of the population within a 1 km buffer of a pharmacy facility, inside the urban center.
Methodology Short
Zonal statistics (sum)
Temporal Coverage
2025
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Share of population with access to facilities
Attribute ID
HL_SHP_HOS_XXXX
Indicator Name
Share of population with access to hospitals
Units
%
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time))   Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Share of population living within a kilometer buffer of a hospital facility, inside the urban center over total urban centre population.
Methodology
Ratio
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

Indicator thematic area
Health
Indicator group
Share of population with access to facilities
Attribute ID
HL_SHP_PHA_XXXX
Indicator Name
Share of population with access to pharmacies
Units
%
Data Source
https://www.healthsites.io/map Downloaded on 27/06/2024 World.zip (last update at: Tue Jun 25 2024 00:00:03 GMT+0200 (Central European Summer Time)) Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Share of population living within a kilometer buffer of a pharmacy facility, inside the urban center over total urban centre population.
Methodology
Ratio
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices
The data is derived from OSM. OSM limitations, completeness and accuracy are inherited.

2.9.12 Water

Indicator thematic area
Water
Indicator group
Groundwater
Attribute ID
WA_GWR_GWB_XXXX
Indicator Name
Basin Type
Units
Categorical
Data Source
RICHTS, A., STRUCKMEIER, W. & ZAEPKE, M. (2011): WHYMAP and the Groundwater Resources of the World 1:25,000,000. In: Jones J. (Eds.): Sustaining Groundwater Resources. International Year of Planet Earth; Springer. doi: 10.1007/978-90-481-3426-7_10
Indicator description
Groundwater basin type
Methodology
Spatial join of the WHYMAP groundwater recharge type layer with the urban centers. If more than one aquifer unit overlays the urban center, the greater area covered by the join in considered to classify the aquifers of the urban centers.
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Groundwater
Attribute ID
WA_GWR_GWR_XXXX
Indicator Name
Groundwater recharge
Units
Categorical
Data Source
RICHTS, A., STRUCKMEIER, W. & ZAEPKE, M. (2011): WHYMAP and the Groundwater Resources of the World 1:25,000,000. In: Jones J. (Eds.): Sustaining Groundwater Resources. International Year of Planet Earth; Springer. doi: 10.1007/978-90-481-3426-7_10
Indicator description
Groundwater recharge classification
Methodology
Spatial join of the WHYMAP groundwater recharge type layer with the urban centers. If more than one aquifer unit overlays the urban center, the greater area covered by the join in considered to define the aquifers' recharge of the urban centers. Recharge is defined as:

Major Groundwater Basins	Complex Hydrogeological Structures
very high (> 300)	very high (> 300)
high (100 - 300)	high (100 - 300)
medium (20 - 100)	medium (20 - 100)
low (2 - 20)	low - very low (< 20)
very low (< 2)	Local and Shallow Aquifers
	very high - high (> 100)
	medium - very low (< 100)

Methodology Short
Spatial Join

Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Groundwater
Attribute ID
WA_GWS_SAL_XXXX
Indicator Name
Aquifer Salinity
Units
Boolean (True/False)
Data Source
RICHTS, A., STRUCKMEIER, W. & ZAEPKE, M. (2011): WHYMAP and the Groundwater Resources of the World 1:25,000,000. In: Jones J. (Eds.): Sustaining Groundwater Resources. International Year of Planet Earth; Springer. doi: 10.1007/978-90-481-3426-7_10
Indicator description
Groundwater salinity
Methodology
Spatial join of the WHYMAP groundwater salinity layer with the urban centers. If the aquifer unit overlays the urban center the aquifers are flag as saline (1), else as not saline (0). Saline is considered when TDS > 5 g/l
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_SHT_XXXX
Indicator Name
Sea surface height above the sea trend
Units
mm/year
Data Source
Global Ocean Mean Sea Level trend map from Observations Reprocessing. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00238 (Accessed on 26-July-2024)
Indicator description
Sea surface height above the sea trend
Methodology
Zonal statistics (average) of the Global Ocean Mean Sea Level trend layer (omi_climate_sl_global_regional_trends) using a 10 km buffer around the coastal urban centers. The data shows the mean sea level trends for the time period 1993 to 2023.
Methodology Short
Zonal statistics (average)
Temporal Coverage
2023
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_STT_XXXX
Indicator Name
Sea surface temperature trend
Units
°C/year
Data Source
Global Ocean Sea Surface Temperature trend map from Observations Reprocessing. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00243 (Accessed on 26-July-2024)
Indicator description
Sea surface temperature trend
Methodology
Zonal statistics (average) of the Global Ocean Sea Surface Temperature trend layer (global_omi_tempsal_sst_trend) using a 10 km buffer around the coastal urban centers. The data shows sea surface temperature trends for the time period 1993 to 2021.
Methodology Short
Zonal statistics (average)
Temporal Coverage
2021
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_SST_XXXX
Indicator Name
Sea surface temperature
Units
°C
Data Source
Global Ocean Physics Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00021 (Accessed on 20-September-2024)
Indicator description
Sea surface temperature
Methodology
Zonal statistics (average) of the Global Ocean Physics Reanalysis layer (cmems_mod_glo_phy_myint_0.083deg_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the yearly averaged sea surface temperature (selecting the depth level 0 from the data) for each year.
Methodology Short
Zonal statistics (average)
Temporal Coverage
2021, 2022, 2023, 2024
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W01_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - January - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W02_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged – February - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W03_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - March - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W04_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - April - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W05_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - May - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W06_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - June - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W07_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - July - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W08_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - August - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W09_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - September - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W10_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - October - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W11_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - November - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

Indicator thematic area
Water
Indicator group
Marine
Attribute ID
WA_MAR_W12_XXXX
Indicator Name
Wave significant height
Units
m
Data Source
Global Ocean Waves Reanalysis. E.U. Copernicus Marine Service Information (CMEMS). Marine Data Store (MDS). DOI: 10.48670/moi-00022 (Accessed on 29-September-2024)
Indicator description
Wave significant height (monthly averaged - December - data over the period 1993 to 2018)
Methodology
Zonal statistics (average) of the Global Ocean Waves Reanalysis layer (cmems_mod_glo_wav_my_0.2deg-climatology_P1M-m) using a 10 km buffer around the coastal urban centers. The data shows the monthly wave significant height averaged over the period 1993 to 2018 (included)
Methodology Short
Zonal statistics (average)
Temporal Coverage
2018
Uncertainties & Best practices

2.9.13 Infrastructure

Indicator thematic area
Infrastructures
Indicator group
Roads
Attribute ID
IN_ROA_LEN_XXXX
Indicator Name
Road length
Units
m
Data Source
Overture Maps Foundation, overturemaps.org. Accessed on 24/07/2024
Indicator description
Total road length inside the urban center
Methodology
Length calculation in local geographic projection and sum of the features' length inside the urban center.
Methodology Short
Calculate geometry (length)
Temporal Coverage
2024
Uncertainties & Best practices

Indicator thematic area
Infrastructures
Indicator group
Roads
Attribute ID
IN_ROA_DEN_XXXX
Indicator Name
Road density network
Units
m/m^2
Data Source
Overture Maps Foundation, overturemaps.org. Accessed on 24/07/2024
Indicator description
Road network density, total road length inside the urban center divided by the urban center area
Methodology
Division between total length in the urban center and the urban center area.
Methodology Short
Division
Temporal Coverage
2024
Uncertainties & Best practices

Indicator thematic area
Infrastructures
Indicator group
Critical Infrastructures Spatial Index (CISI)
Attribute ID
IN_CIS_ALL_XXXX
Indicator Name
Critical Infrastructures Spatial Index
Units
dimensionless
Data Source
Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* **9**, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description
Critical Infrastructures Spatial Index is an index that spatially explicit indicates the coverage or lack of infrastructures.
Methodology
Sum of the CISI score by urban center, normalized by the maximum value for all urban centers
Methodology Short
Sum and normalization
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Infrastructures
Indicator group
Critical Infrastructures Spatial Index (CISI)
Attribute ID
IN_CIS_ENE_XXXX
Indicator Name
Critical Infrastructures Spatial Index for the energy sector
Units
dimensionless
Data Source
Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* **9**, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description
Sectorial CISI is an index that spatially explicit indicates the coverage or lack of infrastructures per sector.
Methodology
Area weighted mean subsector score for the energy system.
Methodology Short
Area weighted average
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Infrastructures
Indicator group
Critical Infrastructures Spatial Index (CISI)
Attribute ID
IN_CIS_TRA_XXXX
Indicator Name
Critical Infrastructures Spatial Index for the transportation sector
Units
dimensionless
Data Source
Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* **9**, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description
Sectorial CISI is an index that spatially explicit indicates the coverage or lack of infrastructures per sector.
Methodology
Area weighted mean subsector score for the transportation system.
Methodology Short
Area weighted average
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area	Infrastructures
Indicator group	Critical Infrastructures Spatial Index (CISI)
Attribute ID	IN_CIS_WAT_XXXX
Indicator Name	Critical Infrastructures Spatial Index for the water sector
Units	dimensionless
Data Source	Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* **9**, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description	Sectorial CISI is an index that spatially explicit indicates the coverage or lack of infrastructures per sector.
Methodology	Area weighted mean subsector score for the water system.
Methodology Short	Area weighted average
Temporal Coverage	2020
Uncertainties & Best practices	

Indicator thematic area
Infrastructures
Indicator group
Critical Infrastructures Spatial Index (CISI)
Attribute ID
IN_CIS_WAS_XXXX
Indicator Name
Critical Infrastructures Spatial Index for the waste sector
Units
dimensionless
Data Source
Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* **9**, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description
Sectorial CISI is an index that spatially explicit indicates the coverage or lack of infrastructures per sector.
Methodology
Area weighted mean subsector score for the waste system.
Methodology Short
Area weighted average
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Infrastructures
Indicator group
Critical Infrastructures Spatial Index (CISI)
Attribute ID
IN_CIS_TEL_XXXX
Indicator Name
Critical Infrastructures Spatial Index for the telecommunications sector
Units
dimensionless
Data Source
Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* **9**, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description
Sectorial CISI is an index that spatially explicit indicates the coverage or lack of infrastructures per sector.
Methodology
Area weighted mean subsector score for the telecommunications system.
Methodology Short
Area weighted average
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Infrastructures
Indicator group
Critical Infrastructures Spatial Index (CISI)
Attribute ID
IN_CIS_HEA_XXXX
Indicator Name
Critical Infrastructures Spatial Index for the health sector
Units
dimensionless
Data Source
Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* **9**, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description
Sectorial CISI is an index that spatially explicit indicates the coverage or lack of infrastructures per sector.
Methodology
Area weighted mean subsector score for the health system.
Methodology Short
Area weighted average
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Infrastructures
Indicator group
Critical Infrastructures Spatial Index (CISI)
Attribute ID
IN_CIS_EDU_XXXX
Indicator Name
Critical Infrastructures Spatial Index for the education sector
Units
dimensionless
Data Source
Nirandjan, S., Koks, E.E., Ward, P.J. *et al.* A spatially-explicit harmonized global dataset of critical infrastructure. *Sci Data* 9, 150 (2022). https://doi.org/10.1038/s41597-022-01218-4 Data: A spatially-explicit harmonized global dataset of critical infrastructure (zenodo.org)
Indicator description
Sectorial CISI is an index that spatially explicit indicates the coverage or lack of infrastructures per sector.
Methodology
Area weighted mean subsector score for the education system.
Methodology Short
Area weighted average
Temporal Coverage
2020
Uncertainties & Best practices

2.9.14 Geography

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A01_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SLC" (Short, Low VPI, Cold)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SLC" (Short, Low VPI, Cold)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SLC" (Short, Low VPI, Cold)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A02_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SMC" (Short, Medium VPI, Cold)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SLC" (Short, Low VPI, Cold)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SMC" (Short, Medium VPI, Cold)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A03_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SHC" (Short, High VPI, Cold)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SLC" (Short, Low VPI, Cold)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SHC" (Short, High VPI, Cold)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A04_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TLC" (Tall, Low VPI, Cold)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TLC" (Tall, Low VPI, Cold)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TLC" (Tall, Low VPI, Cold)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A05_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TMC" (Tall, Medium VPI, Cold)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TMC" (Tall, Medium VPI, Cold)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TMC" (Tall, Medium VPI, Cold)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A06_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "THC" (Tall, High VPI, Cold)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "THC" (Tall, High VPI, Cold)
Methodology
Share of the total urban center area over the urban area classified as Biome class "THC" (Tall, High VPI, Cold)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A07_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SLD" (Short, Low VPI, Dry)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SLD" (Short, Low VPI, Dry)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SLD" (Short, Low VPI, Dry)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A08_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SMD" (Short, Medium VPI, Dry)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SMD" (Short, Medium VPI, Dry)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SMD" (Short, Medium VPI, Dry)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A09_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SHD" (Short, High VPI, Dry)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SHD" (Short, High VPI, Dry)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SHD" (Short, High VPI, Dry)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A10_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TLD" (Tall, Low VPI, Dry)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TLD" (Tall, Low VPI, Dry)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TLD" (Tall, Low VPI, Dry)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A11_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TMD" (Tall, Medium VPI, Dry)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TMD" (Tall, Medium VPI, Dry)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TMD" (Tall, Medium VPI, Dry)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A12_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "THD" (Tall, High VPI, Dry)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "THD" (Tall, High VPI, Dry)
Methodology
Share of the total urban center area over the urban area classified as Biome class "THD" (Tall, High VPI, Dry)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A13_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SLB" (Short, Low VPI, Both)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SLB" (Short, Low VPI, Both)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SLB" (Short, Low VPI, Both)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A14_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SMB" (Short, Medium VPI, Both)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SMB" (Short, Medium VPI, Both)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SMB" (Short, Medium VPI, Both)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A15_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SHB" (Short, High VPI, Both)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SHB" (Short, High VPI, Both)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SHB" (Short, High VPI, Both)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A16_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TLB" (Tall, Low VPI, Both)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TLB" (Tall, Low VPI, Both)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TLB" (Tall, Low VPI, Both)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A17_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TMB" (Tall, Medium VPI, Both)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TMB" (Tall, Medium VPI, Both)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TMB" (Tall, Medium VPI, Both)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A18_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "THB" (Tall, High VPI, Both)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "THB" (Tall, High VPI, Both)
Methodology
Share of the total urban center area over the urban area classified as Biome class "THB" (Tall, High VPI, Both)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A19_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SLN" (Short, Low VPI, Non-seasonal)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SLN" (Short, Low VPI, Non-seasonal)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SLN" (Short, Low VPI, Non-seasonal)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A20_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SMN" (Short, Medium VPI, Non-seasonal)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SMN" (Short, Medium VPI, Non-seasonal)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SMN" (Short, Medium VPI, Non-seasonal)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A21_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "SHN" (Short, High VPI, Non-seasonal)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "SMN" (Short, Medium VPI, Non-seasonal)
Methodology
Share of the total urban center area over the urban area classified as Biome class "SMN" (Short, Medium VPI, Non-seasonal)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A22_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TLN" (Tall, Low VPI, Non-seasonal)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TLN" (Tall, Low VPI, Non-seasonal)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TLN" (Tall, Low VPI, Non-seasonal)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A23_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "TMN" (Tall, Medium VPI, Non-seasonal)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "TMN" (Tall, Medium VPI, Non-seasonal)
Methodology
Share of the total urban center area over the urban area classified as Biome class "TMN" (Tall, Medium VPI, Non-seasonal)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Biome
Attribute ID
GE_BIO_A24_XXXX
Indicator Name
Share of Urban Center area classified as Biome class "THN" (Tall, High VPI, Non-seasonal)
Units
%
Data Source
Higgins, S.I., Buitenwerf, R. and Moncrieff, G.R. (2016), Defining functional biomes and monitoring their change globally. Glob Change Biol, 22: 3583-3593. https://doi.org/10.1111/gcb.13367
Indicator description
Share of Urban Center area classified as Biome class "THN" (Tall, High VPI, Non-seasonal)
Methodology
Share of the total urban center area over the urban area classified as Biome class "THN" (Tall, High VPI, Non-seasonal)
Methodology Short
Ratio
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Ecoregion
Attribute ID
GE_ECO_CLA_2025
Indicator Name
Ecoregion
Units
Categorical
Data Source
David M. Olson, Eric Dinerstein, Eric D. Wikramanayake, Neil D. Burgess, George V. N. Powell, Emma C. Underwood, Jennifer A. D'amico, Illanga Itoua, Holly E. Strand, John C. Morrison, Colby J. Loucks, Thomas F. Allnutt, Taylor H. Ricketts, Yumiko Kura, John F. Lamoreux, Wesley W. Wettengel, Prashant Hedao, Kenneth R. Kassem, Terrestrial Ecoregions of the World: A New Map of Life on Earth: A new global map of terrestrial ecoregions provides an innovative tool for conserving biodiversity, *BioScience*, Volume 51, Issue 11, November 2001, Pages 933–938, https://doi.org/10.1641/0006-3568(2001)051[0933:TEOTWA]2.0.CO;2
Indicator description
Ecoregion in which the urban center is located.
Methodology
Overlap of urban centers with ecoregions layer, in the cases where the urban center falls into two or more ecoregions the ecoregion with greater overlapping area is selected.
Methodology Short
Overlap
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Major River Basin
Attribute ID
GE_MRB_MAI_2025
Indicator Name
Main Major River Basin
Units
Categorical
Data Source
Major River Basins of the World (WB) https://datacatalog.worldbank.org/search/dataset/0041426
Indicator description
Main Major River Basin
Methodology
Overlap of urban centers with the major river basin layer, in the cases where the urban center falls into two or more ecoregions the ecoregion with greater overlapping area is selected.
Methodology Short
Overlap
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Major River Basin
Attribute ID
GE_MRB_LIS_2025
Indicator Name
List of Major River Basin
Units
Categorical
Data Source
Major River Basins of the World (WB) https://datacatalog.worldbank.org/search/dataset/0041426
Indicator description
List of Major River Basin
Methodology
Overlap of urban centers with the major river basin layer and selection of all overlapping basins.
Methodology Short
Overlap
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Elevation
Attribute ID
GE_ELV_AVG_2025
Indicator Name
Average Elevation
Units
m
Data Source
Copernicus GLO-90 dataset https://doi.org/10.5270/ESA-c5d3d65
Indicator description
Average elevation in the urban center
Methodology
Zonal statistics (avg) of the elevation layer.
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Soil Class
Attribute ID
GE_SLC_MPC_2025
Indicator Name
Most probable soil class
Units
Categorical
Data Source
SoilGrids250m 2.0 - WRB classes and probabilities. https://data.isric.org/geonetwork/srv/eng/catalog.search#/metadata/c4dc161c-d62d-11ea-a1a3-292680b15169. Repository: https://files.isric.org/soilgrids/latest/data/wrb/MostProbable/ Accessed 25/09/2024
Indicator description
Zonal count of the most probable soil class layer. The soil class more present in the urban center is selected as the most probable soil class.
Methodology
Zonal statistics (count) of the most probable soil class.
Methodology Short
Zonal statistics (count)
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
Geography
Indicator group
Soil Class
Attribute ID
GE_SLC_LST_2025
Indicator Name
List of most probable soil classes
Units
Categorical
Data Source
SoilGrids250m 2.0 - WRB classes and probabilities. https://data.isric.org/geonetwork/srv/eng/catalog.search#/metadata/c4dc161c-d62d-11ea-a1a3-292680b15169. Repository: https://files.isric.org/soilgrids/latest/data/wrb/MostProbable/ Accessed 25/09/2024
Indicator description
Zonal count of the most probable soil class layer. All soil classes present in the urban center are listed in the most probable soil classes list.
Methodology
Zonal statistics (count) of the most probable soil class.
Methodology Short
Zonal statistics (count)
Temporal Coverage
2025
Uncertainties & Best practices

2.9.15 Greenness

Indicator thematic area
Greenness
Indicator group
Tree Canopy Height
Attribute ID
GR_CTH_AVG_ XXXX
Indicator Name
Average Canopy Top Height in the built-up area
Units
m
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Lang, N., Jetz, W., Schindler, K. et al. A high-resolution canopy height model of the Earth. Nat Ecol Evol 7, 1778–1789 (2023). https://doi.org/10.1038/s41559-023-02206-6
Indicator description
Average Canopy Top Height in the built-up area
Methodology
Zonal statistics (average) of canopy top height layer, masked by a 300 m buffer of the GHS-BUILT-S layer.
Methodology Short
Zonal statistics (avg)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Greenness
Indicator group
Tree Canopy Height
Attribute ID
GR_CTH_STD_ XXXX
Indicator Name
Standard deviation Canopy Top Height in the built-up area
Units
m
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Lang, N., Jetz, W., Schindler, K. et al. A high-resolution canopy height model of the Earth. Nat Ecol Evol 7, 1778–1789 (2023). https://doi.org/10.1038/s41559-023-02206-6
Indicator description
Standard deviation Canopy Top Height in the built-up area
Methodology
Zonal statistics (standard deviation) of canopy top height layer, masked by a 300 m buffer of the GHS-BUILT-S layer.
Methodology Short
Zonal statistics (stdev)
Temporal Coverage
2020
Uncertainties & Best practices

Indicator thematic area
Greenness
Indicator group
Greenness in the built-up
Attribute ID
GR_AVG_GRN_ XXXX
Indicator Name
Mean greenness in the built-up area
Units
dimensionless
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Landsat Collection 2 Tier 1 Level 2 8-Day NDVI Composite courtesy of the U.S. Geological Survey United Nations Human Settlement Programme (UN-Habitat), Global Urban Indicators Database 2024 USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products
Indicator description
Mean greenness (NDVI) in the built-up area (within a 300 m buffer of the built-up cells)
Methodology
Sequence of masking and zonal statistics. 300m buffering of the built-up domain, masking of the built-up grid with 3 years average NDVI (greater or equal than threshold); zonal statistics of the NDVI in the obtained mask. Thresholds for high greenness are estimated by UN-Habitat for agro-ecological-zones, from a sample of 700 cities. Agro-ecological zone values are obtained by averaging observations within the cities in each zone.
Methodology Short
Zonal statistics (sum), zonal statistics (avg), mask
Temporal Coverage
1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
Greenness
Indicator group
Greenness in the built-up
Attribute ID
GR_SQM_HGR_ XXXX
Indicator Name
Built-up area in the highest greenness area
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Landsat Collection 2 Tier 1 Level 2 8-Day NDVI Composite courtesy of the U.S. Geological Survey United Nations Human Settlement Programme (UN-Habitat), Global Urban Indicators Database 2024 USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products
Indicator description
Total built-up area (within a 300 m buffer of the built-up cells and high greenness threshold)
Methodology
Sequence of masking and zonal statistics. 300m buffering of the built-up domain, masking of the built-up grid with 3 years average NDVI (greater or equal than threshold); zonal statistics of the built-up in the obtained mask. Thresholds for high greenness are estimated by UN-Habitat for agro-ecological-zones, from a sample of 700 cities. Agro-ecological zone values are obtained by averaging observations within the cities in each zone.
Methodology Short
Zonal statistics (sum), zonal statistics (avg), mask
Temporal Coverage
1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
Greenness
Indicator group
Greenness in the built-up
Attribute ID
GR_SQM_LGR_ XXXX
Indicator Name
Built-up area in the lower greenness area
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:[10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA](https://doi.org/10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA) Landsat Collection 2 Tier 1 Level 2 8-Day NDVI Composite courtesy of the U.S. Geological Survey United Nations Human Settlement Programme (UN-Habitat), Global Urban Indicators Database 2024 USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products
Indicator description
Total built-up area (within a 300 m buffer of the built-up cells and low greenness threshold)
Methodology
Sequence of masking and zonal statistics. 300m buffering of the built-up domain, masking of the built-up grid with 3 years average NDVI (less or equal than threshold); zonal statistics of the built-up in the obtained mask. Thresholds for high greenness are estimated by UN-Habitat for agro-ecological-zones, from a sample of 700 cities. Agro-ecological zone values are obtained by averaging observations within the cities in each zone.
Methodology Short
Zonal statistics (sum), zonal statistics (avg), mask
Temporal Coverage
1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025

Uncertainties & Best practices

Indicator thematic area
Greenness
Indicator group
Greenness in the built-up
Attribute ID
GR_SQM_GRN_ XXXX
Indicator Name
Built-up area in the greenness area
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Landsat Collection 2 Tier 1 Level 2 8-Day NDVI Composite courtesy of the U.S. Geological Survey United Nations Human Settlement Programme (UN-Habitat), Global Urban Indicators Database 2024 USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products
Indicator description
Total built-up area in the greenness area.
Methodology
Sum of the built-up in the low and high greennes
Methodology Short
Sum
Temporal Coverage
1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
Greenness
Indicator group
Greenness in the built-up
Attribute ID
GR_SHB_HGR_ XXXX
Indicator Name
Share of Built-up area in the high greenness area over total built-up area in the urban centre.
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Landsat Collection 2 Tier 1 Level 2 8-Day NDVI Composite courtesy of the U.S. Geological Survey United Nations Human Settlement Programme (UN-Habitat), Global Urban Indicators Database 2024 USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products
Indicator description
Share of built-up area in the high greenness area.
Methodology
Ratio of the built-up in the high greenness and the total built-up of the urban centre.
Methodology Short
Ratio
Temporal Coverage
1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

Indicator thematic area
Greenness
Indicator group
Greenness in the built-up
Attribute ID
GR_SHB_GRN_ XXXX
Indicator Name
Share of Built-up area in the greenness area over total built-up area in the urban centre.
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Landsat Collection 2 Tier 1 Level 2 8-Day NDVI Composite courtesy of the U.S. Geological Survey United Nations Human Settlement Programme (UN-Habitat), Global Urban Indicators Database 2024 USGS Earth Resources Observation and Science (EROS) Center. (2021). Landsat 8 Level-2 Science Products. Landsat NDVI data from Landsat 8 mission. Retrieved from https://eros.usgs.gov/land-cover-land-use/landsat-8-level-2-science-products
Indicator description
Share of built-up area in the greenness area.
Methodology
Ratio of the built-up in the greenness and the total built-up of the urban centre.
Methodology Short
Ratio
Temporal Coverage
1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025
Uncertainties & Best practices

2.10 GHS-UCDB indicator fact sheets – multi-temporal boundaries

This section contains the individual indicator fact sheets organised by the 2 thematic domains

2.10.1 General Characteristics

Indicator thematic area
General Characteristics
Indicator Group
Urban center Name
Attribute ID
GC_UCN_MAI_XXXX
Indicator Name
Urban center Main Name
Units
Dimensionless
Data Source
Open Street Maps GISCO WUP 2018
Indicator description
Name of the main city inside the urban center.
Methodology
The urban centres are named using an algorithm that automatically queries the GISCO, the full OpenStreetMap datasets and WUP 2018 (extended unpublished version, with point locations corrected through geocoding and reverse geocoding).
Methodology Short
Geoencoding
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Urban center Name
Attribute ID
GC_UCN_LIS_XXXX
Indicator Name
Urban center List Name
Units
Dimensionless
Data Source
Open Street Maps GISCO WUP 2018
Indicator description
List of names of the all cities inside the urban center.
Methodology
The urban centres are named using an algorithm that automatically queries the GISCO, the full OpenStreetMap datasets and WUP 2018 (extended unpublished version, with point locations corrected through geocoding and reverse geocoding).
Methodology Short
Geoencoding
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Country Name
Attribute ID
GC_CNT_GAD_XXXX
Indicator Name
Country Name
Units
Dimensionless
Data Source
GADM version 4.1, released on 16 July 2022 https://gadm.org/data.html
Indicator description
Country named based on GADM dataset
Methodology
Spatial join of the urban centers and the GADM country layer adapted for GHSL.
Methodology Short
Spatial Join
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Development
Attribute ID
GC_DEV_USR_XXXX
Indicator Name
UN SDG Region
Units
Categorical
Data Source
UN https://unstats.un.org/sdgs/indicators/regional-groups/
Indicator description
Country grouping in geographic regions based on the 2016 Sustainable Development Goals Report and the progress reports on the Millennium Development Goals.
Methodology
Join by attribute (by country)
Methodology Short
Join by attribute
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Development
Attribute ID
GC_DEV_WIG_XXXX
Indicator Name
World Bank Income Group
Units
Categorical
Data Source
The World Bank https://datahelpdesk.worldbank.org/knowledgebase/articles/906519
Indicator description
The World Bank income group classification provides a complete list of economies classified by income, region, and World Bank lending status. This table is updated to year 2022.
Methodology
Join by attribute (by country).
Methodology Short
Join by attribute
Temporal Coverage
2025
Uncertainties & Best practices

Indicator thematic area
General Characteristics
Indicator group
Urban centre birth
Attribute ID
GC_UCB_YOB _XXXX
Indicator Name
Year of Birth
Units
year
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA European Commission, and Statistical Office of the European Union, 2021 Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons — 2021 edition. Publications Office of the European Union, 2021; ISBN 978-92-76-20306-3 10.2785/706535
Indicator description
Indicates the year in the multitemporal series GHS-SMOD R2023A, the cells reach the conditions to be classified as urban centre.
Methodology
The methodology to classify the urban centres is described in “Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons —“.
Methodology Short
Modelled
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

The DEGURBA model considers data only from 1975 to 2030, cities born in 1975 should be considered as born in 1975 or earlier, and cities death in 2030 should be considered as death on 2030 or later

Indicator thematic area
General Characteristics
Indicator group
Urban centre death
Attribute ID
GC_UCB_YOD _XXXX
Indicator Name
Year of Death
Units
year
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA European Commission, and Statistical Office of the European Union, 2021 Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons — 2021 edition. Publications Office of the European Union, 2021; ISBN 978-92-76-20306-3 10.2785/706535
Indicator description
Indicates weather an urban centre is projected to be a urban centre in 2030 or ‘dies’ (doesn’t reach the conditions to be a urban centre) in 2030.
Methodology
The methodology to classify the urban centres is described in “Applying the Degree of Urbanisation — A methodological manual to define cities, towns and rural areas for international comparisons —".
Methodology Short
Modelled
Temporal Coverage
2025, 2030
Uncertainties & Best practices

The DEGURBA model considers data only from 1975 to 2030, cities born in 1975 should be considered as born in 1975 or earlier, and cities death in 2030 should be considered as death on 2030 or later

2.10.2 Multi-temporal GHSL

Indicator thematic area
Multi-temporal_GHSL
Indicator group
Point-in-time Area
Attribute ID
MT_UCA_KM2_XXXX
Indicator Name
Urban Centre Area
Units
Km^2
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Urban Centre Area
Methodology
Calculate area (geometry) of the urban centre.
Methodology Short
Area
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Point-in-time Population
Attribute ID
MT_POP_TOT_XXXX
Indicator Name
Total Population
Units
Number of inhabitants
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multi-temporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description (xxx max words)
Total population allocated inside of the Multi-temporal UC in number of inhabitants. The boundaries of the urban centre are calculated dynamically per each epoch based on its population, not anchored in 2025.
Methodology
Zonal sum of the GHS-POP R2023A layer pixel values inside the multi-temporal urban centre.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Point-in-time Built-up
Attribute ID
MT_BUS_TOT_XXXX
Indicator Name
Total Built-up surface
Units
m^2
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Total built-up surface of the UC in square meters. The boundaries of the urban centre are calculated dynamically per each epoch based on its population, not anchored in 2025.
Methodology
Zonal sum of the GHS-BUILT-S R2023A pixel values inside the multi-temporal urban centre.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Point-in-time Built-up
Attribute ID
MT_BUV_TOT_XXXX
Indicator Name
Total Built-up volume
Units
m^3
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283
Indicator description
Total built-up volume of the UC in square meters. The boundaries of the urban centre are calculated dynamically per each epoch based on its population, not anchored in 2025.
Methodology
Zonal sum of the GHS-BUILT-V R2023A pixel values inside the multi-temporal urban centre.
Methodology Short
Zonal Statistics (sum)
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Point-in-time Population
Attribute ID
MT_POP_DEN_XXXX
Indicator Name
Population density
Units
Number of inhabitants per km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid Multi-temporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description (xxx max words)
Population density in the Multi-temporal UC
Methodology
Zonal sum of the GHS-POP R2023A layer pixel values inside the multi-temporal urban centre divided by its area.
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Point-in-time Built-up
Attribute ID
MT_BPC_TOT_XXXX
Indicator Name
Total built-up per capita
Units
m^2 per inhabitant
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, Multi-temporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid Multi-temporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Total built-up area per capita in the multi-temporal urban centre
Methodology
Total built-up area divided by total population
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Point-in-time Built-up
Attribute ID
MT_BUV_SHR_XXXX
Indicator Name
Share of built-up volume being residential
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-V R2023A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, Multi-temporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/ab2f107a-03cd-47a3-85e5-139d8ec63283, doi:10.2905/AB2F107A-03CD-47A3-85E5-139D8EC63283
Indicator description
Share of residential built-up volume over total built-up volume in the multi-temporal urban centre
Methodology
Residential built-up volume divided by total built-up volume. 1 - GHS-BUILT-V-NRES R2023A/ GHS-BUILT-V R2023A
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Point-in-time Built-up
Attribute ID
MT_BUS_SHT_XXXX
Indicator Name
Built-up fraction (Share of UC area being built-up)
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, Multi-temporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Share of total built-up surface over UC area in the multi-temporal urban centre
Methodology
Total built-up surface divided by UC area
Methodology Short
Division
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
1. Multi-temporal GHSL
Indicator Group
Multi-temporal change Population
Attribute ID
MT_POP_DIF_XXXX_YYYY
Indicator Name
Population relative change
Units
%
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid Multi-temporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Total population change over five years as percentage in the multi-temporal urban centre
Methodology
Population relative percentage difference (pop t+5 – pop t)/pop t
Methodology Short
Relative percentage difference
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal GHSL
Indicator Group
Multi-temporal change Population
Attribute ID
MT_PDY_DIF_XXXX_YYYY
Indicator Name
Population density change
Units
Number of inhabitants per km^2
Data Source
Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid Multi-temporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Population density change over five years as delta inhabitants perkm^2 in the multi-temporal urban centre
Methodology
Population density difference pop t+5/area t+5 - pop t/area t
Methodology Short
Difference
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
1. Multi-temporal GHSL
Indicator Group
Multi-temporal change Area
Attribute ID
MT_XST_D30_XXXX_YYYY
Indicator Name
Change in UC extent
Units
%
Data Source
Schiavina M., Melchiorri M., Pesaresi M. (2023): GHS-SMOD R2023A - GHS settlement layers, application of the Degree of Urbanisation methodology (stage I) to GHS-POP R2023A and GHS-BUILT-S R2023A, multitemporal (1975-2030). European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/a0df7a6f-49de-46ea-9bde-563437a6e2ba, doi:10.2905/A0DF7A6F-49DE-46EA-9BDE-563437A6E2BA
Indicator description
Total UC area change over five years as percentage in the multi-temporal urban centre
Methodology
UC Area relative percentage difference (area t+5 – area t)/area t
Methodology Short
Relative percentage difference
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Multi-temporal change Built-up
Attribute ID
MT_BPC_DIF_XXXX_YYYY
Indicator Name
Built-up per capita change
Units
m^2 per inhabitant
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, Multi-temporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid Multi-temporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE
Indicator description
Total built-up surface per capita change over five years as delta m^2 per inhabitant in the multi-temporal urban centre
Methodology
Built-up per capita difference BUS t+5/pop t+5 - BUS t/pop t
Methodology Short
Difference
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Multi-temporal change Built-up
Attribute ID
MT_BUF_DIF_XXXX_YYYY
Indicator Name
Change in the fraction of built-up surface
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, Multi-temporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Share of total built-up surface over UC area change over five years as delta percentage in the multi-temporal urban centre
Methodology
Built-up fraction difference BUS t+5/area t+5 - BUS t/area t
Methodology Short
Difference
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

Indicator thematic area
Multi-temporal_GHSL
Indicator Group
Multi-temporal change Built-up
Attribute ID
MT_BUS_DIF_XXXX_YYYY
Indicator Name
Built-up surface relative change
Units
%
Data Source
Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, Multi-temporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D72EA
Indicator description
Total built-up surface change over five years as percentage in the multi-temporal urban centre
Methodology
Built-up surface relative percentage difference (BUS t+5 – BUS t)/BUS t
Methodology Short
Relative percentage difference
Temporal Coverage
1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030
Uncertainties & Best practices
Please mind that the boundaries of UC in this data stream change according to the population in each year. Such data is particularly adapted for population weighted metrics (i.e. per capita) and for population density.

2.11 Input Data

The input data are data from the GHSL P2023 release, plus the corresponding input data for each of the indicators contained in section 2.9 and 2.10.

2.12 Technical Details

Authors: Marí Rivero Inés, Melchiorri Michele, Florio Pietro, Schiavina Marcello, Krasnodębska Katarzyna, Politis Panagliotis, Uhl Johannes, Pesaresi Martino, Maffenini Luca, Sulis Patrizia, Crippa Monica, Guizzardi Diego, Pisoni Enrico, Belis Claudio, Oom Duarte, Branco Alfredo, Mwaniki Dennis, Kochulem Edwin, Githira Daniel, Carioli Alessandra, Ehrlich Daniele, Tommasi Pierpaolo, Thomas Kemper, Lewis Dijkstra.

Product name: GHS_UCDB_GLOBE_R2024

Spatial extent: Global

Temporal extent: from 1975 to 2030, 5 years interval

Coordinate System: World Mollweide (EPSG: 54009)

Spatial resolution available: -

2.12.1 GHS_UCDB_GLOBE_R2024

Data organisation: Geopackage (.gpkg) database with vector layer of Urban Centre entities boundaries (polygons) and centroids (points) and spreadsheet (xlsx)

Records: 11,422 urban centres

Attributes:

- 2.9.1 General Characteristics;
- *2.9.2* GHSL
- 2.9.3 Socioeconomic
- 2.9.4 Land Use Land Cover
- 2.9.5 Exposure
- 0

- Hazards
- 2.9.7 SDGs
- 2.9.8 Climate
- 2.9.9 Emissions
- 2.9.10 Natural Systems
- 2.9.11 Health
- 2.9.12 Water
- 2.9.13 Infrastructure
- 2.9.14 Geography
- 2.9.15 Greenness

2.12.2 GHS_UCDB_REGION_GLOBE_R2024A

Data organisation: Geopackage (.gpkg) database with vector layer of Urban Centre entities boundaries (polygons), centroids (points), and tables (csv)

Records: in individual .gpkg and tables by region

Regions :

Region	UC Count
Australia and New Zealand	44
Central and Southern Asia	2895
Eastern and South-Eastern Asia	3117
Europe	1165
Latin America and the Caribbean	1089
Northern Africa and Western Asia	1038
Northern America	398
Oceania	18
Sub-Saharan Africa	1658

Attributes:

- 2.9.1 General Characteristics;
- *2.9.2* GHSL
- 2.9.3 Socioeconomic
- 2.9.4 Land Use Land Cover
- 2.9.5 Exposure
- 0

- Hazards
- 2.9.7 SDGs
- 2.9.8 Climate
- 2.9.9 Emissions
- 2.9.10 Natural Systems
- 2.9.11 Health
- 2.9.12 Water
- 2.9.13 Infrastructure
- 2.9.14 Geography
- 2.9.15 Greenness

2.12.3 GHS_UCDB_THEME_GLOBE_R2024A

Data organisation: Geopackage (.gpkg) database with vector layer of Urban Centre entities boundaries (polygons) and centroids (points).

Records: 11,422 urban centres

Attributes: in individual csv and xlsx by thematic domain

- 2.9.1 General Characteristics;
- 2.9.2 GHSL
- 2.9.3 Socioeconomic
- 2.9.4 Land Use Land Cover
- 2.9.5 Exposure
- 0

- Hazards
- 2.9.7 SDGs
- 2.9.8 Climate
- 2.9.9 Emissions
- 2.9.10 Natural Systems
- 2.9.11 Health
- 2.9.12 Water
- 2.9.13 Infrastructure
- 2.9.14 Geography
- 2.9.15 Greenness

2.12.4 GHS_UCDB_CONTRIBUTIONS_R2024A

Data organisation: tables (csv, xlsx)

Attributes:

The UCDB_CONTRIBUTIONS is a living dataset, therefore the entries will be updated with attributes and corresponding factsheet in individual folders.

At the time of the first release, this section contains:

- Completeness of Built-up Area in OpenStreetMap
- Completeness of Road Length in OpenStreetMap

The first dataset is contributed by:

João Porto de Albuquerque; Professor (Chair) in Urban Analytics, Deputy Director of the Urban Big Data Centre;

Benjamin Herfort; Heidelberg Institute for Geoinformation Technology, Heidelberg, Germany

2.12.5 GHS_UCDB_MTUC_GLOBE_R2024A

Data organisation: Geopackage (.gpkg) database with vector layer of Urban Centre entities boundaries (polygons) and centroids (points).

Records: 11,422 urban centres

Attributes:

- 2.10.1 General Characteristics
- 2.10.2 Multi-temporal GHSL

Table 3 - Technical details of the datasets in GHS-UCDB_GLOBE_R2024A

GHS_SMOD_GLOBE_R2023A		
ID	**Description**	**Resolution (Projection)**
GHS_UCDB_GLOBE_R2024	Urban centre database fixed boundaries, all thematic domains and all records File format: gpkg, csv, xlsx	World Mollweide ESRI:54009
GHS_UCDB_REGION_GLOBE_R2024A	Urban centre database fixed boundaries, Region records and full attributes File format: gpkg, csv, xlsx	
GHS_UCDB_THEME_GLOBE_R2024A	Urban centre database fixed boundaries, single thematic domains and full attributes File format: gpkg, csv, xlsx	
GHS_UCDB_CONTRIBUTIONS_R2024A	Urban centre database fixed boundaries, single attribute and full records File format: csv	
GHS_UCDB_MTUC_GLOBE_R2024A	Urban centre database multi-temporal boundaries, all thematic domains and all records File format: gpkg, csv, xlsx	

2.13 How to cite

Dataset:

Marí Rivero Inés, Melchiorri Michele, Florio Pietro, Schiavina Marcello, Krasnodębska Katarzyna, Politis Panagliotis, Uhl Johannes, Pesaresi Martino, Maffenini Luca, Sulis Patrizia, Crippa Monica, Guizzardi Diego, Pisoni Enrico, Belis Claudio, Oom Duarte, Branco Alfredo, Mwaniki Dennis, Kochulem Edwin, Githira Daniel, Carioli Alessandra, Ehrlich Daniele, Tommasi Pierpaolo, Thomas Kemper, Lewis Dijkstra. Joint Research Centre (JRC) [Dataset] doi: 10.2905/1A338BE6-7EAF-480C-9664-3A8ADE88CBCD

Concept & Methodology:

Melchiorri, Michele. "The global human settlement layer sets a new standard for global urban data reporting with the urban centre database." Frontiers in Environmental Science 10 (2022): 1003862.

3 Conclusions

The new release of the GHS-UCDB dataset, now presented as Stats in the City, marks a substantial improvement and update to the Urban Centre Database product within the GHSL Suite. This significant enhancement not only incorporates new data sources but also broadens the thematic scope, effectively integrating data from operational Copernicus Services.

A notable feature of this dataset is its ability to offer user-specific delineation of urban centres, adapting to diverse uses and applications. This flexibility and comprehensiveness open up new opportunities for the creation of detailed urban centre profiles and multi-thematic studies on cities worldwide for broader analyses and more informed decision-making.

Moreover, the introduction of a new contributors section within the dataset is a forward-thinking approach that encourages collaboration and community engagement. This feature enables continuous updates and the seamless integration of data from the user community, who can create new data for the urban centre spatial units.

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Melchiorri, Michele, Martino Pesaresi, Aneta J. Florczyk, Christina Corbane, and Thomas Kemper. 2019. "Principles and Applications of the Global Human Settlement Layer as Baseline for the Land Use Efficiency Indicator—SDG 11.3.1." *ISPRS International Journal of Geo-Information* 8 (2): 96. https://doi.org/10.3390/ijgi8020096.

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