Geospatial information for urban sustainable development goal monitoring

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Overview

• UN sustainable development goal 11
• Potential for use of geospatial information
• Data infrastructure prerequisites
• Use cases
• Conclusions and outlook
UN Sustainable Development Goal 11

- Make cities inclusive, safe, resilient and sustainable
- Amongst the targets and related indicators (extracts)
  - Provide access to safe, affordable, accessible and sustainable transport systems for all, ..., notably by expanding public transport,
    *Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities*
  - Provide universal access to safe, inclusive and accessible, green and public spaces,
    *Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities*
Potential for use of geospatial information

- **Public transport**: operationalise the concept of "convenient access", including the spatial distribution of this access
- **Green and public spaces**
  - Complement the indicator on share of open space with indicators relative to the location of population
- **In general**: take into account of the *spatial heterogeneity* of cities
  - In terms of population distribution
  - In terms of services provisions
General data infrastructure prerequisites

• Harmonised definition of **cities**: people-based definition (criteria of population size and density)
  • Based on regular population grid at 1 km² resolution
• Comparable **land use** data and compatible street network layout with adequate network segment attributes
  • Copernicus Urban Atlas; commercial street network or OSM network
• High-resolution **population** distribution data
  • Downscaled using Urban Atlas and building footprint data
Use case 1: access to public transport

- Convenient access to public transport
  - Access point within walking distance
    - 5 minutes walking to bus or tram stop
    - 10 minutes walking to metro or rail station
  - Taking into account the level of service offered at these points
    - Number of departures per hour
- Combination with population distribution provides summary metrics at city level
Metrics on access to public transport

- Population-weighted median number of departures available within walking distance
- Classification of population according to the level of access found in their neighbourhood
- Classification of workplace-based employment is possible if high-resolution employment distribution data are available
Further developments

- Assess accessibility to population (alternatively: employment) in cities by using public transport
  - Origin-destination travel time calculations between all building blocks of a city
  - Intervals between service departures are modelled by repeating the calculations every quarter of an hour during a two-hour peak period
- Results are scalable from building block level to city level
- Absolute number of people accessible within 45 minutes; share of accessible city population; comparison with accessibility by walking or in straight line
Helsinki: population and employment accessible within 45 minutes by public transport
Use case 2: access to green urban areas

- Copernicus Urban Atlas selection of green urban areas and forests
- Assessment of surface of green available within walking distance from each inhabited Urban Atlas polygon (building block)
- Aggregation at city level is weighted by spatial population distribution: population-weighted median surface of nearby green urban areas
Results for European cities

• Complementarity relative to the simple share of green urban areas
• Also allows for an assessment of the equity of spatial distribution of green areas relative to population
Distribution of population according to the surface area of nearby green areas in selected large capital cities
Conclusions and outlook

- Geospatial indicators add insight next to the official SDG indicator list
  - Spatially scalable (neighbourhoods, communities inside cities)
  - Aggregates at city level can be designed to reflect the spatial patterns
- Some challenges regarding the extension of the methodologies
  - Openness and availability of data, especially on public transport
  - More thematic precision needed on public access to open space
  - Local, timely data on population breakdown by age, gender, disabilities may be problematic
References