Swedish examples on 11.2.1, 11.3.1 and 11.7.1

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SDG Indicator Tests by Countries in Europe

- GEOSTAT 3: ESS Project with a purpose to guide countries in Europe how to implement the Global Statistical Geospatial Framework AND to test the how the framework helps in producing SDG indicators
- Statistics Sweden has tested indicators 11.2.1, 11.3.1 and 11.7.1
- Supported also by UN-GGIM: Europe Working Group on Integration, testing 11.2.1, 11.3.1, 11.7.1 and 15.1.1

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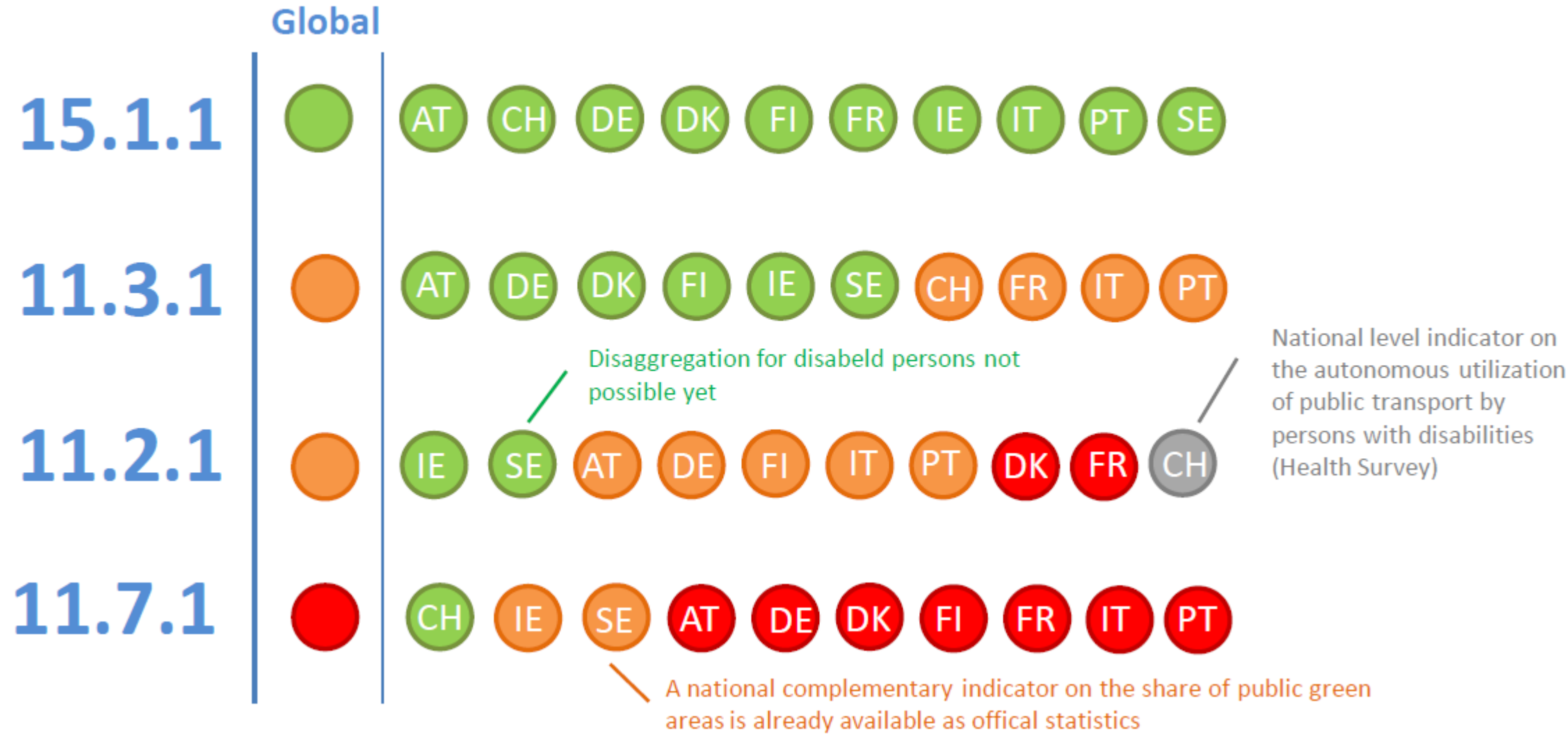
Assessment by UN-GGIM: Europe



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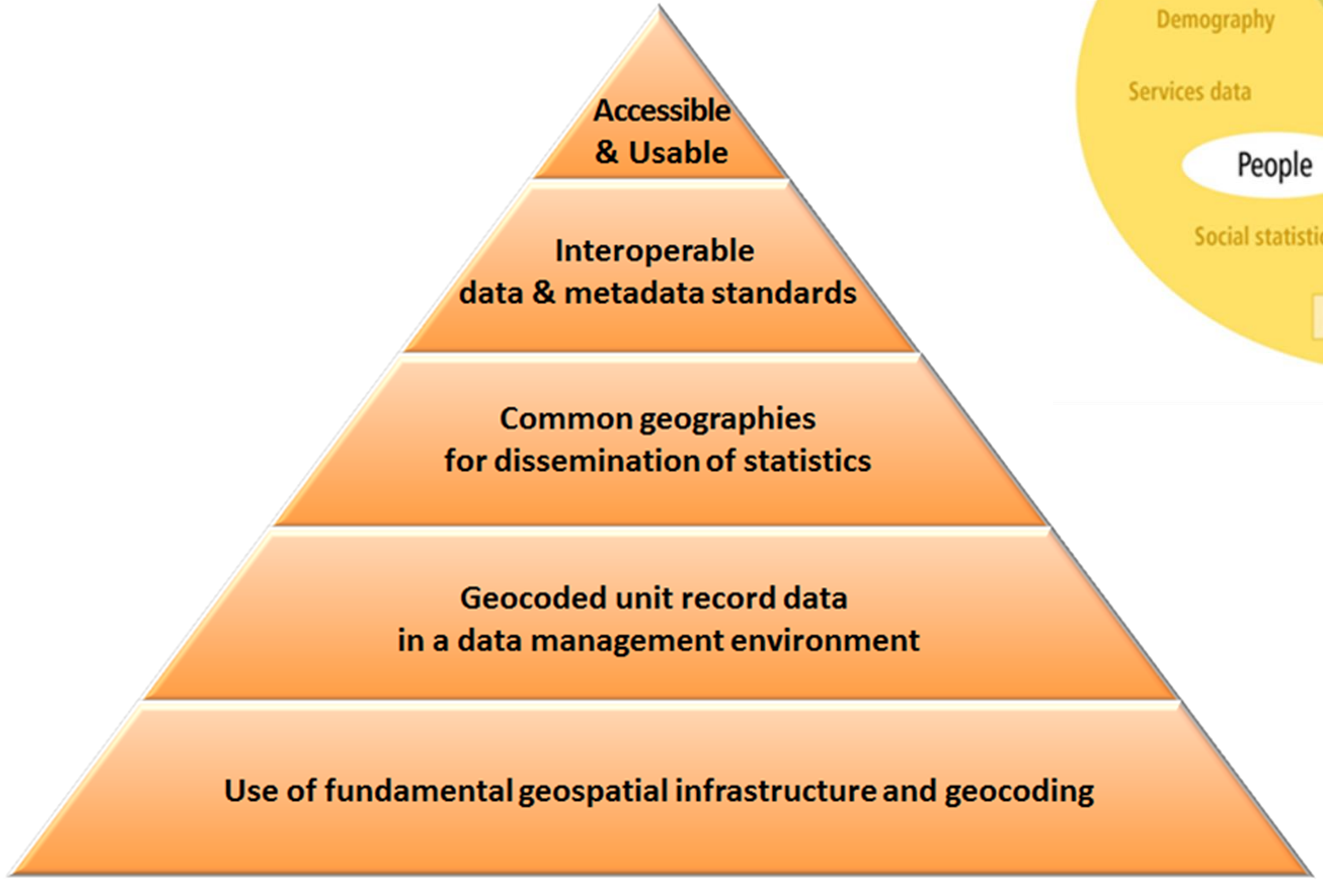
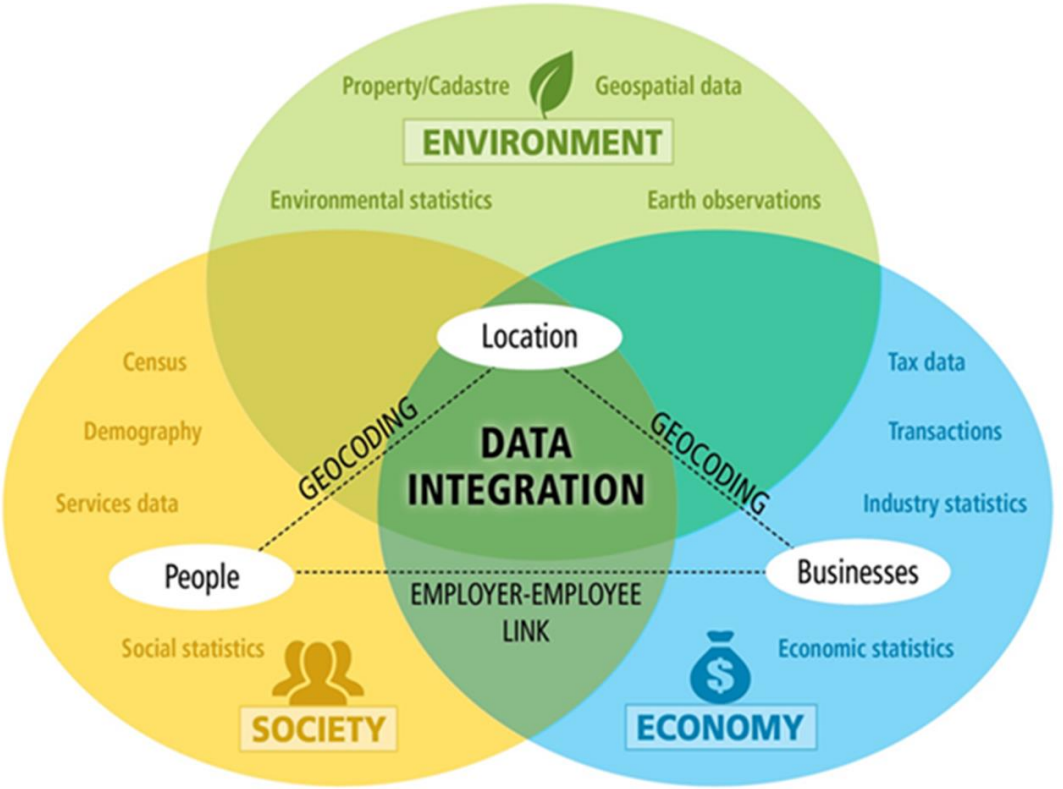
The Global Statistical Geospatial Framework

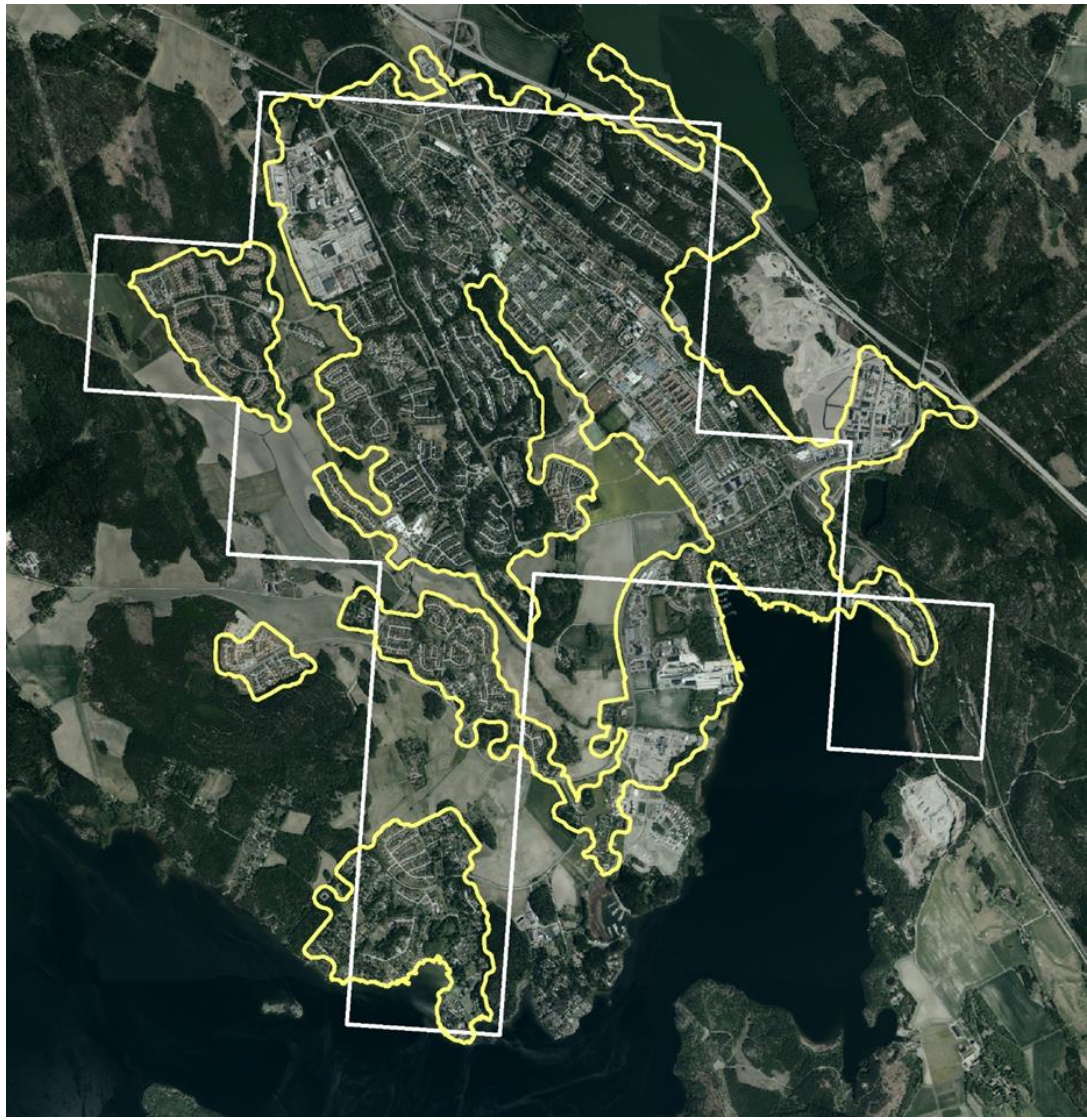




Indicator 11.2.1, Access to public transport

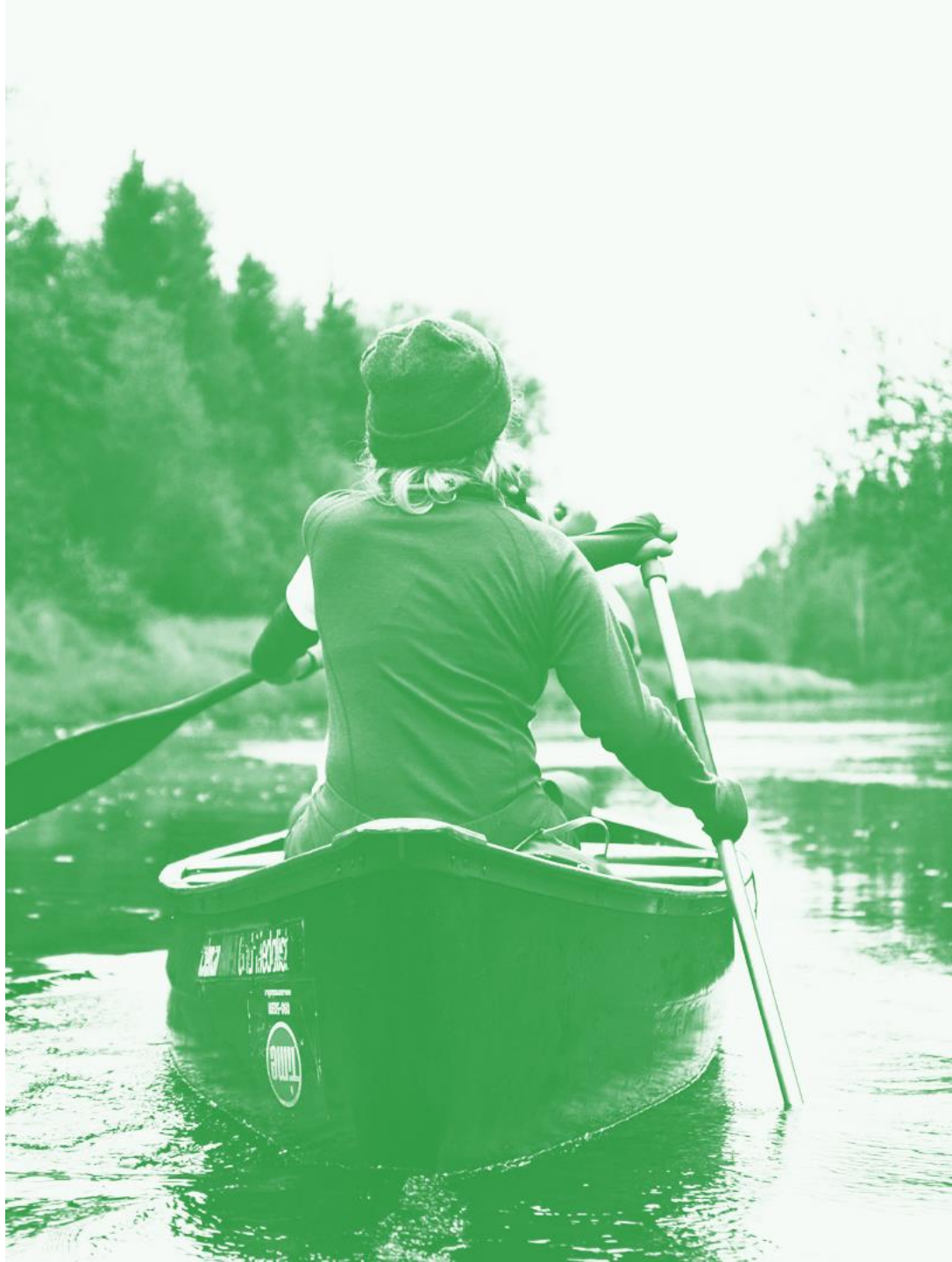
11.2.1: Data and Methods

- Data coming from national authorities, Eurostat and open access data on public transport stops
- Comparing results of National delineations of localities and European urban clusters
- Comparing different network calculation methods



Workflow

- Geocoding population data
- Delimitation of urban agglomerations
- Selection and preparation of public transportation stops
- Computation of service areas
- Calculation of the population within service areas



Test of different Geospatial Methods

Method	Pros	Cons
Method 1: Euclidian distance buffering	Easy to use, robust and fast.	Does not take barriers into account (e.g. a buffers crossing water, railways etc), resulting in overestimation of the population with convenient access to public transportation
Method 2: Network distance measurement	If street network is complete and includes walkways and bicycle lanes, distance calculations are very accurate and close to truth.	If street network is not complete, the calculations will most likely underestimate the population with convenient access to public transportation. Very demanding and complex calculations.

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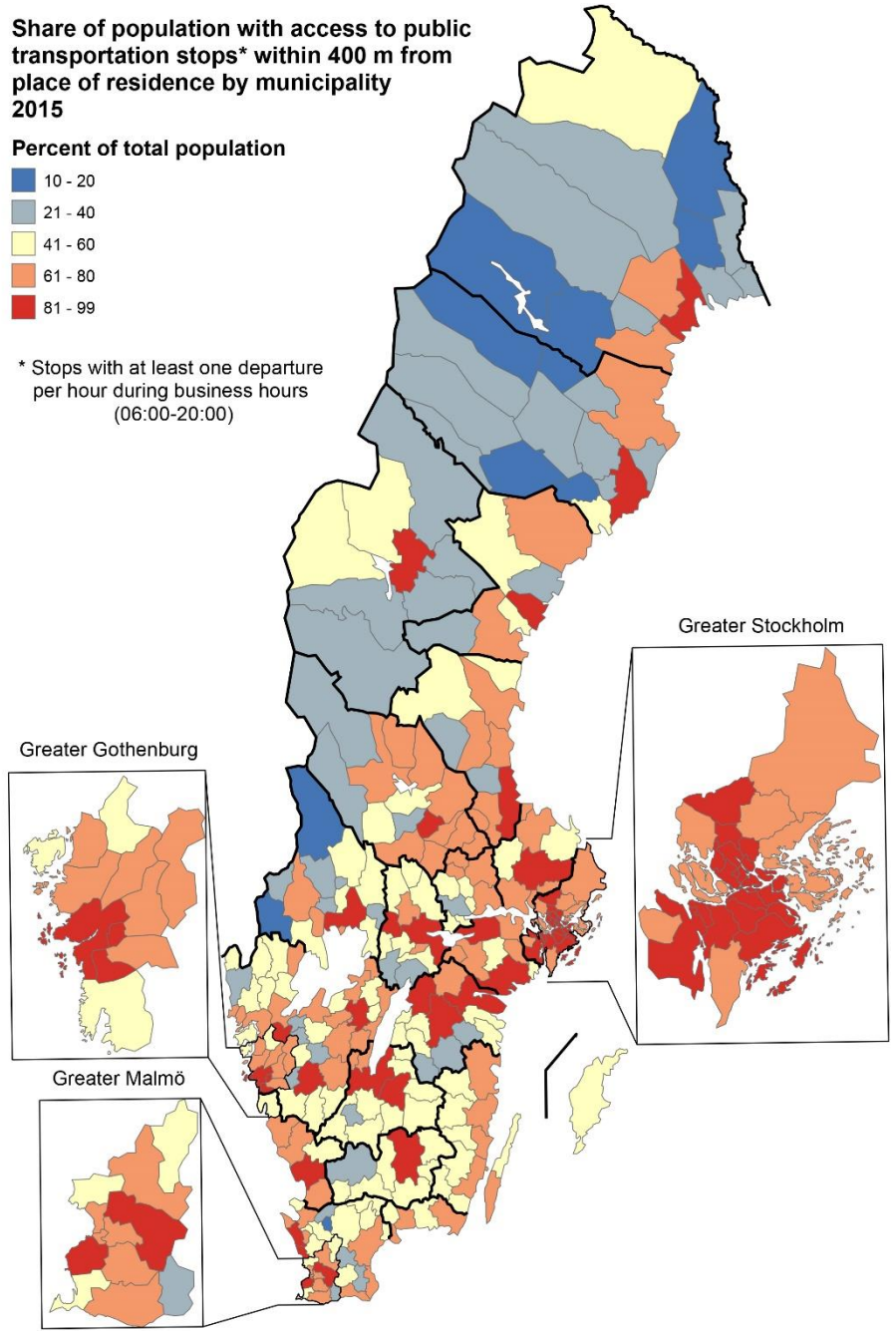
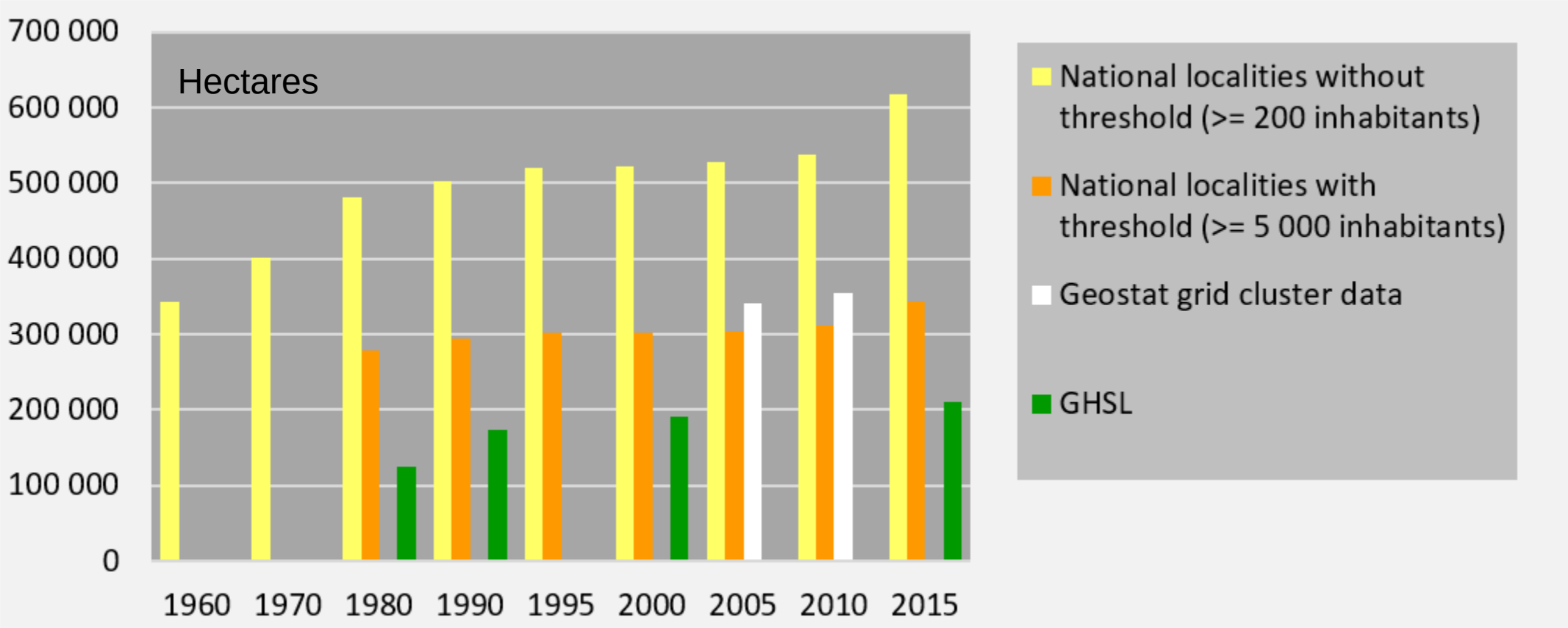
Population within 500 meters from public transport stop 2015

	In urban areas	Outside urban areas	Total
Women	89,6	20,4	81,1
Men	88,9	20,1	79,5
Total	89,3	20,2	80,3



Indicator 11.3.1, Ratio of land consumption rate to population growth

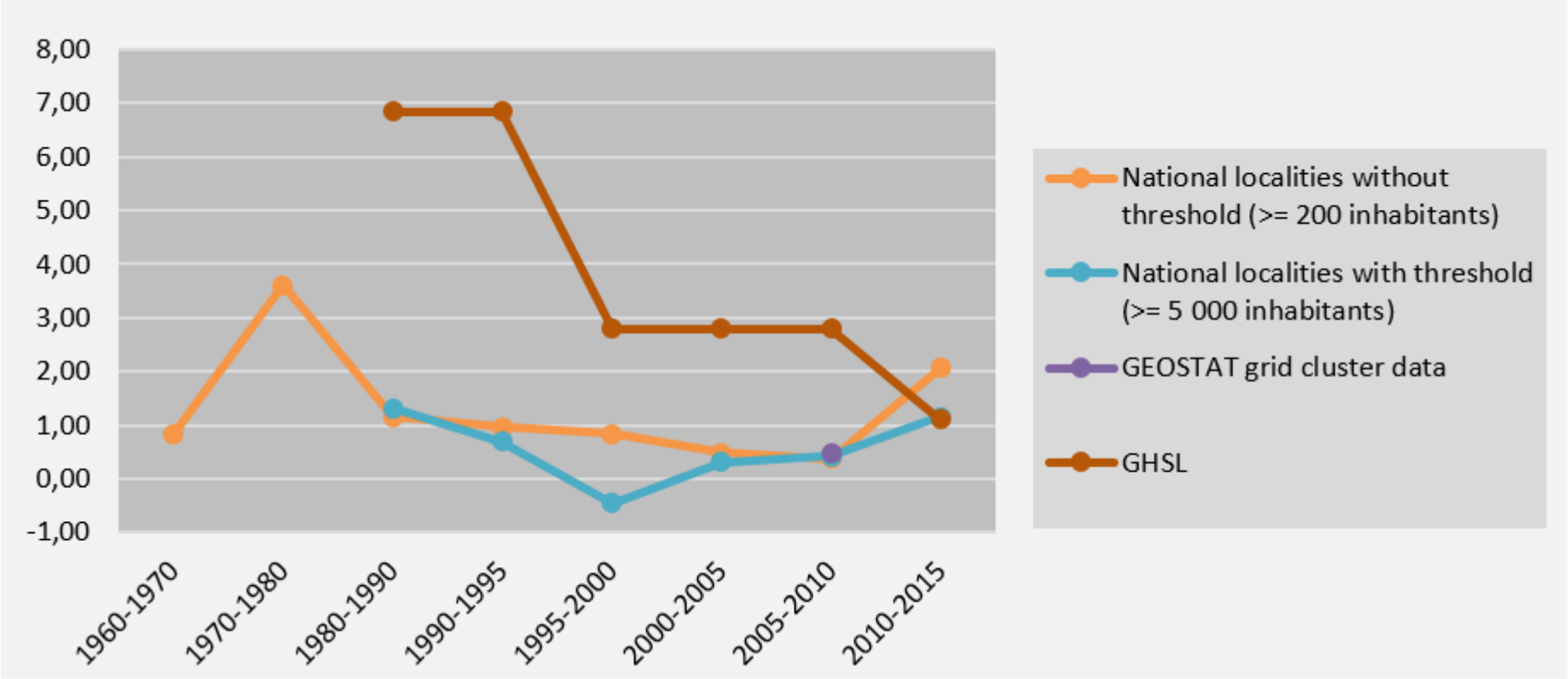
Calculation of total urban land area



Calculating population within urban agglomerations

- National localities: official statistics of population within the localities;
- GEOSTAT grid cluster data: the populations value of each grid;
- GHSL: the official statistics of the total population of Sweden.

Method 1: UN-Habitat LCRPGR



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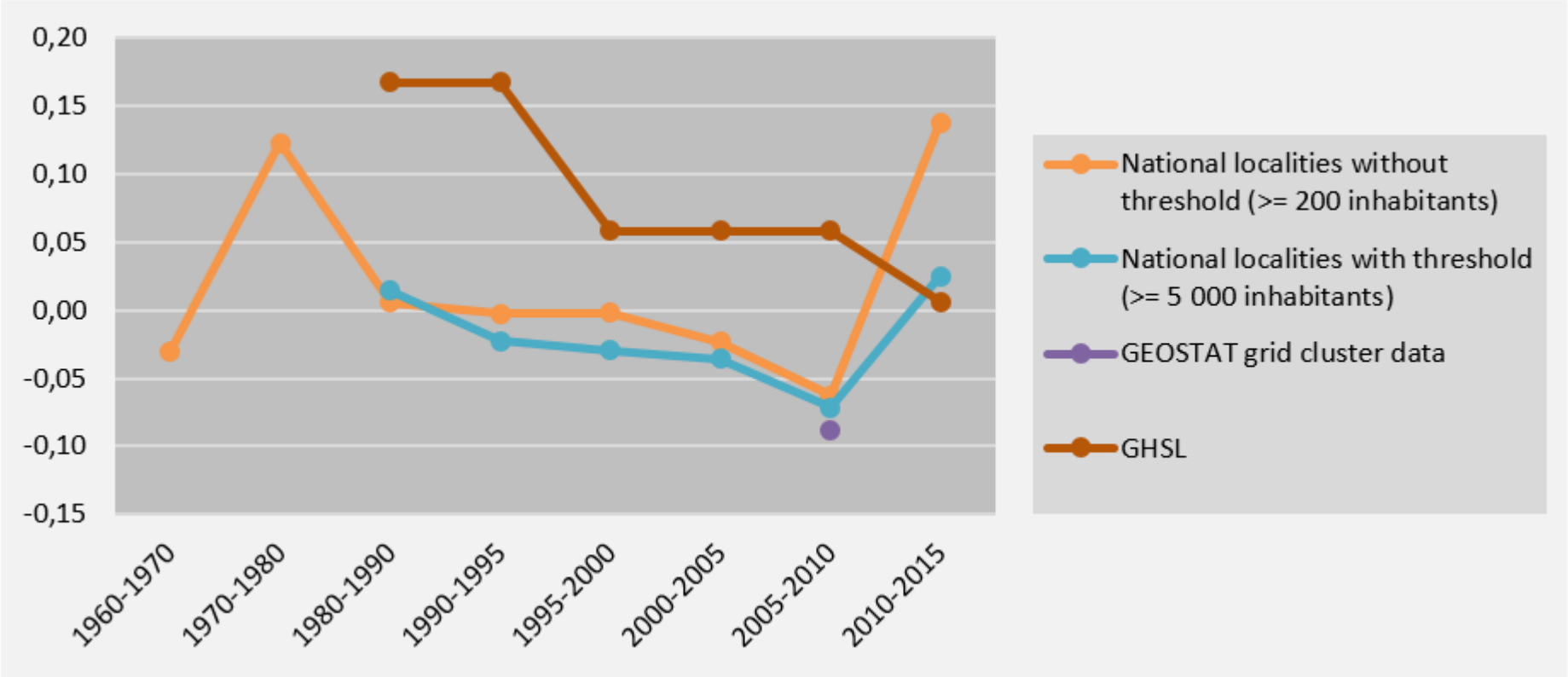
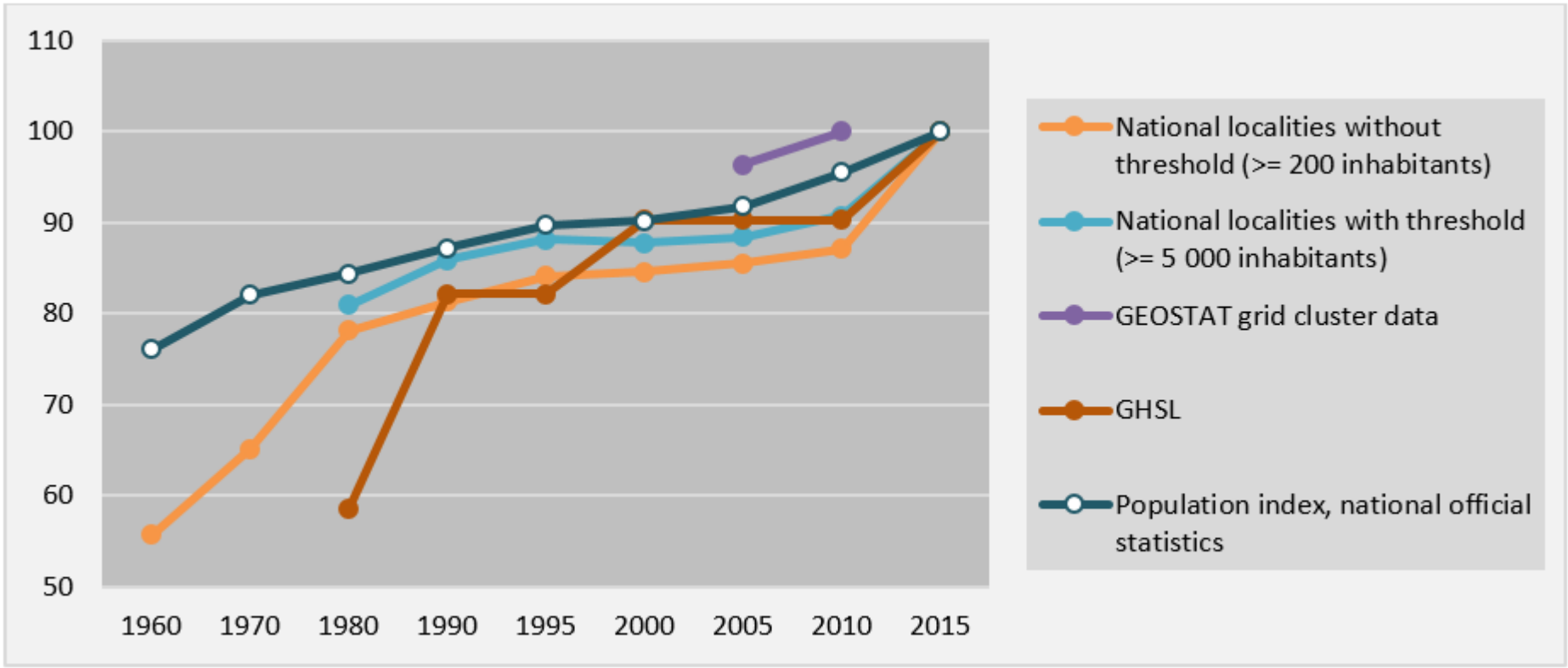
The Ratio between the land use growth rate and population growth rate

Method 2: JRC Land Use Efficiency



Method 3: Index

(Population growth and Land consumption separately)



Conclusions

- The national data is the most detailed, both in terms of temporal and spatial resolution. However, methods and data quality of the national data have changed during these years, which must be considered when analysing the result.
- In terms of geospatial processing, indicator 11.3.1 is the least demanding of the three indicators being tested in GEOSTAT 3. Besides establishing figures for built-up land, this indicator does not require any further geospatial processing. The challenge is rather to find the most appropriate formula for calculation of the final result.

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Indicator 11.7.1, Average share of the built-up area of cities that is open space for public use for all

Testing two concepts

- The first concept is based on a National indicator approach, not following the UN Habitat metadata description, measuring;
  - the share of the built-up area of cities that is open ***green*** space for public use and
  - the share of the population with access to green areas within 200 meters from place of permanent dwelling.
- The second concept is aligned with the approach outlined in the UN Habitat metadata description, but uses partially other data sources than described in the metadata document.

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A lot of data sources are required

- Geographic delimitation of urban areas (‘localities’) following established national methodology (Statistics Sweden).
- Population data from the Population register geocoded to address point location (Statistics Sweden).
- EO data (multispectral SPOT 5, 10 m resolution) classified with segmentation and per pixel algorithms to produce an urban land cover map. EO based classification is enriched with data on building and street footprint.
- Cadastral parcels (polygons) from the authoritative National Cadastral Map (NMCA).

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A lot of data sources are required ctd

- Information from the Tax Assessment Register regarding ownership and type of Real Property (National Tax Administration).
- Topographic features (polygons) from the authoritative National Cadastral Map, such as airports, quarries, cemeteries, allotment gardens etc, (NMCA).
- Building features (polygons) from the authoritative National Cadastral Map (NMCA).
- Parcels with arable land and pasture from the LPIS (Swedish Board of Agriculture).
- Street network from the National Road Database (National Transport Administration).

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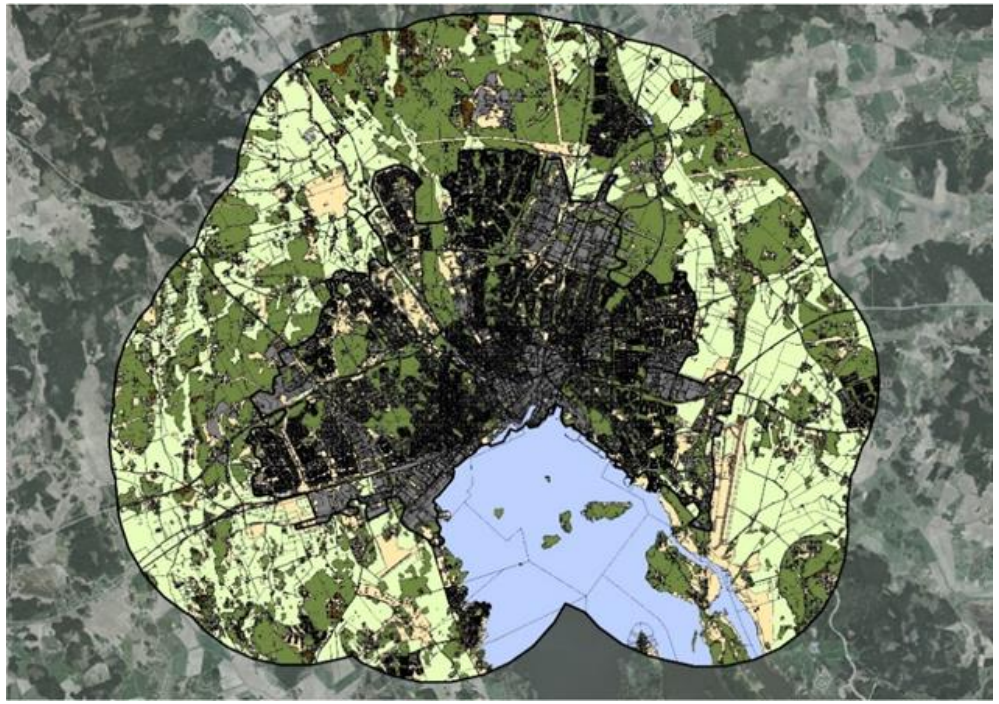
Workflow resulting in a ”Data cube”

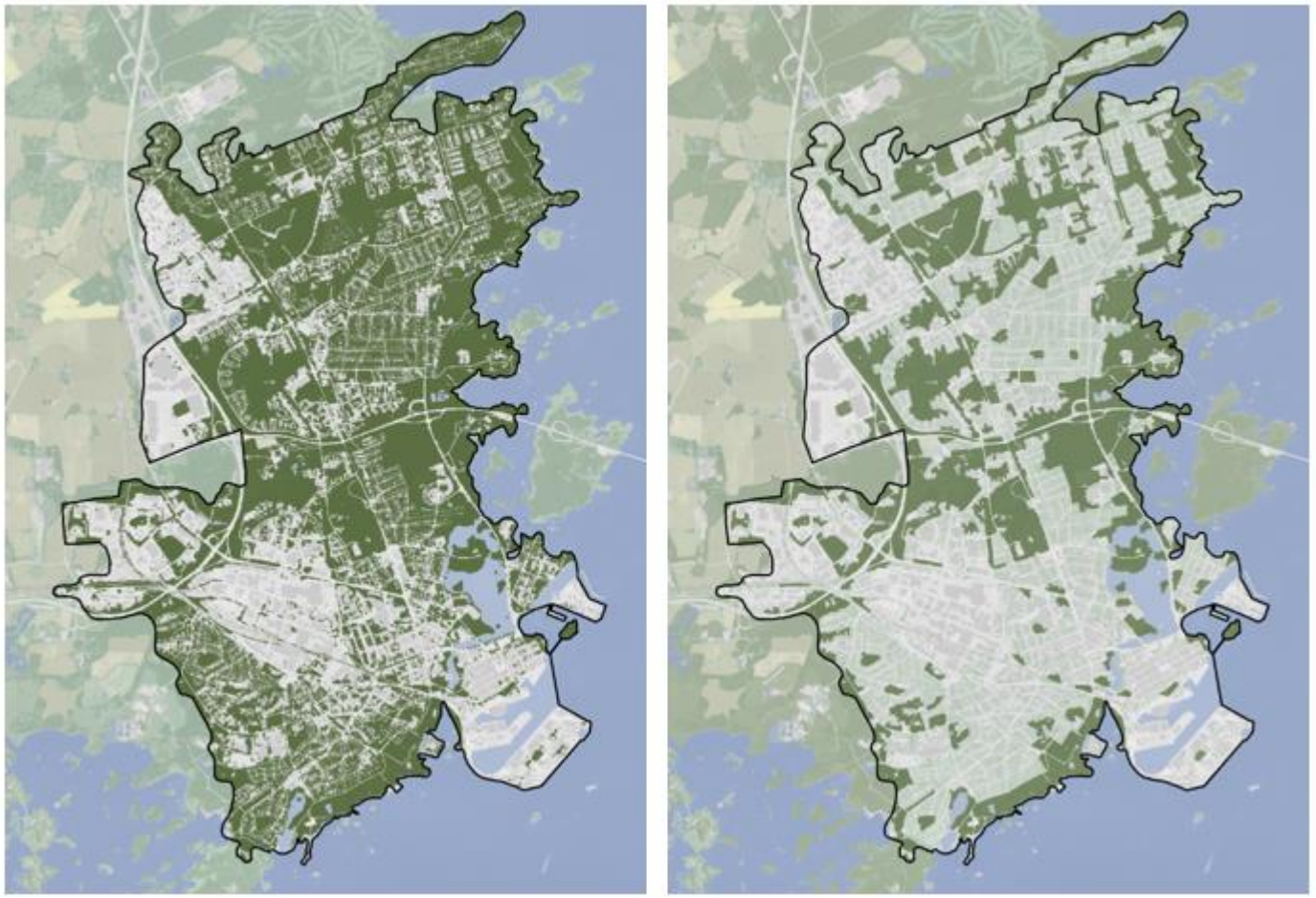
- Geocoding population data
- Delimitation of urban agglomerations
- Creation of urban land cover data
- Post-processing of urban land cover data



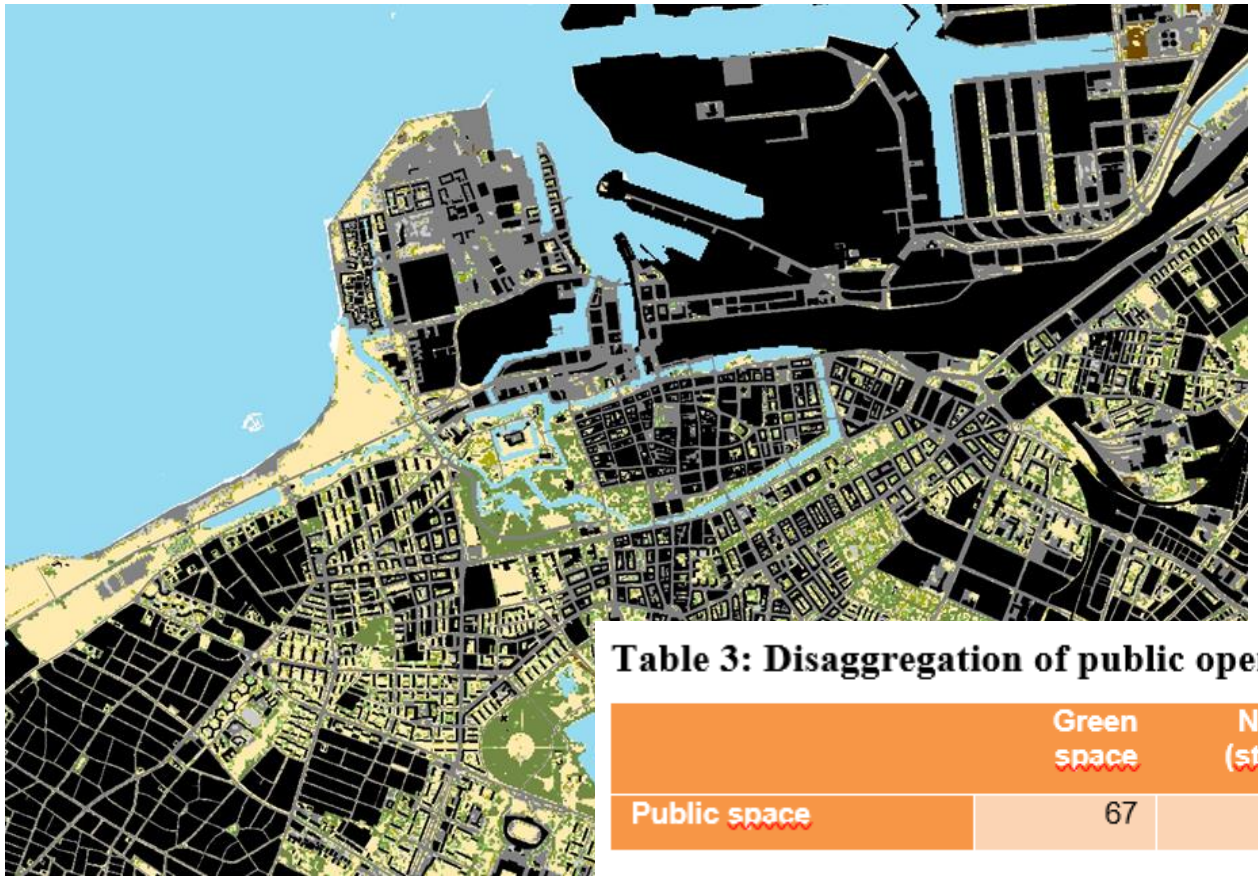
The result is a “data cube”, which holds information about each spatial object in three thematic layers:

- land cover (green space and impervious land)
- land use (airports, quarries or other restricted areas etc)
- fiscal information on ownership and type of real property (private vs public ownership and housing, industry, business etc)

Total green space / Public urban green areas



A subset of the city of Malmö showing public space vs non-public space



Non-public space indicated in black

Table 3: Disaggregation of public open space by category of open space

	Green space	Non-green space (streets excluded)	Streets	Total public space
Public space	67	21	12	100

The GSGF is useful when producing selected indicators

- Availability of authoritative, point-based location data for geocoding
- Availability of population data from administrative sources, enabling easy, annual updates of the indicator without having to use population estimations
- Use of point-of-entry validation of address information in population registry providing very good conditions for geocoding and few non-matching observations
- The framework does not support processing of Earth Observations, thus not sufficient for producing 11.7.1.

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More information: efgs.info/geostat

GEOSTAT 3 will submit a report to Eurostat in January 2019

Already avialable: Capability assessment by Statistics Sweden