UN-GGIM: Europe webinar

Showcasing the added-value of geospatial and statistical data integration to compute SDG indicators

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UN-GGIM EUROPE | UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

SDG indicator 11.3.1

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https://un-ggim-europe.org/

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.

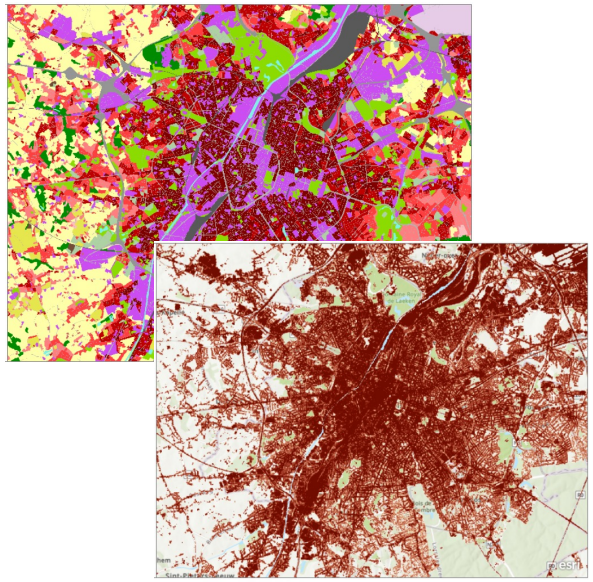
SDG indicator analysis – 11.3.1

Land consumption rate to population growth rate

DATA SOURCE AND COMPUTATION

- Pan-European geospatial data sources are available:
  - Land consumption: Copernicus Land Monitoring Service Urban Atlas and Imperviousness Density
  - 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).



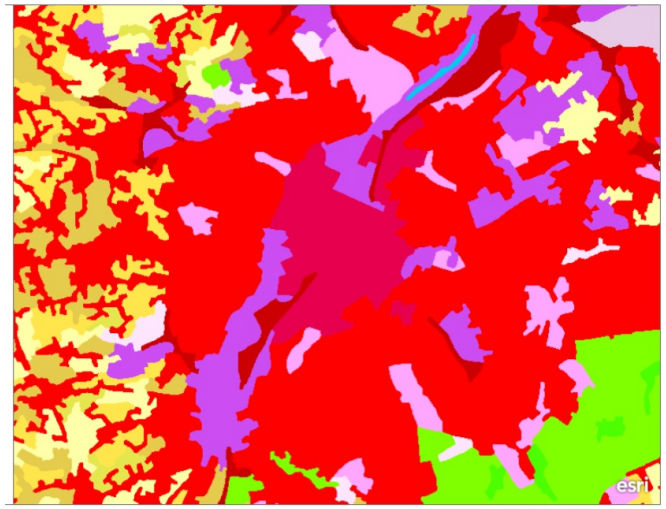
- Urban Atlas based: only for FUAs, 2012-2018, every 3 years from 2021 on
- Imperviousness based: entire landscape, every 3 years from 2018 on

SDG indicator analysis – 11.3.1

Land consumption rate to population growth rate

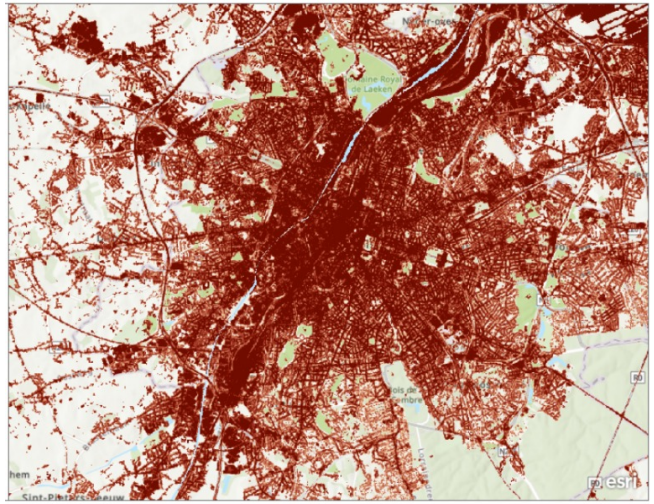
DATA SOURCE – needed spatial detail

Corine Land Cover 2018, 100m



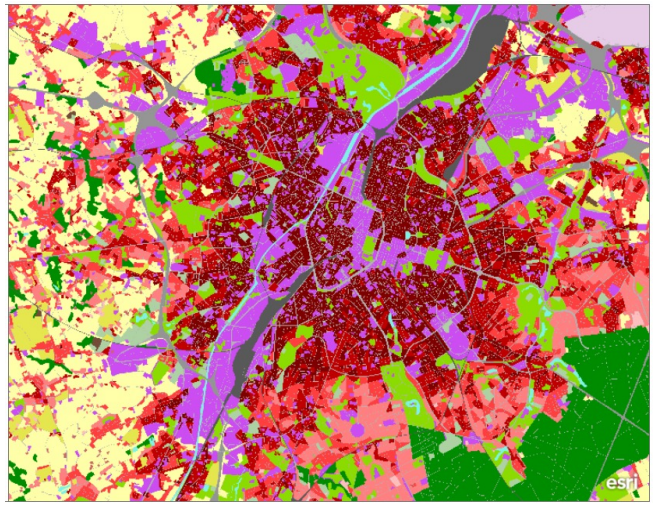
https://land.copernicus.eu/pan-european/corine-land-cover

Imperviousness, 10m



https://land.copernicus.eu/pan-european/high-resolution-layers/imperviousness

Urban Atlas, 10m (rasterised)



https://land.copernicus.eu/local/urban-atlas

SDG indicator analysis – 11.3.1

Land consumption rate to population growth rate

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 m^2/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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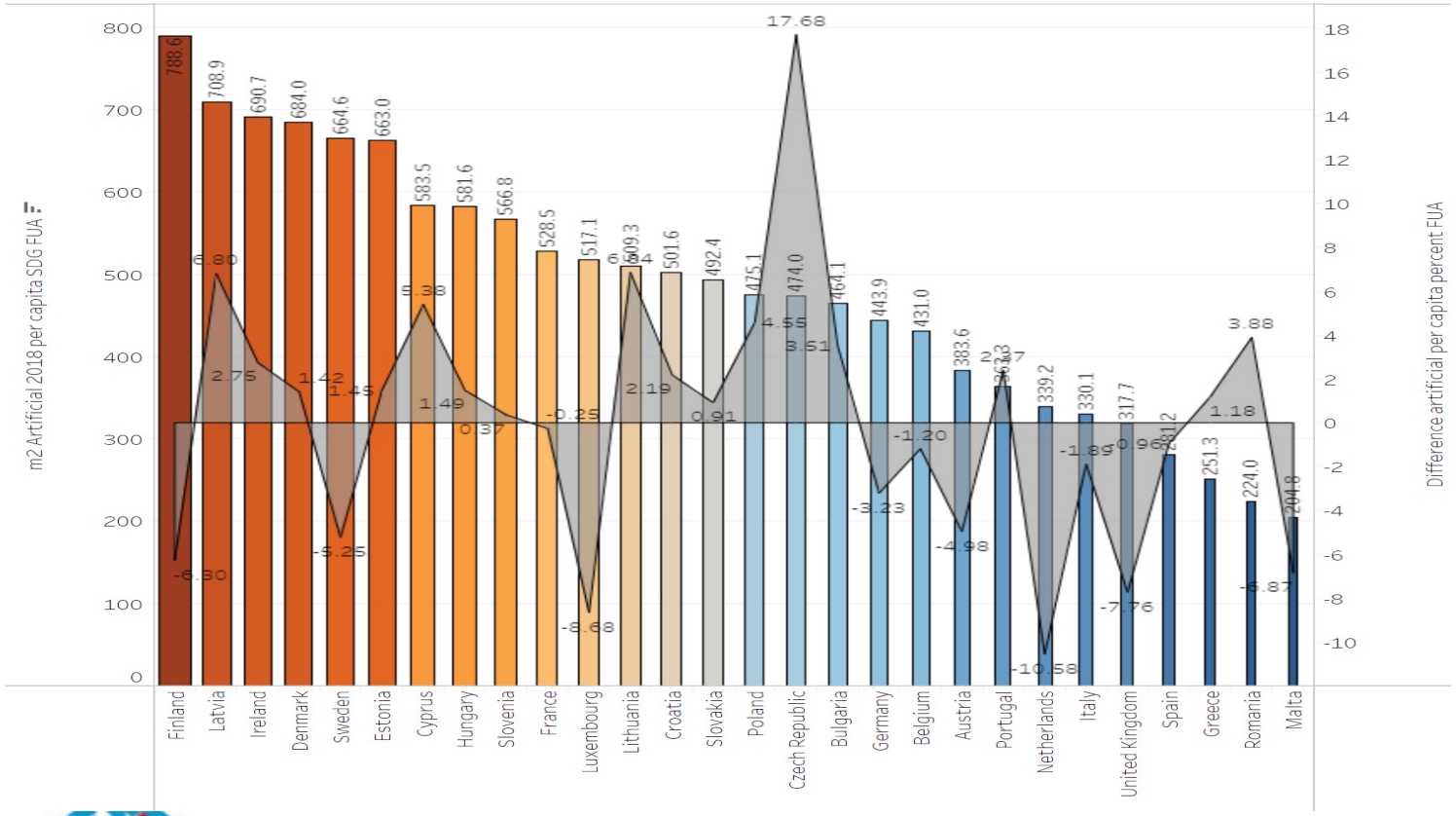
Land consumption rate to population growth rate

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

https://www.eea.europa.eu/data-and-maps/dashboards/land-use-efficiency-in-functional

SDG indicator analysis – 11.3.1

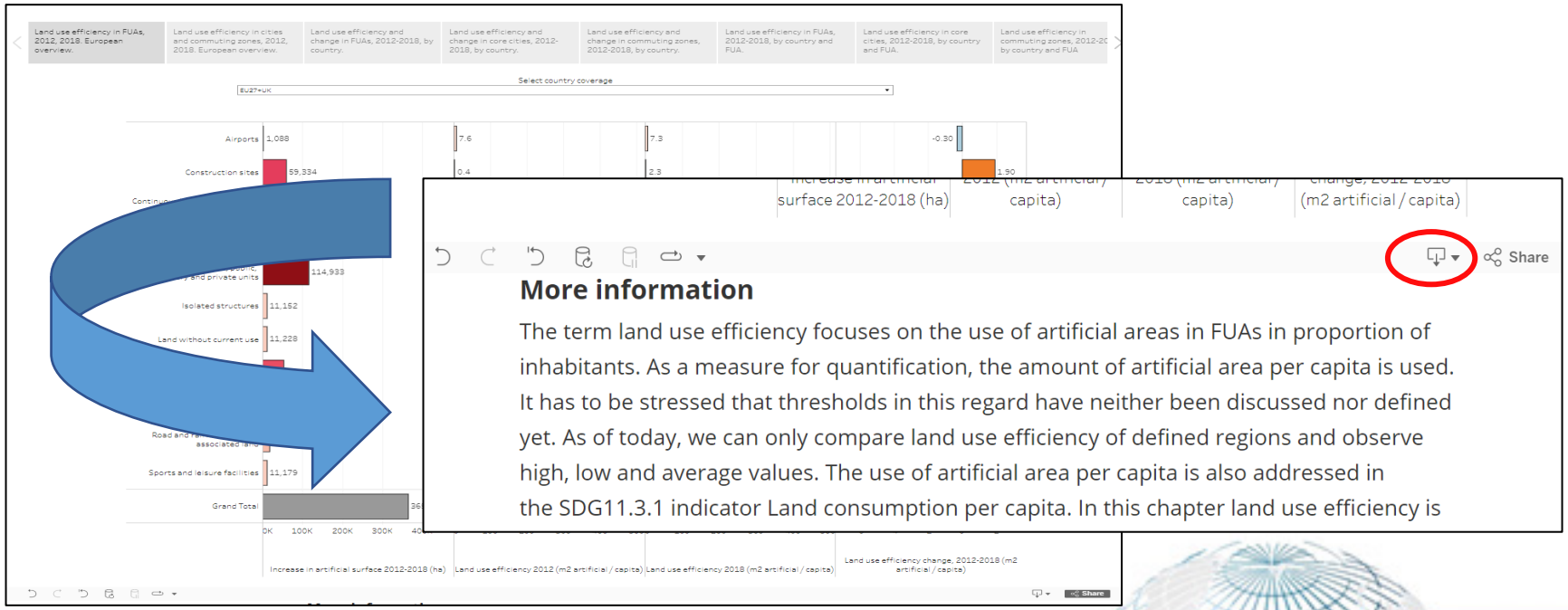
Land consumption rate to population growth rate

FINDINGS – accessable statistics

Visit the related dashboard:

https://www.eea.europa.eu/data-and-maps/dashboards/land-use-efficiency-in-functional

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



SDG indicator analysis – 11.3.1

Land consumption rate to population growth rate

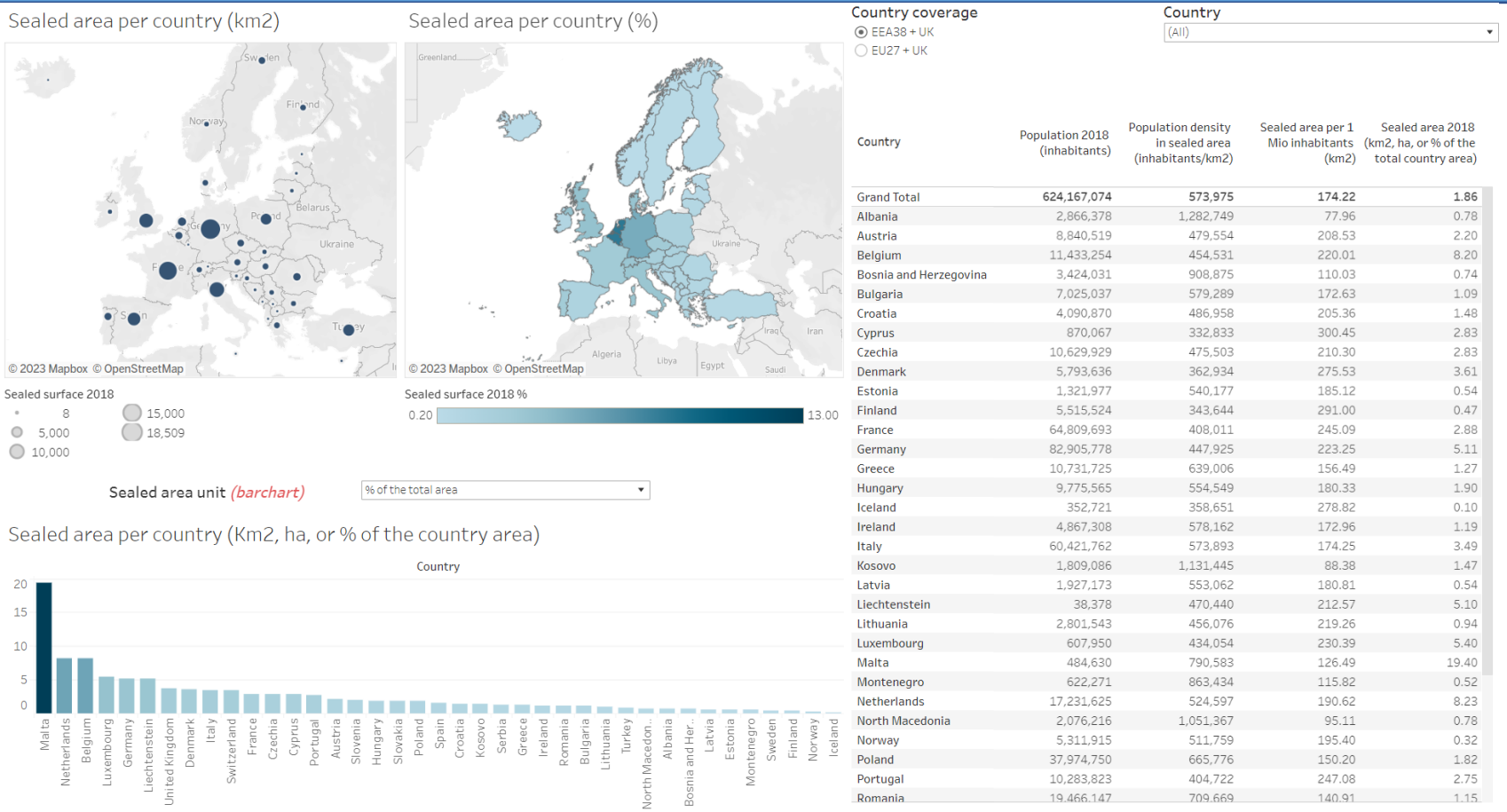
RECOMMENDATIONS

- **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 ration 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



Country coverage
- EEA38 + UK
- EU27 + UK

Country: (All)

Country	Population 2018 (inhabitants)	Population density in sealed area (inhabitants/km2)	Sealed area per 1 Mio inhabitants (km2)	Sealed area 2018 (km2, ha, or % of the total country area)
Grand Total	**624,167,074**	**573,975**	**174.22**	**1.86**
Albania	2,866,378	1,282,749	77.96	0.78
Austria	8,840,519	479,554	208.53	2.20
Belgium	11,433,254	454,531	220.01	8.20
Bosnia and Herzegovina	3,424,031	908,875	110.03	0.74
Bulgaria	7,025,037	579,289	172.63	1.09
Croatia	4,090,870	486,958	205.36	1.48
Cyprus	870,067	332,833	300.45	2.83
Czechia	10,629,929	475,503	210.30	2.83
Denmark	5,793,636	362,934	275.53	3.61
Estonia	1,321,977	540,177	185.12	0.54
Finland	5,515,524	343,644	291.00	0.47
France	64,809,693	408,011	245.09	2.88
Germany	82,905,778	447,925	223.25	5.11
Greece	10,731,725	639,006	156.49	1.27
Hungary	9,775,565	554,549	180.33	1.90
Iceland	352,721	358,651	278.82	0.10
Ireland	4,867,308	578,162	172.96	1.19
Italy	60,421,762	573,893	174.25	3.49
Kosovo	1,809,086	1,131,445	88.38	1.47
Latvia	1,927,173	553,062	180.81	0.54
Liechtenstein	38,378	470,440	212.57	5.10
Lithuania	2,801,543	456,076	219.26	0.94
Luxembourg	607,950	434,054	230.39	5.40
Malta	484,630	790,583	126.49	19.40
Montenegro	622,271	863,434	115.82	0.52
Netherlands	17,231,625	524,597	190.62	8.23
North Macedonia	2,076,216	1,051,367	95.11	0.78
Norway	5,311,915	511,759	195.40	0.32
Poland	37,974,750	665,776	150.20	1.82
Portugal	10,283,823	404,722	247.08	2.75
Romania	19,466,147	709,669	140.91	1.15

https://www.eea.europa.eu/data-and-maps/dashboards/soil-sealing-and-ecosystem-impacts

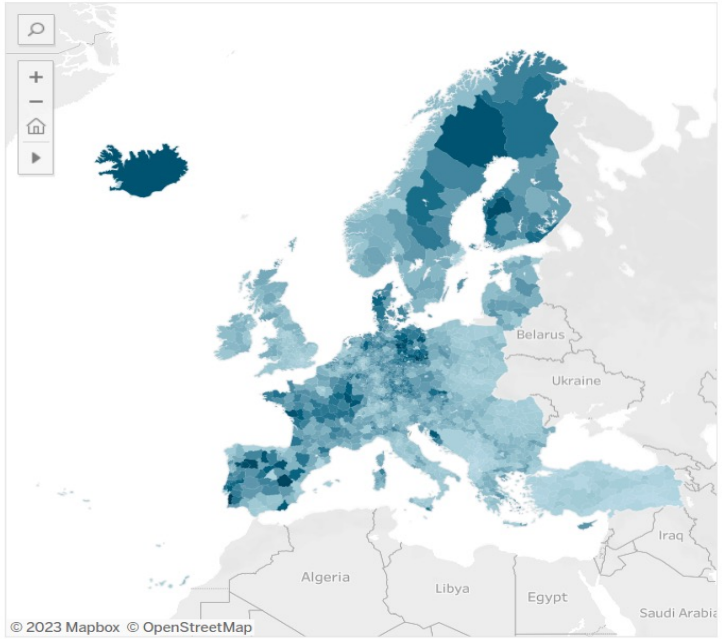
Further assessment – SDG 11.3.1, extending the framework

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

Country coverage
EEA38 + UK

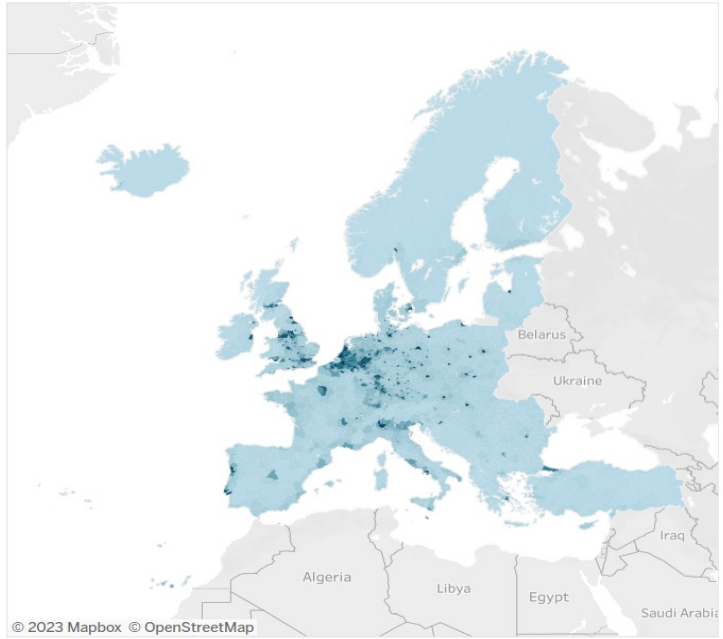
Country
(All)

Sealed area per capita.



Sealed area per 1 Mio inhabitants (km2)
34.1 576.3

Sealed area (% of the total NUTS3 area)



Sealed area (% of the total NUTS3 area)
0.05 18.00

https://www.eea.europa.eu/data-and-maps/dashboards/soil-sealing-and-ecosystem-impacts

Further assessment – SDG 11.3.1, extending the framework

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

Country coverage
(No data available for Turkey)
EEA38 + UK

Sealed area unit
(km2, ha, or % of the degree of urbanization classes total area)
% (total area)

Country
(All)

Sealed area in degree of urbanization classes *% (total area), EEA38 + UK*

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

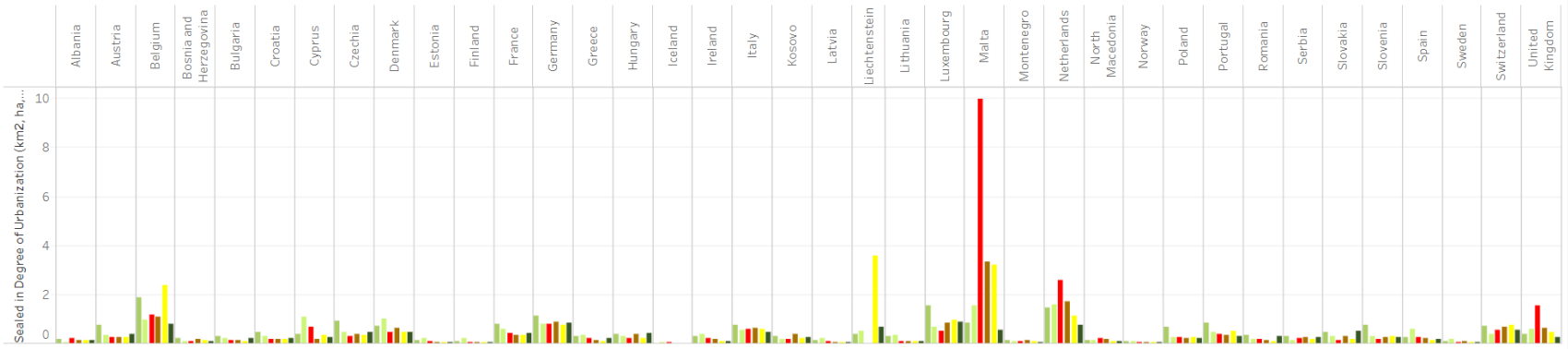
Sealed in degree of urbanization (km2, ha, or % of the degree of urbanization total area)

Degreee of urbanization
- Dispersed rural areas
- Mostly uninhabitated areas
- Cities
- Towns
- Suburbs
- Villages

Degree of urbanization classes total area (km2) and sealed area % (total area), EEA38 + UK (*)

	Area in km²	Sealed area in degree of urbanization (km2, ha, or % of the degree of urbanization total area)
Mostly uninhabitated areas	4,230,493	0.39
Dispersed rural areas	552,557	0.46
Villages	94,167	0.27
Suburbs	76,105	0.27
Towns	49,840	0.29
Cities	42,740	0.35

Sealed area in degree of urbanization classes per country % (total area)



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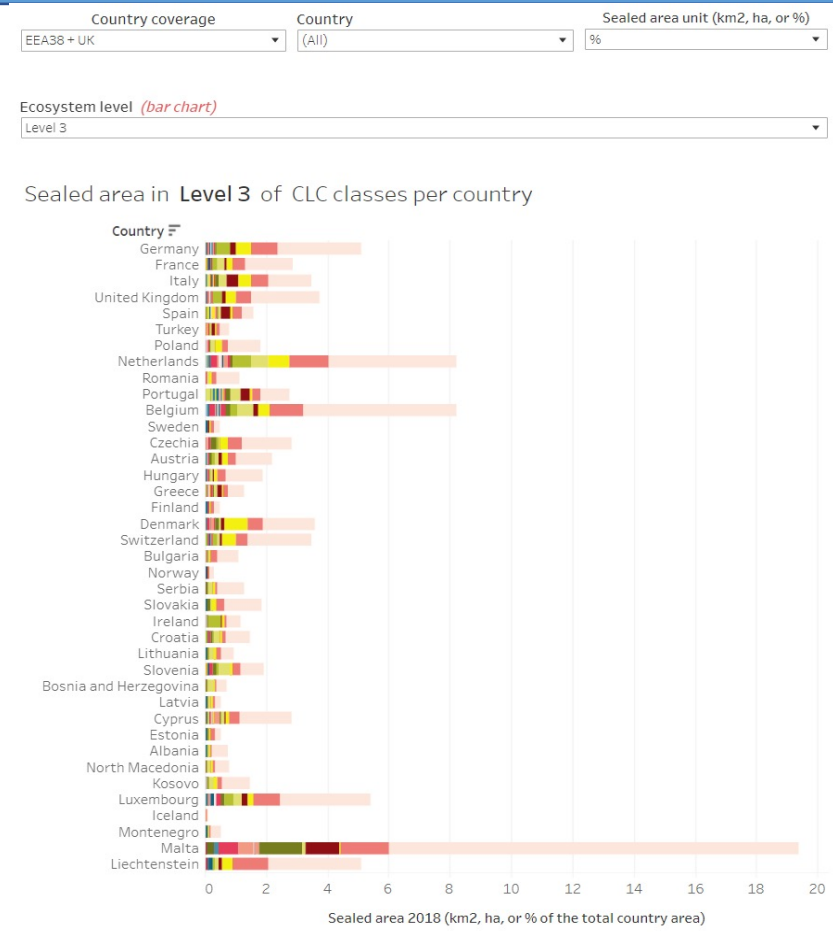
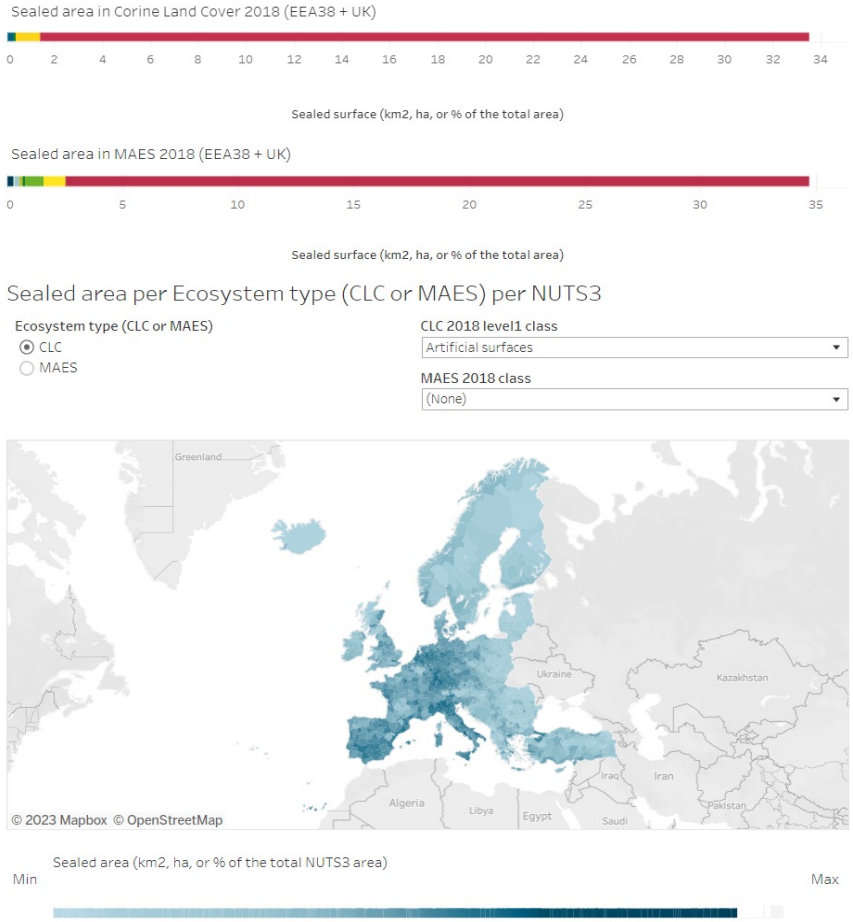
Further assessment – SDG 11.3.1, extending the framework

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





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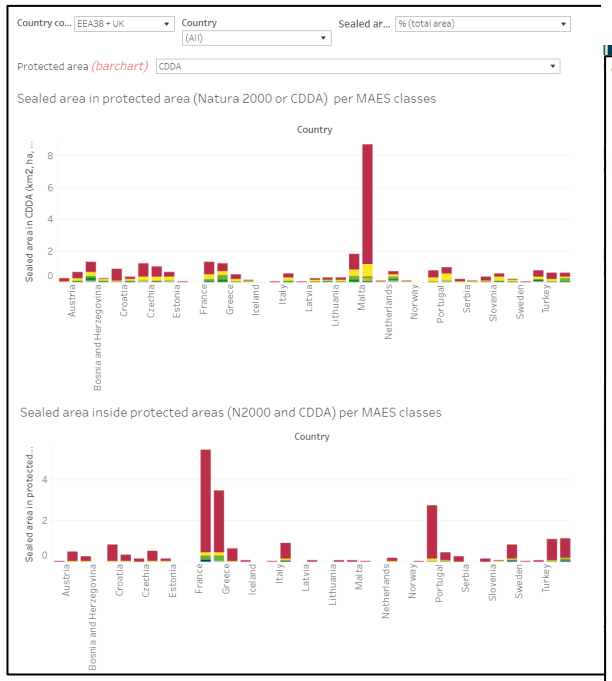
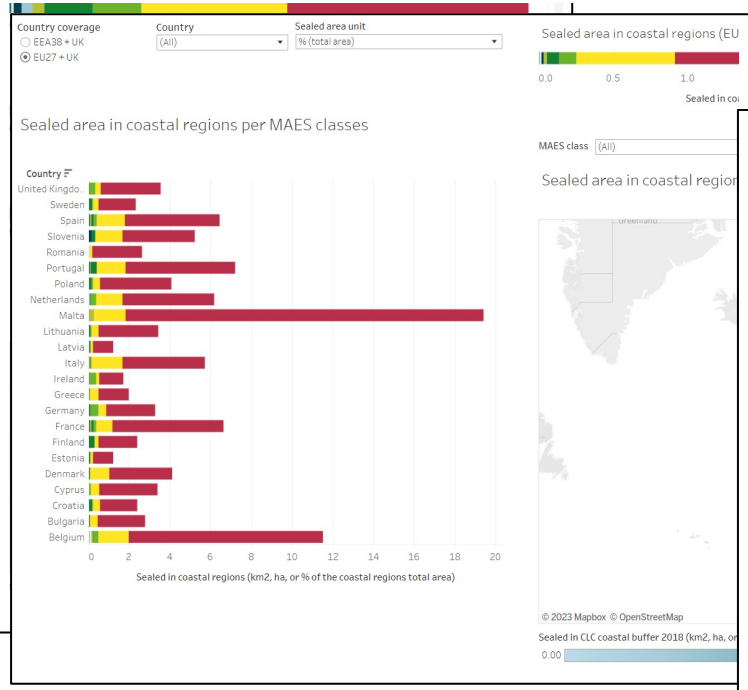
Further assessment – SDG 11.3.1, extending the framework

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

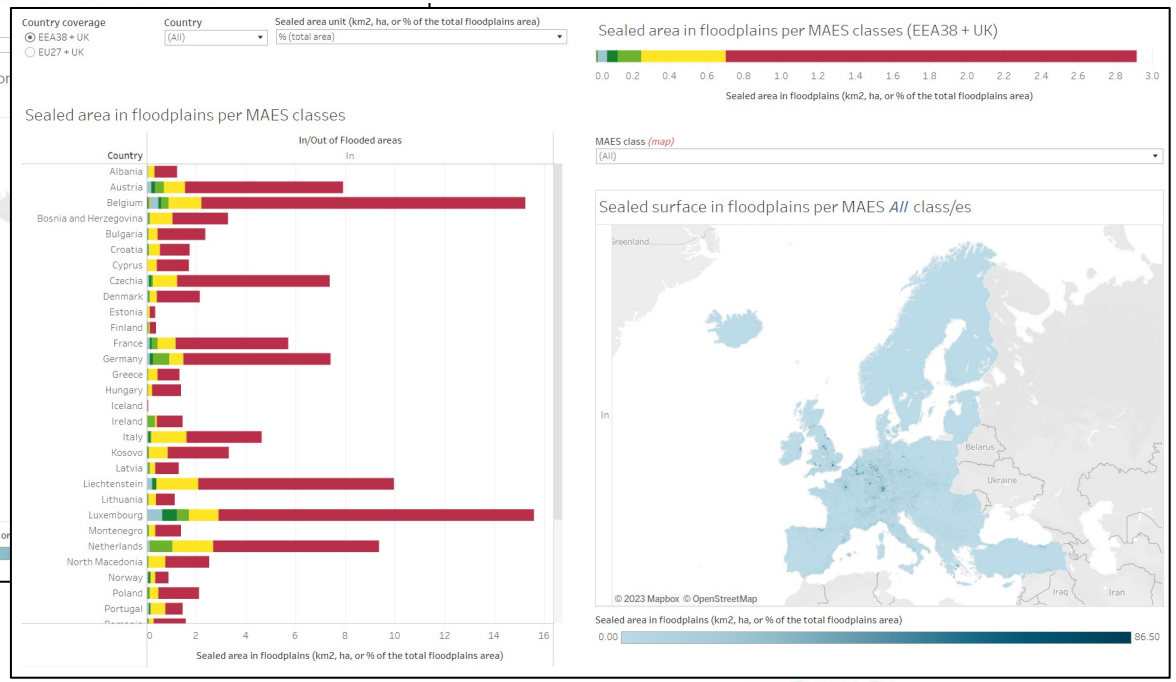
protected areas



coastal regions



floodplains



https://www.eea.europa.eu/data-and-maps/dashboards/soil-sealing-and-ecosystem-impacts

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

- SDG 11.3.1 global metadata: https://unstats.un.org/sdgs/metadata/files/Metadata-11-03-01.pdf
- UN-GGIM Europe, working group of data integration: https://un-ggim-europe.org/wp-content/uploads/2022/01/1131_UNGGIM_Europe_WG_DataIntegration_SWG1_SDG_IndicatorCalculation-and-Recommendations.pdf
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- Soil sealing and ecosystem impacts, EEA dashboard: https://www.eea.europa.eu/data-and-maps/dashboards/soil-sealing-and-ecosystem-impacts

THANK YOU!

Questions?

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