UN-GGIM: Europe webinar
Showcasing the added-value of geospatial and statistical data integration to compute SDG indicators

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SDG indicator 11.3.1

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SDG 11.3.1

Land consumption rate to population growth rate
SDG indicator analysis – 11.3.1
Land consumption rate to population growth rate

DEFINITION

- Aims at monitoring integrated and sustainable planning and management of human settlements.

- At global level, the indicator is defined as the ratio of land consumption rate to population growth rate.
  - Land consumption rate is the uptake of land by urbanized land uses, which often involves conversion of land from non-urban to urban functions. Land consumption rate is the rate at which urbanized land or land occupied by a city/urban area changes during a period of time, usually one or few years.
  - Population growth rate is the change of a population in a defined area (country, city, etc.) during a period, usually one or few years.

- Two ancillary indicators to understand the ratio of rate of changes:
  - Land consumption (built-up area) per capita, a measure of the average amount of built-up area available to each person in an urban area during each analysis year.
  - Total change in built up area which is a measure of the total increase in built up areas within the urban area over time.

- High land use efficiency (low land consumption per capita) means that small amounts of artificial area are used by many inhabitants: e.g. buildings have several floors and the road network and public transport are frequented by many persons.
Pan-European geospatial data sources are available:

- Land consumption: Copernicus Land Monitoring Service [Urban Atlas](https://land.copernicus.eu) and [Imperviousness Density](https://land.copernicus.eu)
- Population growth: Urban Audit, Annual Regional Database of the European Commission (ARDECO)

Five steps for indicator computation:

- Delimitation of urban areas
- Spatial analysis and computation of the land consumption rate
- Spatial analysis and computation of the population growth rate
- Computation of the ratio of land consumption rate to population growth rate
- Computation of recommended secondary indicators (land consumption per capita).

- Urban Atlas based: only for FUAs, 2012-2018, every 3 years from 2021 on
- Imperviousness based: entire landscape, every 3 years from 2018 on
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DATA SOURCE – needed spatial detail

Corine Land Cover 2018, 100m
https://land.copernicus.eu/pan-european/corine-land-cover

Imperviousness, 10m
https://land.copernicus.eu/pan-european/high-resolution-layers/imperviousness

Urban Atlas, 10m (rasterised)
https://land.copernicus.eu/local/urban-atlas
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**FINDINGS - overview**

- In the EU27+UK region, *land consumption per capita declined* from 423m² per capita in 2012 to 418m² per capita in 2018 (1.3% decline) -> better land use efficiency = urban densification?
- Highest land consumption per capita (low land use efficiency): Umeå (Sweden), Kuopio (Finland), Gorlitz (Germany)
- Lowest land consumption per capita (high efficiency): Soest (NL), Gallarate (IT), Hastings (UK)

**Cities vs. Commuting zones:**
- In 2018 *land consumption per capita in cities was 70% less* compared to commuting zones (224 m²/capita in cities vs. 691 m²/capita in commuting zones) -> high land use efficiency in cities as opposed to commuting zones.
- Cities:
  - decreasing land consumption per capita trend of -1.4% (from 227 m²/capita in 2012 to 223.8 m²/capita in 2018)
- Commuting zones:
  - decreasing land consumption per capita trend of -1.8% (from 703.7 m²/capita in 2012 to 691.1 m²/capita in 2018)
- => land use efficiency increased more in commuting zones
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FINDINGS – country comparison

Highest increase in land consumption per capita (change to lower land use efficiency):
- Lithuania
- Poland
- Czech republic
- Bulgaria

Highest decrease in land consumption per capita (change to higher land use efficiency):
- Finland
- Sweden
- Luxembourg
- Netherlands
- UK

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FINDINGS – accessible statistics

Visit the related dashboard:


- Interactive queries
- Many analytical details
- Support own assessments
- Download tables
- Download charts

The term land use efficiency focuses on the use of artificial areas in FUAs in proportion of inhabitants. As a measure for quantification, the amount of artificial area per capita is used. It has to be stressed that thresholds in this regard have neither been discussed nor defined yet. As of today, we can only compare land use efficiency of defined regions and observe high, low and average values. The use of artificial area per capita is also addressed in the SDG11.3.1 indicator Land consumption per capita. In this chapter land use efficiency is...
Dynamically changing variables: Monitor population and land consumption at regular intervals and for the same period.

Change to landscape level data when the CLMS imperviousness becomes available (better monitoring of scattered urban and industrial sprawl patterns).

Changing FUA boundaries: Fix the boundaries extent to the first observation year.

Disaggregate: To better understand change patterns, results should be disaggregated by location – cities, commuting zones, urban typology, etc.

Transparency: Land consumption per capita is easier to understand (already complicated) than the ratio of land consumption rate to population growth rate.

Land take vs. land consumption per capita: Agree on definitions, e.g. the inclusion/exclusion of urban green.
SDG 11.3.1
Extending the indicator framework
Further assessment – SDG 11.3.1, extending the framework

Sealed area per capita, 2018 (2021, …) – landscape level country values

Further assessment – SDG 11.3.1, extending the framework

Sealed area per capita, 2018 (2021, ...) – landscape level regional (NUTS3) values

Further assessment – SDG 11.3.1, extending the framework

Sealed area 2018 (2021, ...) – per degree of urbanisation

Further assessment – SDG 11.3.1, extending the framework

Sealed area 2018 (2021, ...) – per ecosystem types

Further assessment – SDG 11.3.1, extending the framework

Sealed area 2018 (2021, ...) – in protected areas, coastal regions and floodplains

Concluding remarks

• The computation steps for the calculation of this indicator are relatively straightforward

• Data availability in Europe is good and improving

• Data availability in Europe allows further regional and thematic assessments (e.g. biodiversity, flood protection, coastal ecosystem degradation, C sequestration, etc.)

• Indicator interpretation is complex, sub indicators need to be computed
References

THANK YOU!

Questions?

UN-GGIM: Europe website: https://un-ggim-europe.org/