Identification of specific areas within provincial capital cities and their functional areas in terms of the demographic and economic situation of their inhabitants - GIS-based spatial analysis

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Purpose

1. Identify and monitor the social and economic spatial structure within the cities and their surroundings
2. Identifying special zones in terms of:
   - The **age structure** of the population with particular emphasis on indicators characterizing the ageing of the population
   - The **economic structure** of the residents
3. Provide as detailed information as possible for the local authorities and researchers

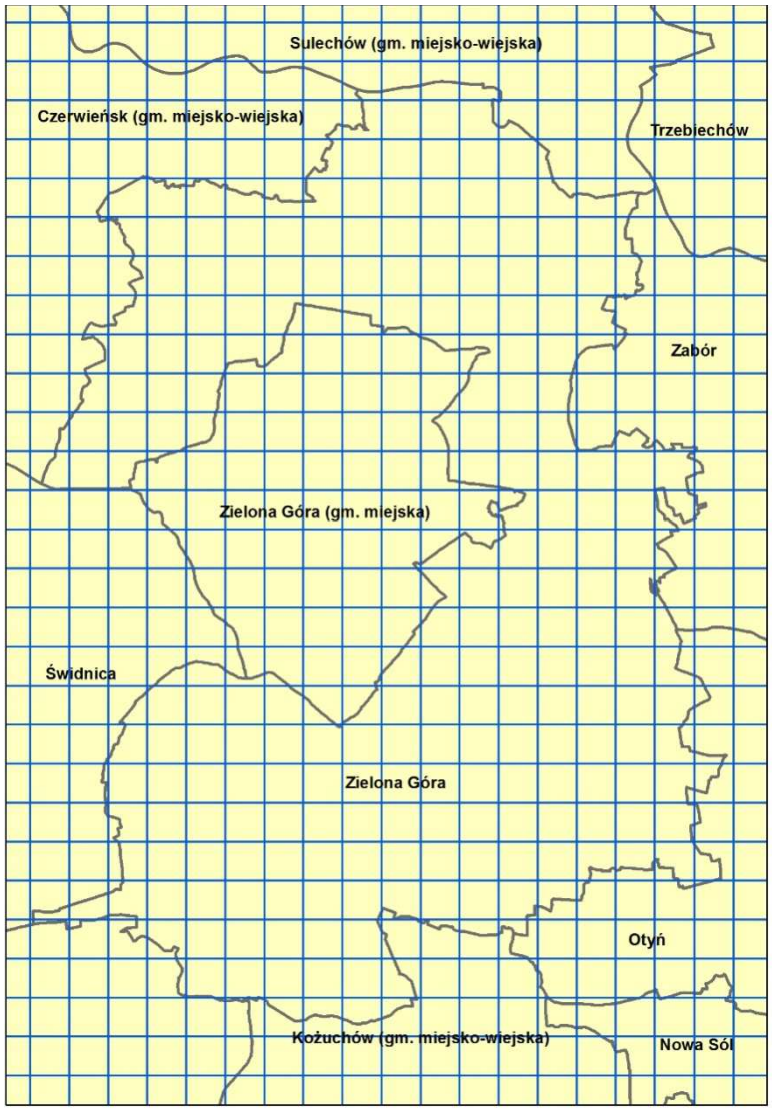
Data

1. Reference period
   - 2011
2. Data source
   - Information collected during the 2011 Census
3. Spatial scope
   - Provincial cities with their functional areas
   - Framework: a grid of **500m x 500m squares**

Source data

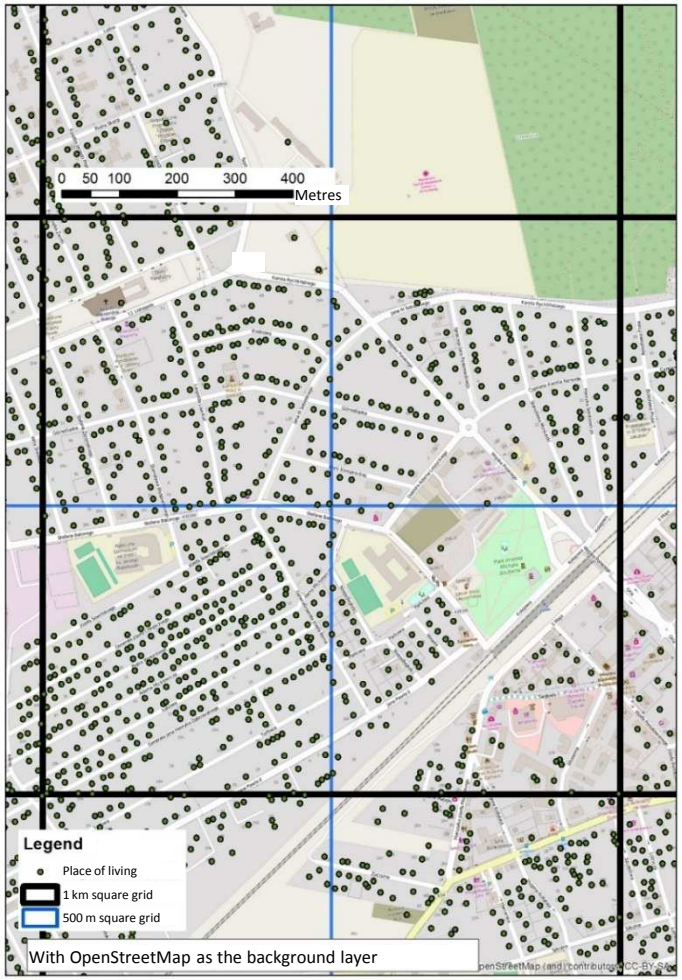
Spatial data:

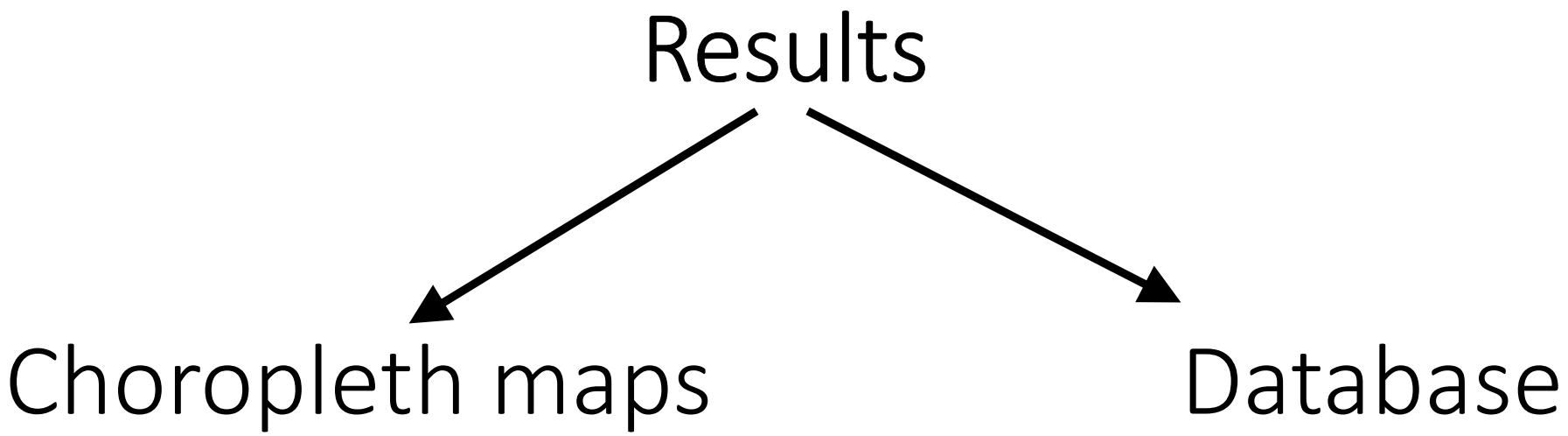
- 1km x 1km grid of squares acquired from the European Forum for Geography and Statistics
  - Spatial reference system: The Lambert azimuthal equal-area projection (ETRS 1989 LAEA)



Data processing

- Creation of a grid of 500m x 500m squares



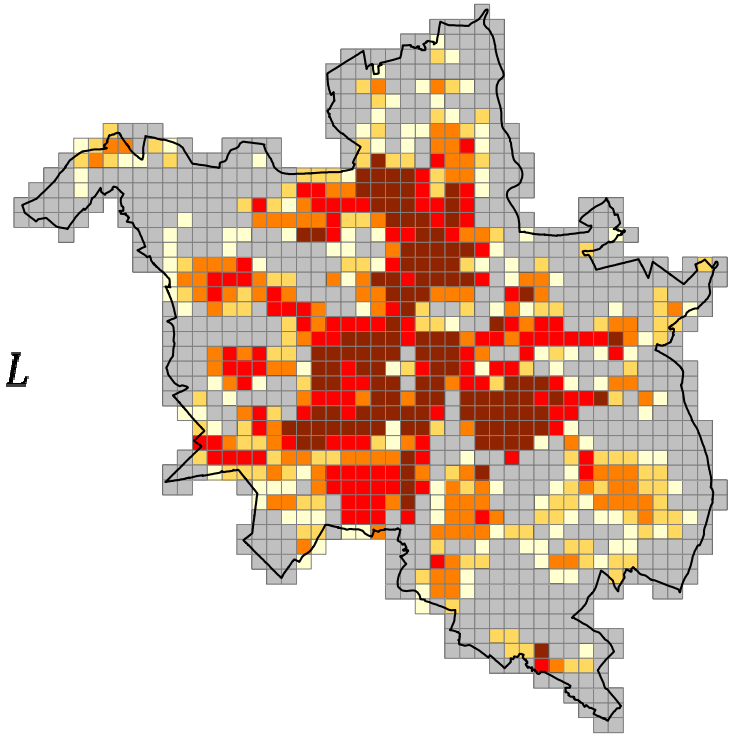

Results
Choropleth maps
Database

The demographic indices and age structure

Indicators for territorial policies: closing data gaps by using traditional and new sources and methods

Population

L

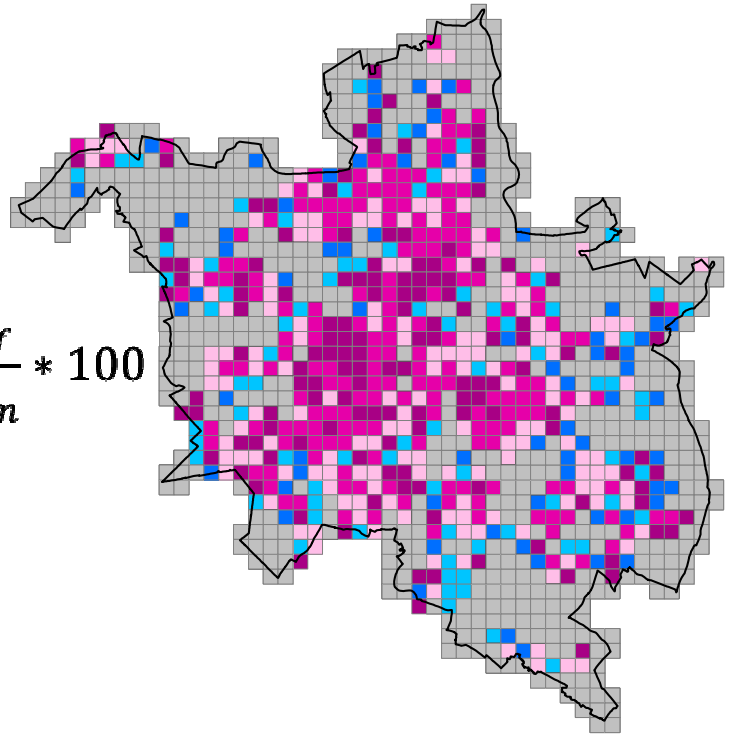


In person:
- 1538 and more
- 451 - 1537
- 188 - 450
- 58 - 187
- 11 - 57

Area excluded from the research
Administrative border

Feminisation

$\frac{L_f}{L_m} * 100$



Number of women per 100 men:
- 121 and more
- 111 - 120
- 101 - 110
- 91 - 100
- 90 and less

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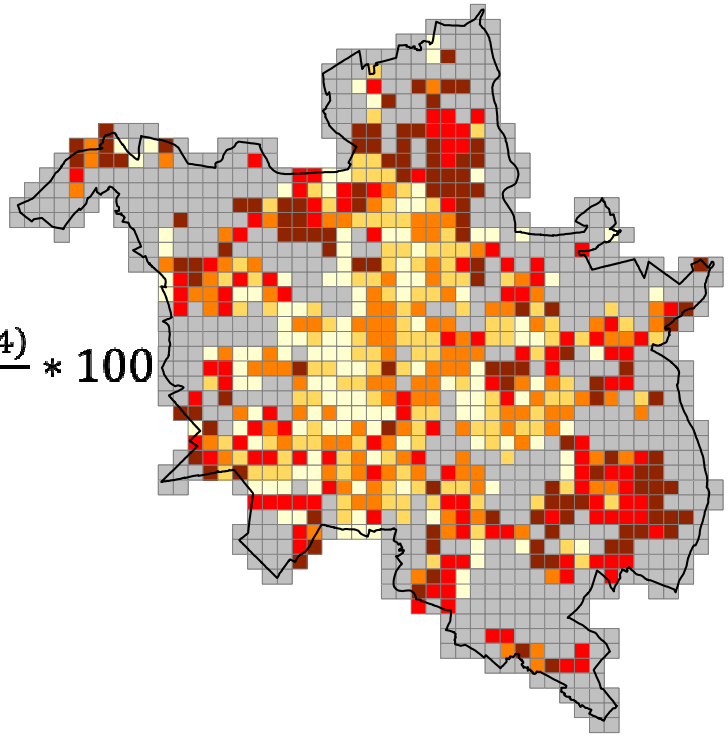
The percentage of people aged 0-14

$$\frac{L_{(0-14)}}{L} * 100$$



In percent:
- 17,66 and more
- 14,65 - 17,65
- 12,57 - 14,64
- 10,98 - 12,56
- 0,00 - 10,97

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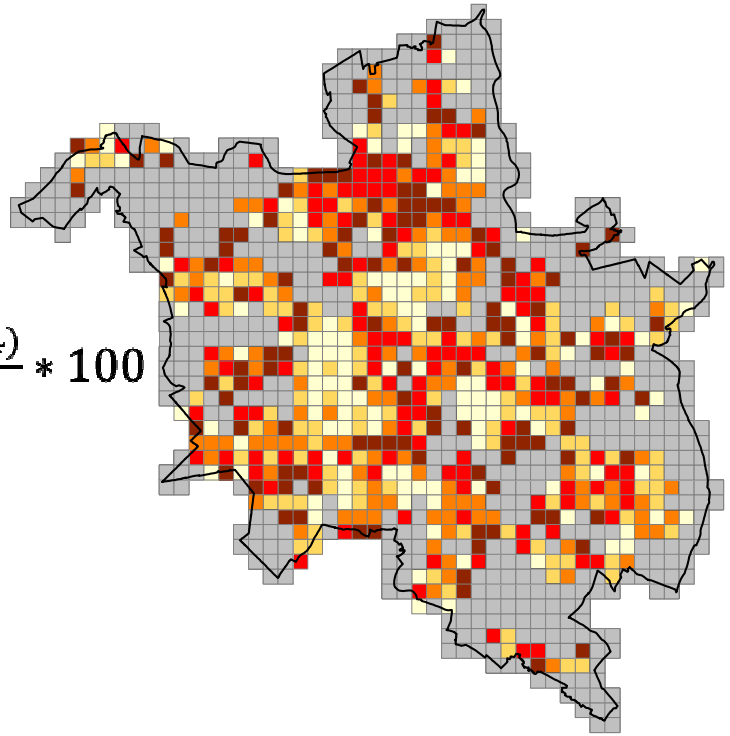
Administrative border

The percentage of people aged 15-64

$$\frac{L_{(15-64)}}{L} * 100$$



In percent:
- 77,20 and more
- 74,12 - 77,19
- 71,89 - 74,11
- 68,76 - 71,88
- 50,64 - 68,75

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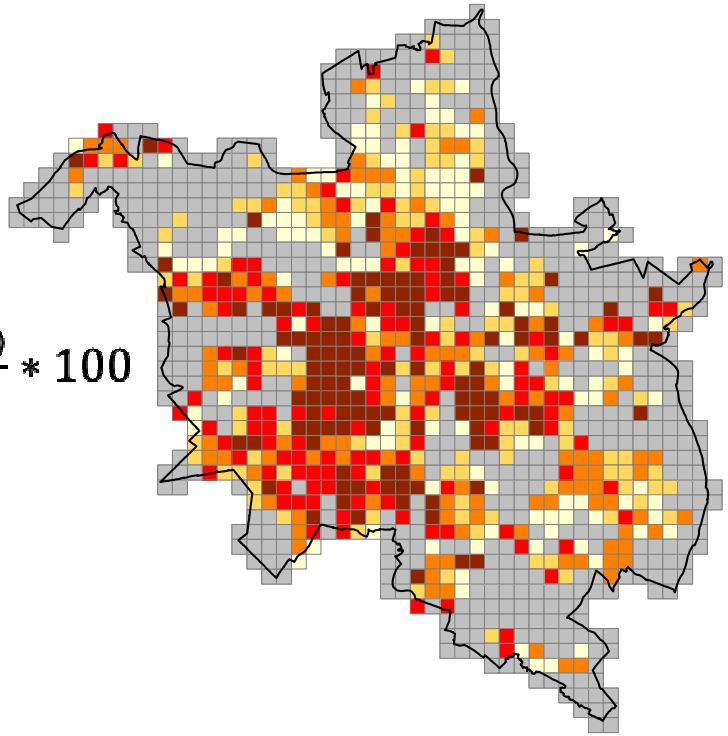
The percentage of people aged 65+

$$\frac{L_{(65+)}}{L} * 100$$



In percent:
- 17,61 and more
- 13,47 - 17,60
- 10,68 - 13,46
- 7,05 - 10,67
- 0,00 - 7,04

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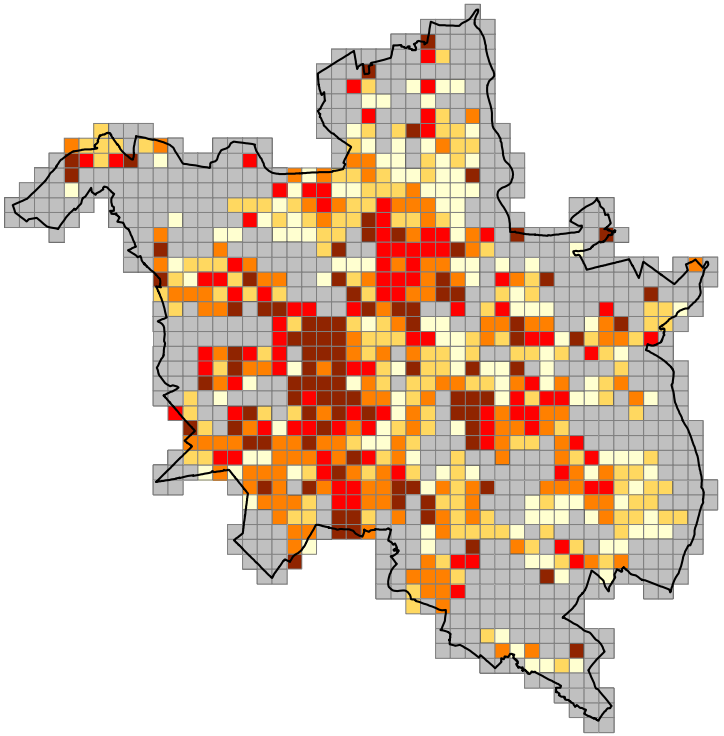
Median age



In years:
- 43,1 and more
- 40,1 - 43,0
- 37,1 - 40,0
- 34,1 - 37,0
- 34,0 and less

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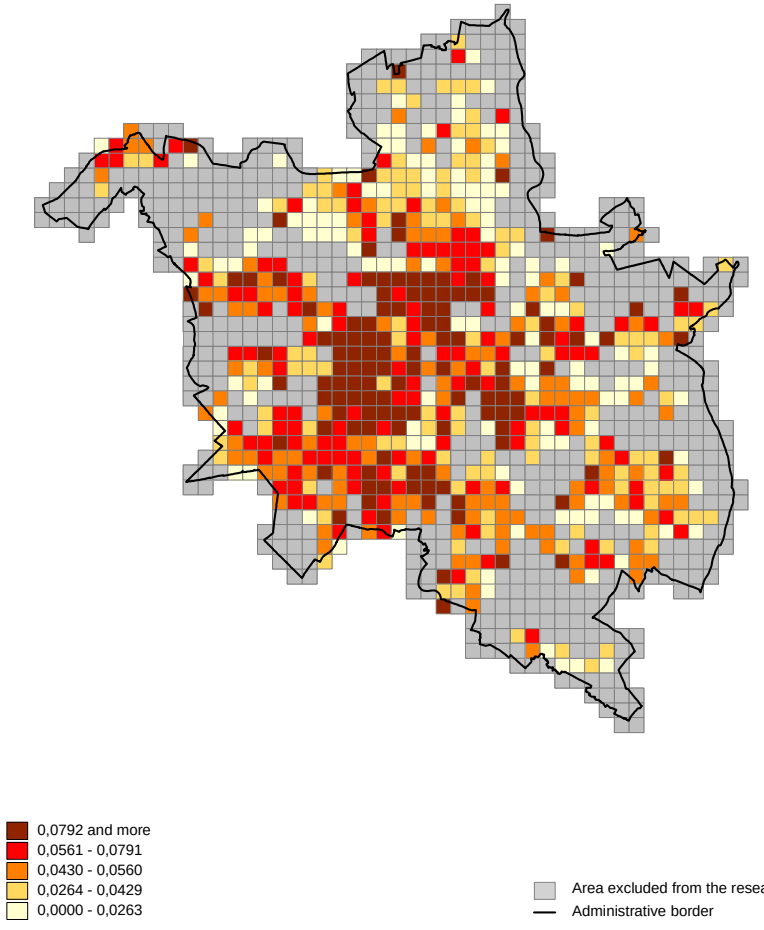
Cyrus Chu's ageing index



$$I = \frac{1}{\omega - z} \sum_{p_j = p_z}^{p_\omega} (j - z) * p_j$$

where:

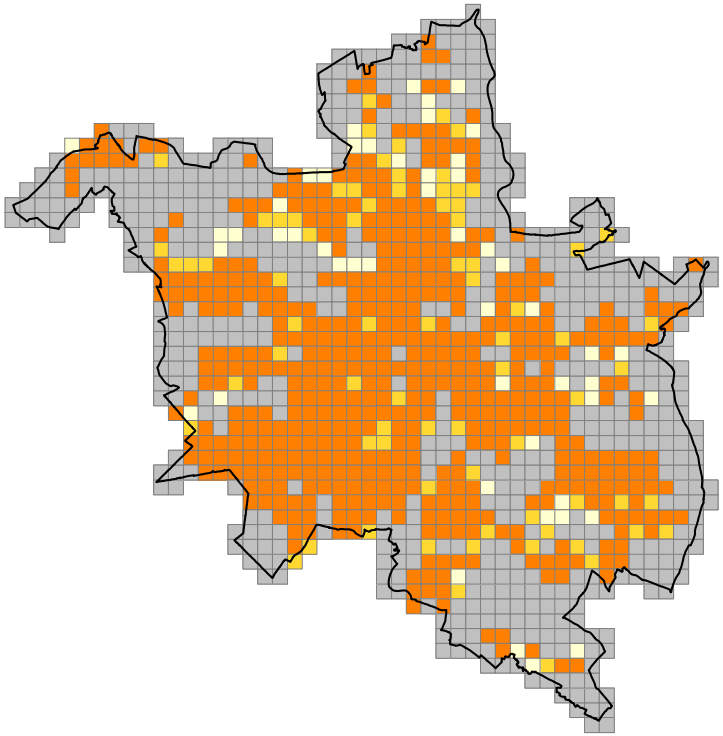
I – index of elderly people,

p_j – percentage of people in range j,

z – the threshold of old age (65),

ω – the upper limit of the oldest age range

The UN index of population ageing



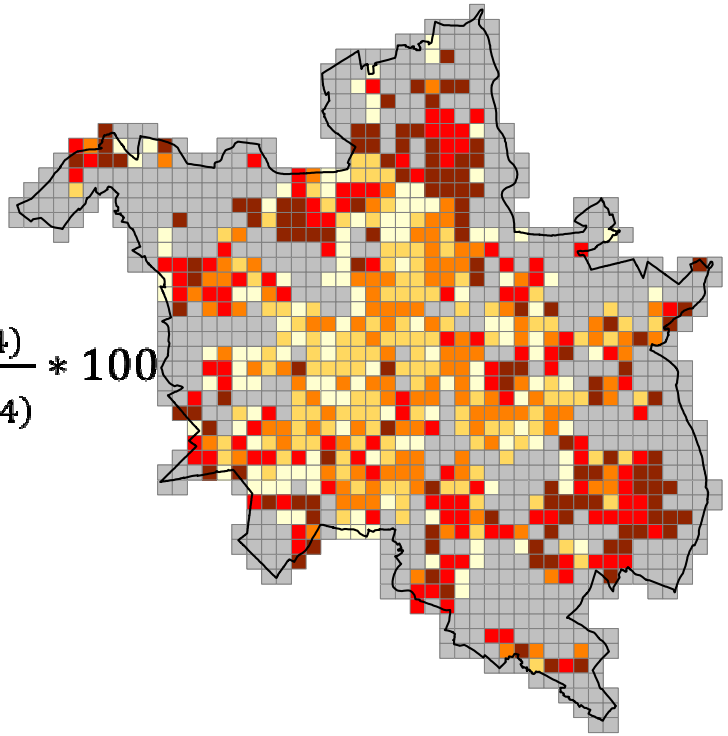
$$\frac{L_{(65+)}}{L} * 100$$

The share of people aged 65+
in the total population [%]:
- above 7 (old population)
- 4-7 (mature population)
- below 4 (young population)

- Area excluded from the research
- Administrative border

Youth dependency ratio

$$\frac{L_{(0-14)}}{L_{(15-64)}} * 100$$



Population aged 0-14
per 100 people aged 15-64
- 24,60 and more
- 19,63 - 24,59
- 17,29 - 19,62
- 15,21 - 17,28
- 0,00 - 15,20

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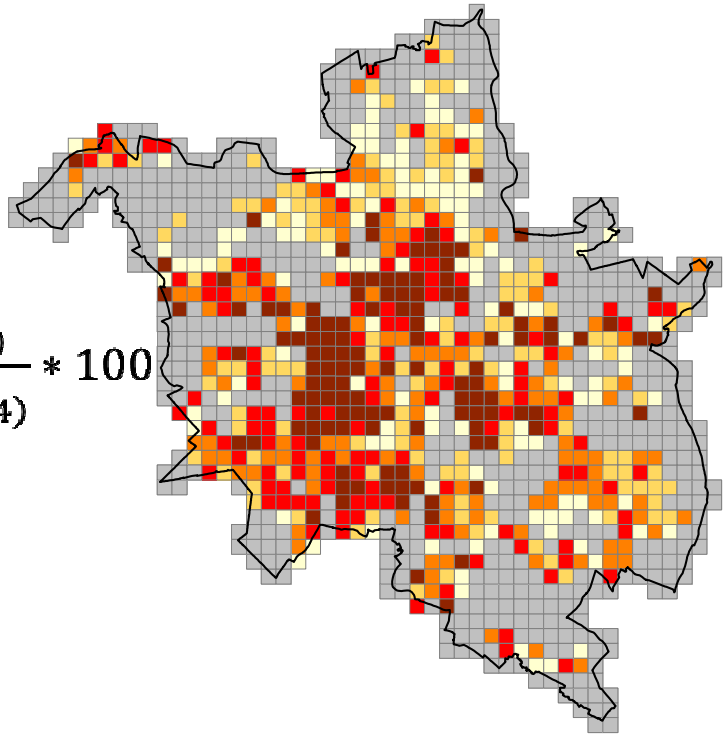
Aged dependency ratio

$$\frac{L_{(65+)}}{L_{(15-64)}} * 100$$



Population aged 65+
per 100 people aged 15-64
- 25,01 and more
- 18,43 - 25,00
- 14,30 - 18,42
- 9,14 - 14,29
- 0,00 - 9,13

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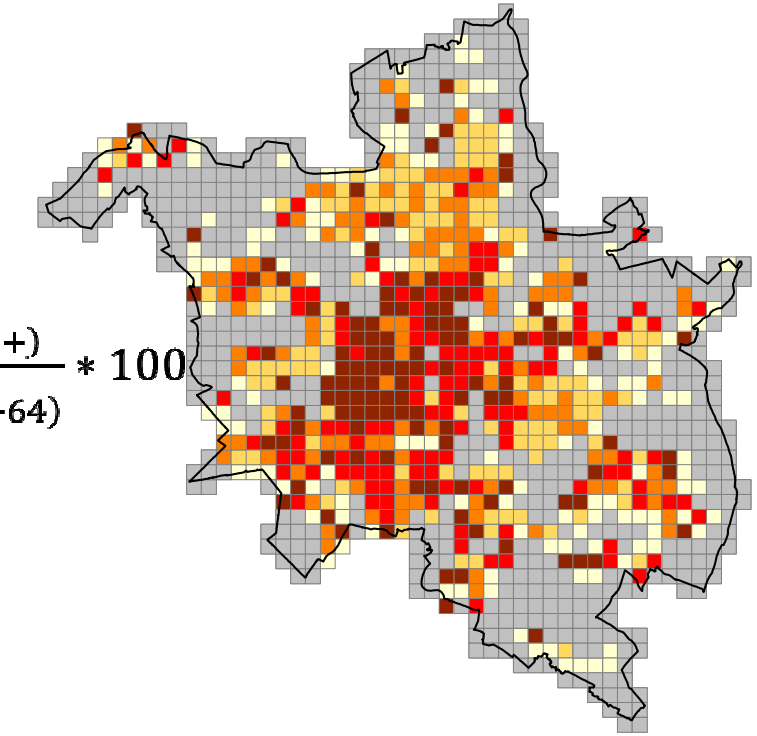
Administrative border

Parent support ratio

$$\frac{L_{(85+)}}{L_{(50-64)}} * 100$$



Population aged 85+
per 100 people aged 50-64
- 11,12 and more
- 7,06 - 11,11
- 3,88 - 7,05
- 0,01 - 3,87
- 0,00

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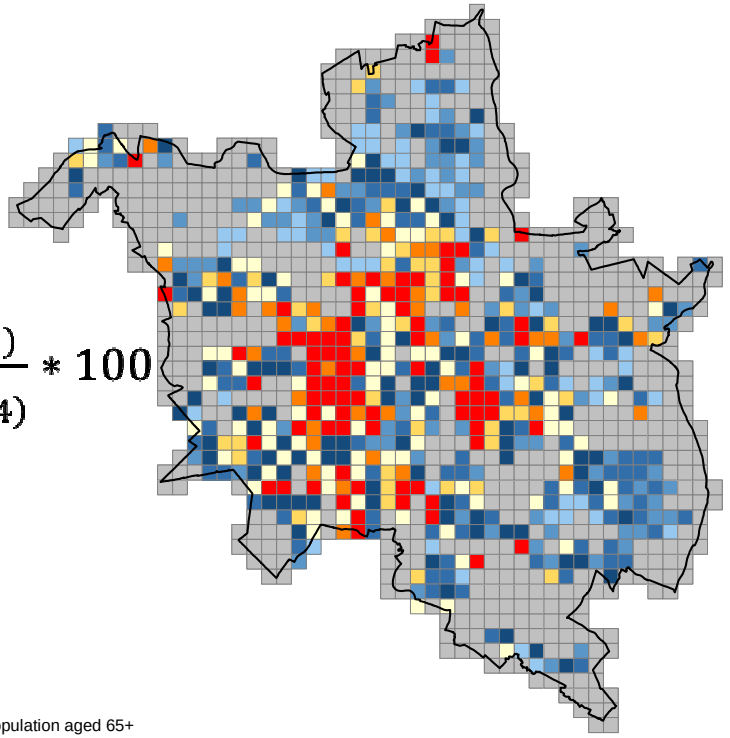
Administrative border

Ageing index

$$\frac{L_{(65+)}}{L_{(0-14)}} * 100$$



Population aged 65+
per 100 people aged 0-14
- 175,00 and more
- 150,00 - 174,99
- 125,00 - 149,99
- 100,00 - 124,99
- 75,00 - 99,99
- 50,00 - 74,99
- 25,00 - 49,99
- 24,99 and less

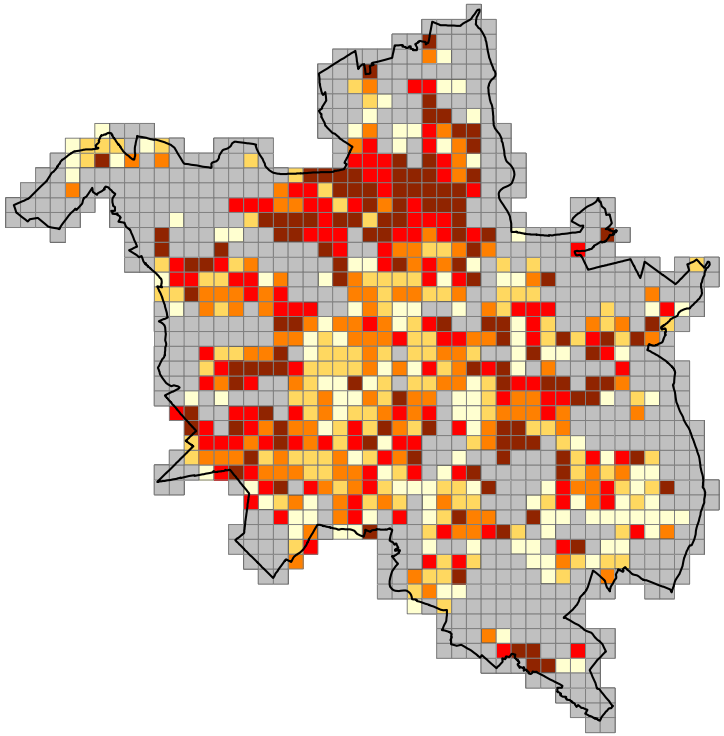
Area excluded from the research
Administrative border

Socio-economic structure

1. Share of the total population whose main source of income is **labour**,
2. Share of the total population whose main source of income is **pension**,
3. Share of **elderly people** whose main source of income is **wage labour in the total population of elderly people**,
4. Share of **pensioners and disability benefit claimants** in the total working age population,
5. Share of **unemployment benefit claimants** in the total working age population,
6. Share of **social pension or social assistance claimants** in the total population

Indicators for territorial policies: closing data gaps by using traditional and new sources and methods

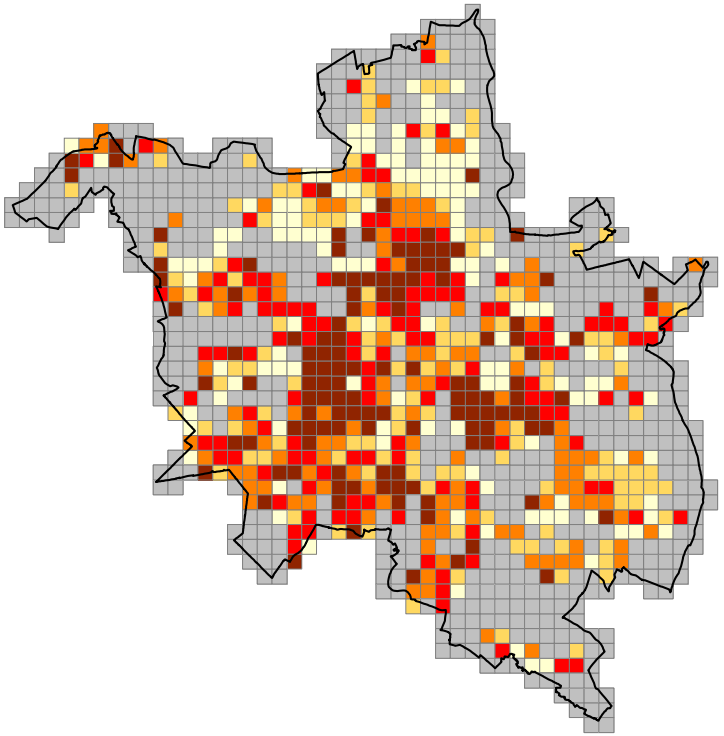
Share of the total population whose main source of income is labour



In percent:
- 54,27 and more
- 50,01 - 54,26
- 47,73 - 50,00
- 45,38 - 47,72
- 21,62 - 45,37

Area excluded from the research
Administrative border

Share of the total population whose main source of income is pension



In percent:
- 22,10 and more
- 18,49 - 22,09
- 15,64 - 18,48
- 10,87 - 15,63
- 0,00 - 10,86

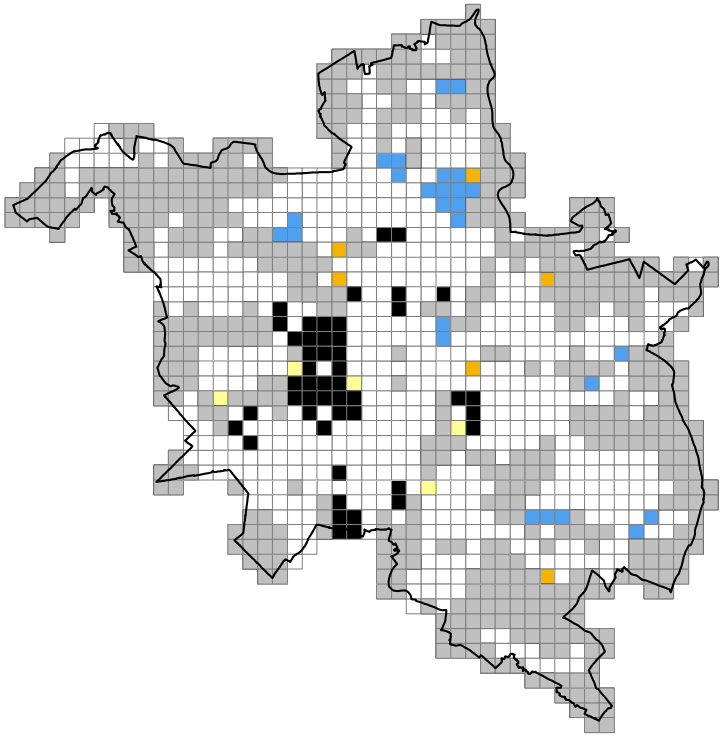
Area excluded from the research
Administrative border

Identification of specific areas

1. Concentration of elderly people
   – local Moran's I statistic

2. The dominant source of income
   – Location quotient

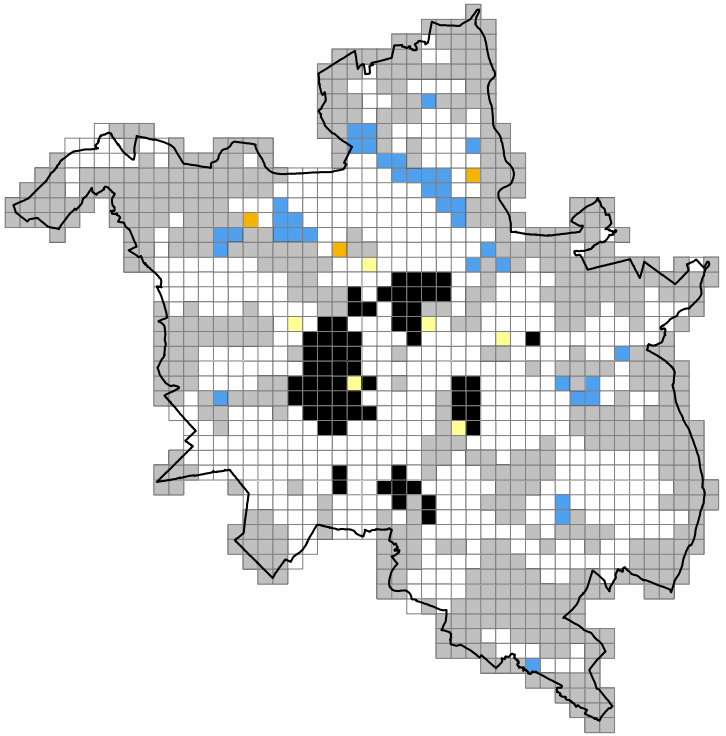
Median age



HH
HL
LH
LL
Not significant

Area excluded from the research
Administrative border

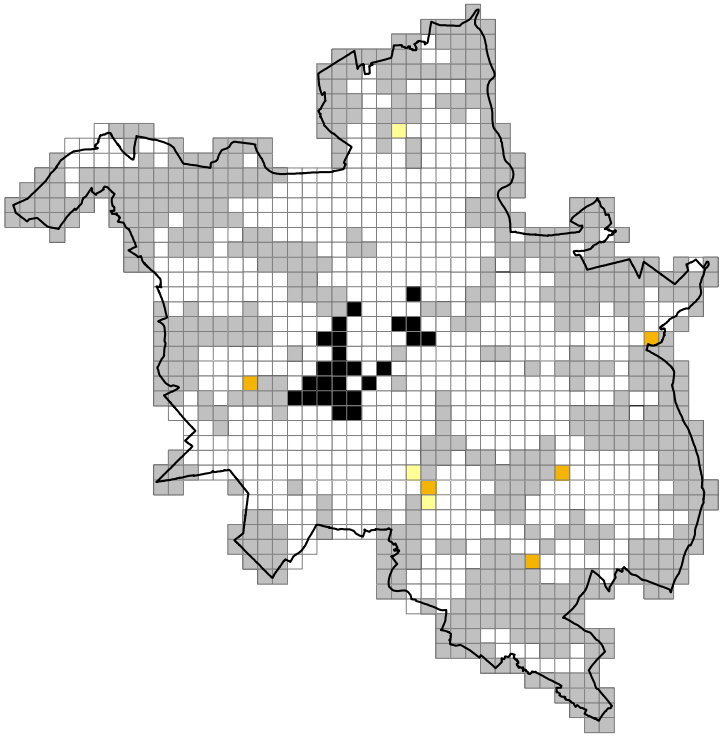
Cyrus Chu's ageing index



HH
HL
LH
LL
Not significant

Area excluded from the research
Administrative border

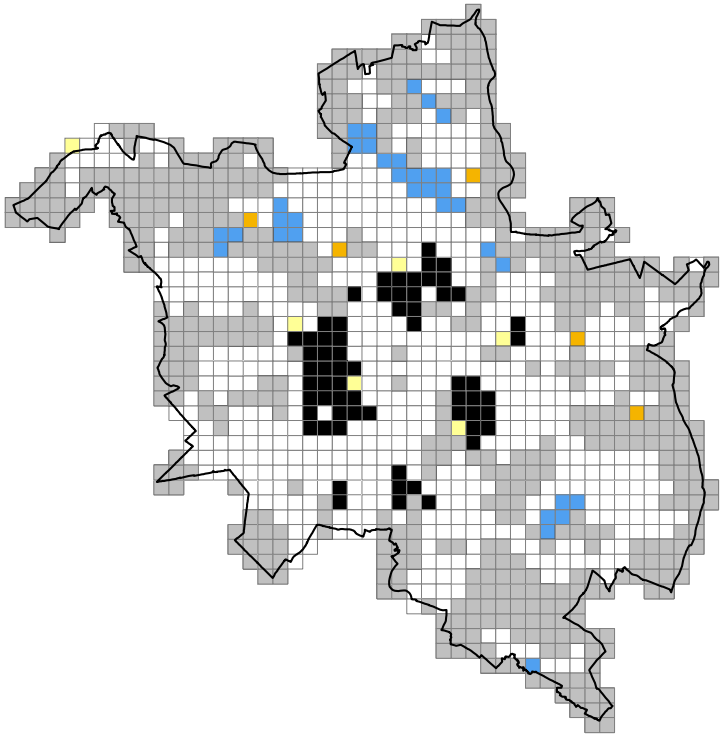
Parent support ratio



HH
HL
LH
LL
Not significant

Area excluded from the research
Administrative border

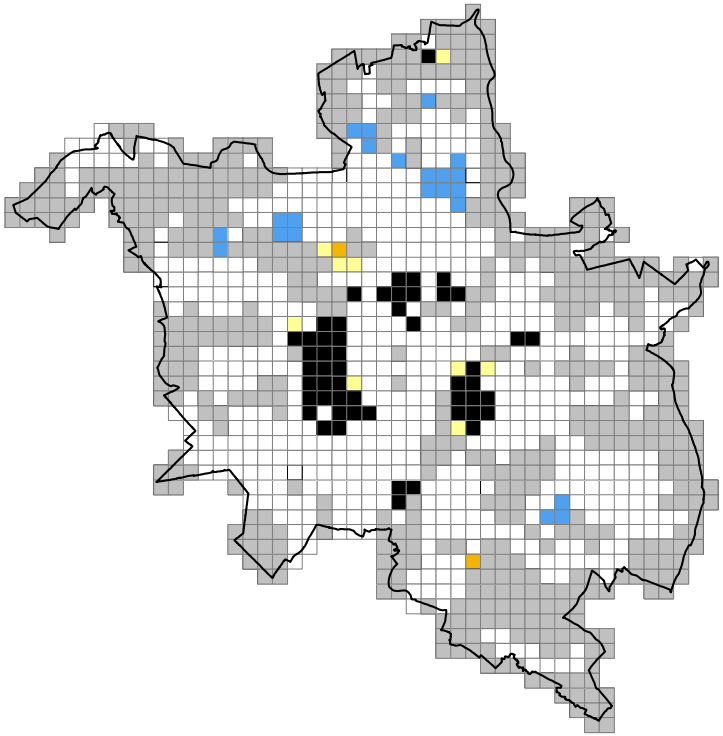
Aged dependency ratio



HH
HL
LH
LL
Not significant

Area excluded from the research
Administrative border

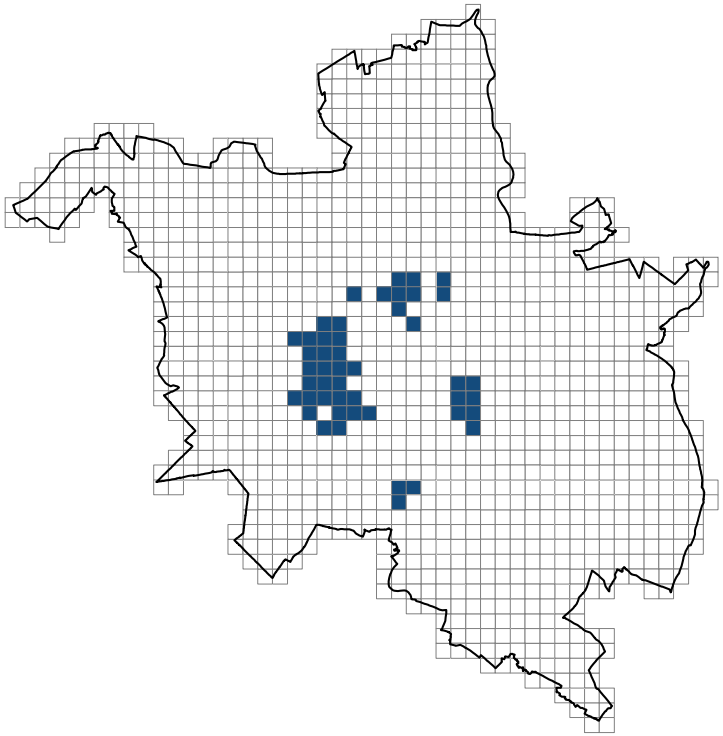
Population ageing index



HH
HL
LH
LL
Not significant

Area excluded from the research
Administrative border

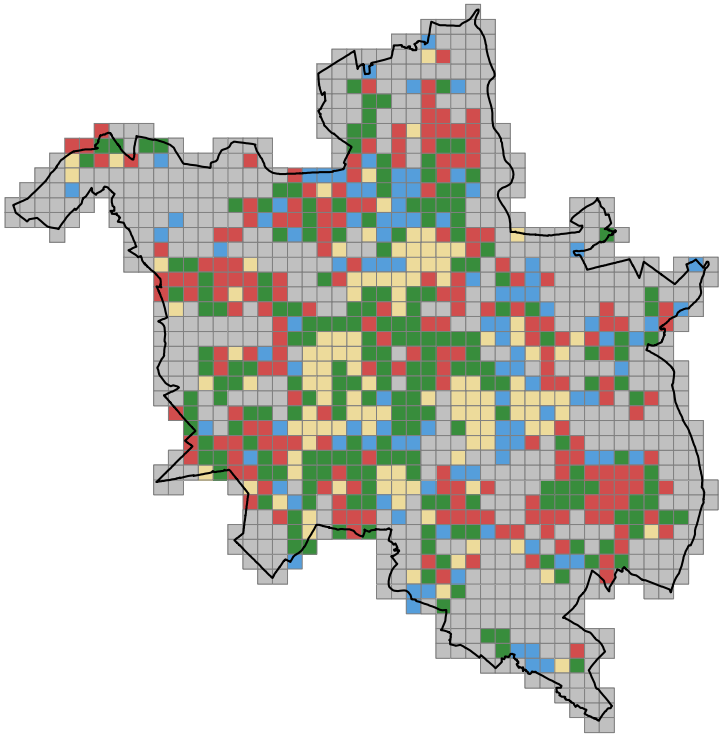
High concentration of elderly people areas



Number of occurences HH:
3-5

Administrative border

Main source of income



Summary

- The results provide the basis for continuous monitoring and analysis of the socio-economic structure within the provincial cities and their suroundings

Summary

- The proposed approach can be used to explore spatial variation of diverse features and processes, including real estate market, educational level, public safety or healthcare

Discussion

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