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# Growth Analysis

Swedish Agency for Growth Policy Analysis



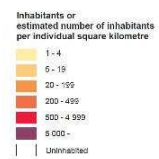
# Pinpoint Sweden - A platform for accessibility analysis based on grid data

- Introduction and background
- Examples of assignments and communication
- Future communication and needs



Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.

Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.



**National grid-based data**  
Data sources: National Statistical Institute  
Mapunit data based on geographies at population at geocoded buildings, addresses or postal codes to insure high grids.  
English language names used in America, Denmark, France, Finland, the Netherlands, Norway, Slovenia, Sweden, and Switzerland were changed to Russian<sup>1</sup> and Northern Russian.

Population	urban	suburban	semi-urban	rural	total	urban	suburban	semi-urban	rural	total
1990	11,100	10,100	10,100	10,100	41,400	11,100	10,100	10,100	10,100	41,400
2000	12,100	11,100	11,100	11,100	45,400	12,100	11,100	11,100	11,100	45,400
2010	13,100	12,100	12,100	12,100	49,400	13,100	12,100	12,100	12,100	49,400
2020	14,100	13,100	13,100	13,100	53,400	14,100	13,100	13,100	13,100	53,400
2030	15,100	14,100	14,100	14,100	57,400	15,100	14,100	14,100	14,100	57,400
2040	16,100	15,100	15,100	15,100	61,400	16,100	15,100	15,100	15,100	61,400
2050	17,100	16,100	16,100	16,100	65,400	17,100	16,100	16,100	16,100	65,400
2060	18,100	17,100	17,100	17,100	69,400	18,100	17,100	17,100	17,100	69,400
2070	19,100	18,100	18,100	18,100	73,400	19,100	18,100	18,100	18,100	73,400
2080	20,100	19,100	19,100	19,100	77,400	20,100	19,100	19,100	19,100	77,400
2090	21,100	20,100	20,100	20,100	81,400	21,100	20,100	20,100	20,100	81,400
2100	22,100	21,100	21,100	21,100	85,400	22,100	21,100	21,100	21,100	85,400

**Estimated grid based data**  
Data source: European Commission JRC

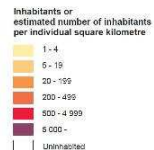
Population data based on disaggregation of population at L3 level through Centre Land Cover 2000 data to square km grids.

Estimated data are used in Belgium, Belgium, Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovakia, Spain and United Kingdom [excl. Northern Ireland].

Map © European Forum for Geostatistics. Further information: <http://www.efgs.info>  
Geographical features © EuroGeographics for the administrative boundaries

Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.

Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.

[illegible]

Estimated grid based data  
Data source: European Commission JRC  
Population data based on disaggregation  
of population in 1 km<sup>2</sup> cells  
through Corine Land Cover 2000 data  
to square km grids.  
Estimated data are used in Belgium, Bulgaria,  
Croatia, Czech Republic, France, Germany,  
Greece, Hungary, Ireland, Italy, Latvia, Lithuania,  
Luxembourg, Poland, Portugal, Romania, Slovakia,  
Spain and United Kingdom (incl. Northern

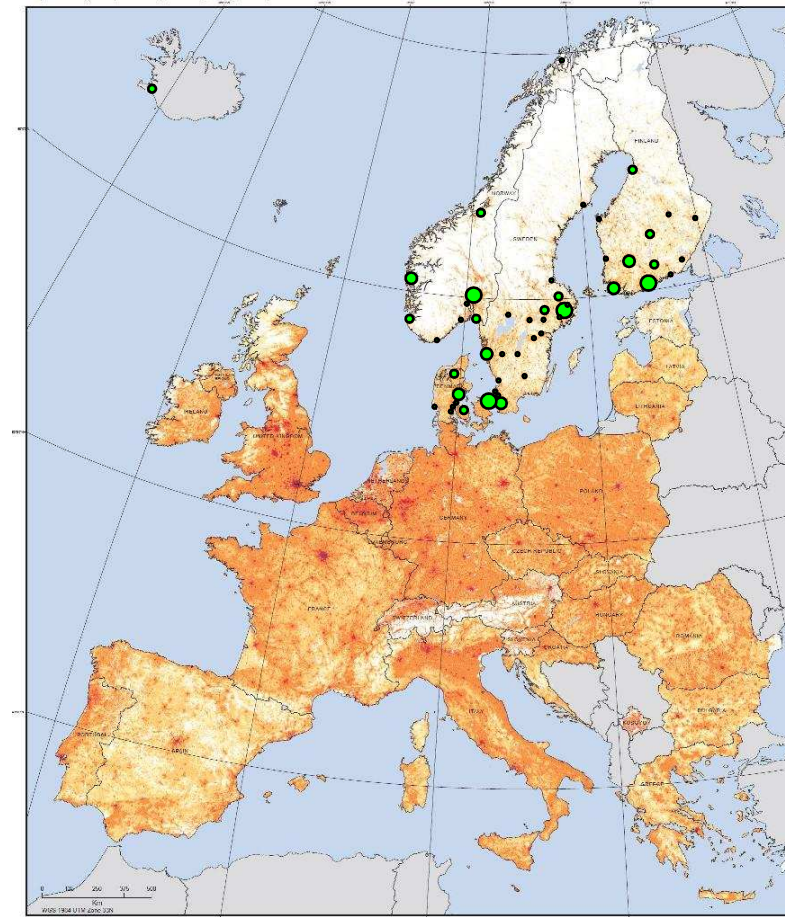
Map © European Forum for Geostatistics. Further information: <http://www.efgs.net>  
Geographical features © EuroGeographics for the administrative boundaries  
Map composed by sketches / map 2/26/10

About 25% of the total population in Norden lives in localities with more than 200 000 inhabitants

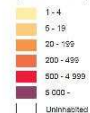


## GEOSTAT Population Map 2010

Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.



Inhabitants or estimated number of inhabitants per individual square kilometre



### National grid based data

These statistics are based on population at aggregated administrative boundaries or on statistical data by grid. They are based on data from national statistical institutes and JRC.

Country	Area (km²)	Population (2010)	Population density (2010)
Belgium	30,528	10,500,000	344
Denmark	4,309	5,500,000	128
France	643,801	65,000,000	101
Germany	357,021	82,000,000	229
Italy	301,338	60,000,000	199
Poland	312,685	38,000,000	122
Spain	505,992	45,000,000	89
Sweden	449,964	9,000,000	20
United Kingdom	244,820	61,000,000	249
Wales	20,779	3,000,000	144
Yemen	527,970	22,000,000	42

### Estimated grid based data

Data source: Population Commission, JRC.

Population data based on disaggregation of population of 100,000 and 100,000 data to 100,000 grid.

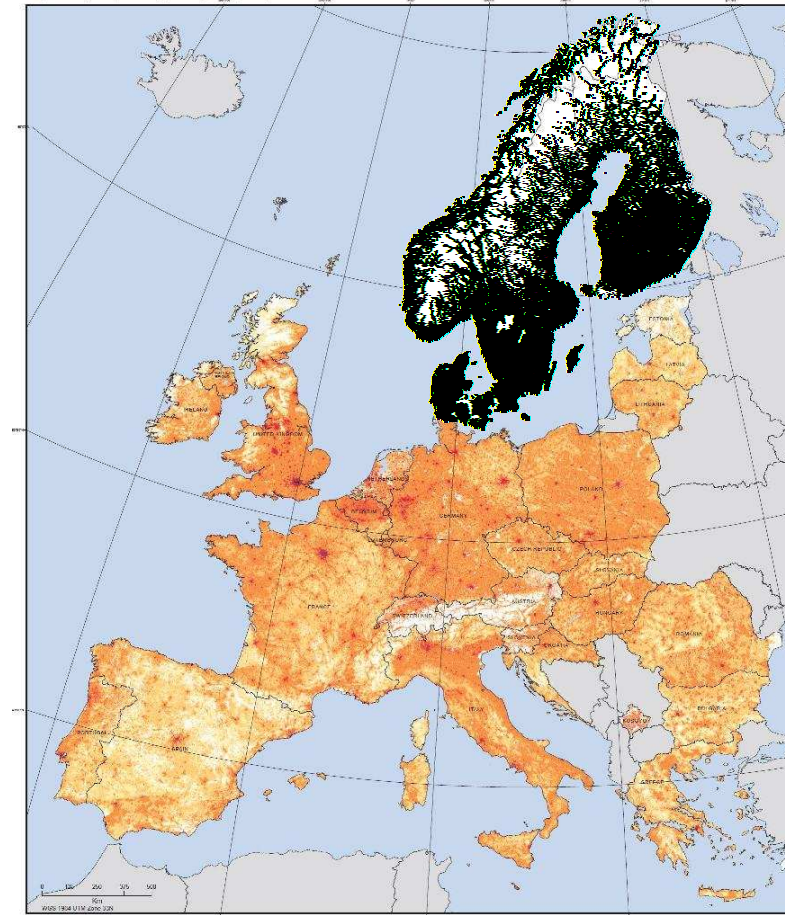
Estimated data are used in Belgium, Denmark, Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovakia, Spain and United Kingdom (not Northern Ireland).

Map © European Forum for Geostatistics. Further information: <http://www.efg-geo.eu>  
Geostatistical features in Eurogeographics for the administrative boundaries  
Map processed by Statistics in Maps 2010

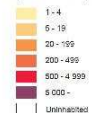
About 40% of the population in Norden lives in localities with more than 50 000 inhabitants

## GEOSTAT Population Map 2010

Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.



Inhabitants or estimated number of inhabitants per individual square kilometre



### National grid based data

These statistics are based on population data from national statistical institutes. The data is based on population data from national statistical institutes. The data is based on population data from national statistical institutes.

Country	Area (km²)	Population (2010)	Population density (inhabitants/km²)
Albania	28 748	2 874 800	100
Andorra	468	84 000	180
Austria	83 859	8 400 000	100
Belarus	207 600	9 500 000	45
Belgium	30 528	10 500 000	344
Bulgaria	110 910	7 500 000	67
Croatia	56 542	4 300 000	76
Cyprus	9 251	840 000	91
Czechia	78 867	10 500 000	133
Denmark	4 309	5 500 000	128
Estonia	45 248	1 300 000	29
Finland	143 300	5 300 000	37
France	643 801	65 000 000	101
Germany	357 021	82 000 000	230
Greece	131 957	11 500 000	87
Hungary	93 028	10 500 000	113
Iceland	101 824	320 000	3
Ireland	70 273	4 300 000	61
Italy	301 330	60 000 000	200
Latvia	64 589	2 300 000	36
Lithuania	62 689	3 100 000	49
Luxembourg	2 586	500 000	193
Malta	316	400 000	1265
Netherlands	41 526	16 500 000	397
Norway	385 203	4 800 000	12
Poland	312 685	38 000 000	122
Portugal	92 090	10 500 000	114
Romania	238 391	21 500 000	90
Slovakia	49 034	5 400 000	110
Slovenia	20 273	2 100 000	104
Spain	505 992	45 000 000	89
Sweden	449 964	9 500 000	21
Switzerland	41 284	7 500 000	182
Turkey	783 562	74 000 000	94
Ukraine	603 628	46 000 000	76
United Kingdom	244 818	61 000 000	250
Uninhabited			

### Estimated grid based data

Data source: European Commission, JRC.

Population data based on disaggregation of population of 2010 and 2000 data to 1 km grid.

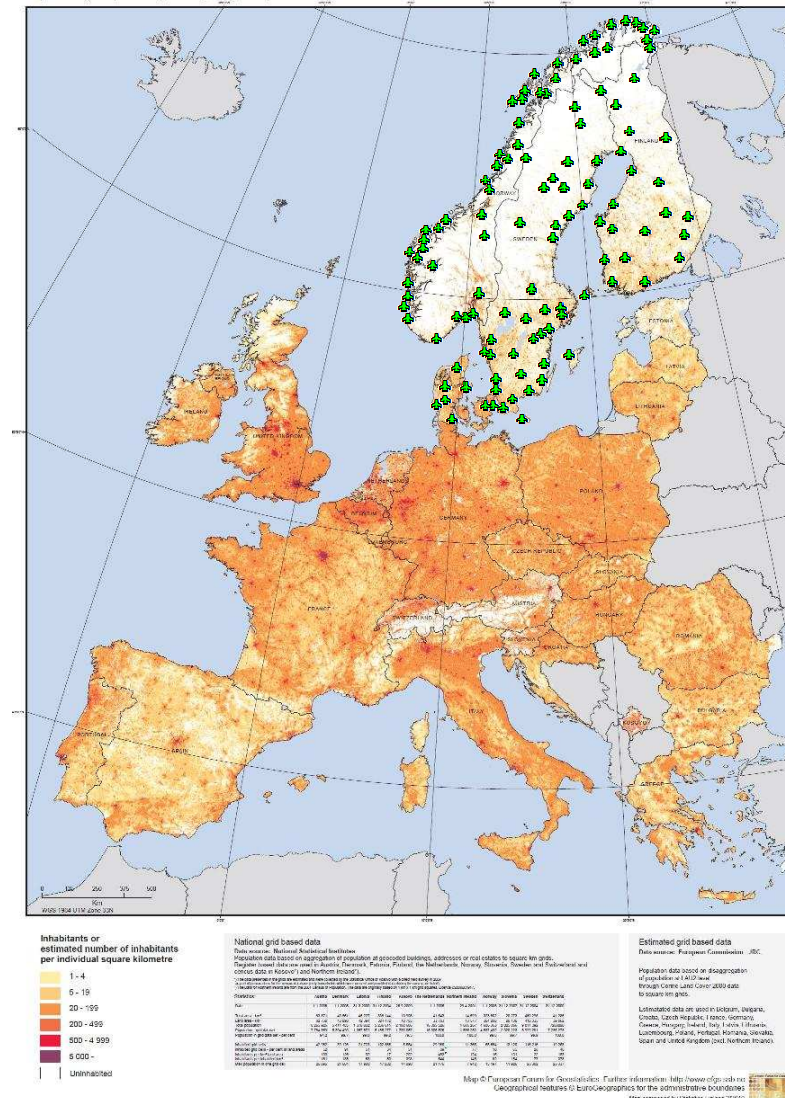
Estimated data are used in Iceland, Denmark, Czechia, Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and Uninhabited.

Map © European Forum for Geostatistics. Further information: <http://www.efgs.eu>  
Geostatistical features in Europe: <http://www.geostatistics.eu>  
Map prepared by Statistics in Europe 2010

About 25 % of the cells in a 250 meter grid of Sweden are populated

## GEOSTAT Population Map 2010

Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.

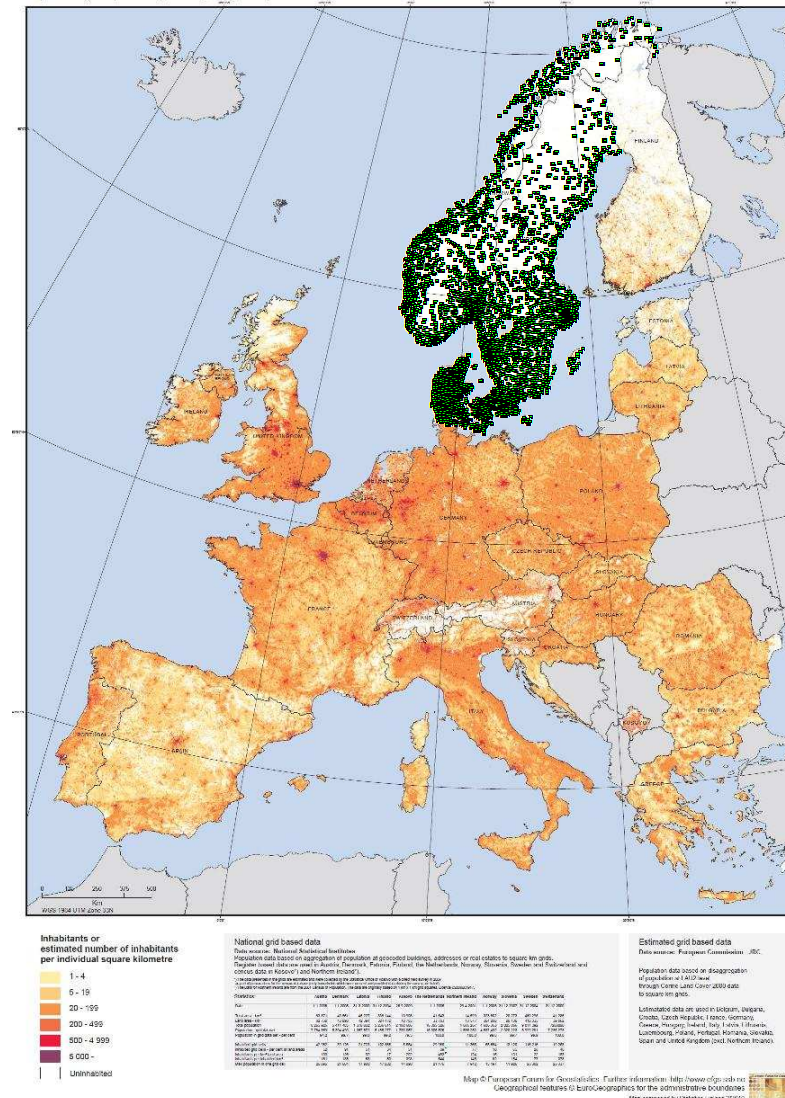


Citizens' average distance to an airport in Sweden is about 30 minutes by car



## GEOSTAT Population Map 2010

Population by 1 square km grids. A hybrid grid map based on grid data of national statistical institutes and JRC.



Citizens' average distance to a grocery store in Sweden is about two minutes by car



## PiPoS a platform for Accessibility Analysis

- The platform calculates distances (meter or second) along a roadnetwork, between points in large datasets.
  - Road segments covering the nordic countries ~ 4.2 milj
  - Inhabitated 250m tiles ~ 1 milj
- A line production tool?

### *Tech stuff*

- *Developed in C# in Microsoft Visual Studio*
- *SQL-server (with the Spatial datatypes)*
- *Thesis on accessibility analysis :*  
*<http://lup.lub.lu.se/luur/download?func=downloadFile&recordId=1219034&fileId=1219035>*



# Three categories of use...

## *Classifying assignments.*

- **Simple accessibility *analysis***

A thin user interface that calls PiPoS-functions in a direct manner.

- Ex. Accessibility to Pharmacies

- **Batch applications**

An application that does some calculations but mainly repetitive tasks

- Ex. Accessibility Index

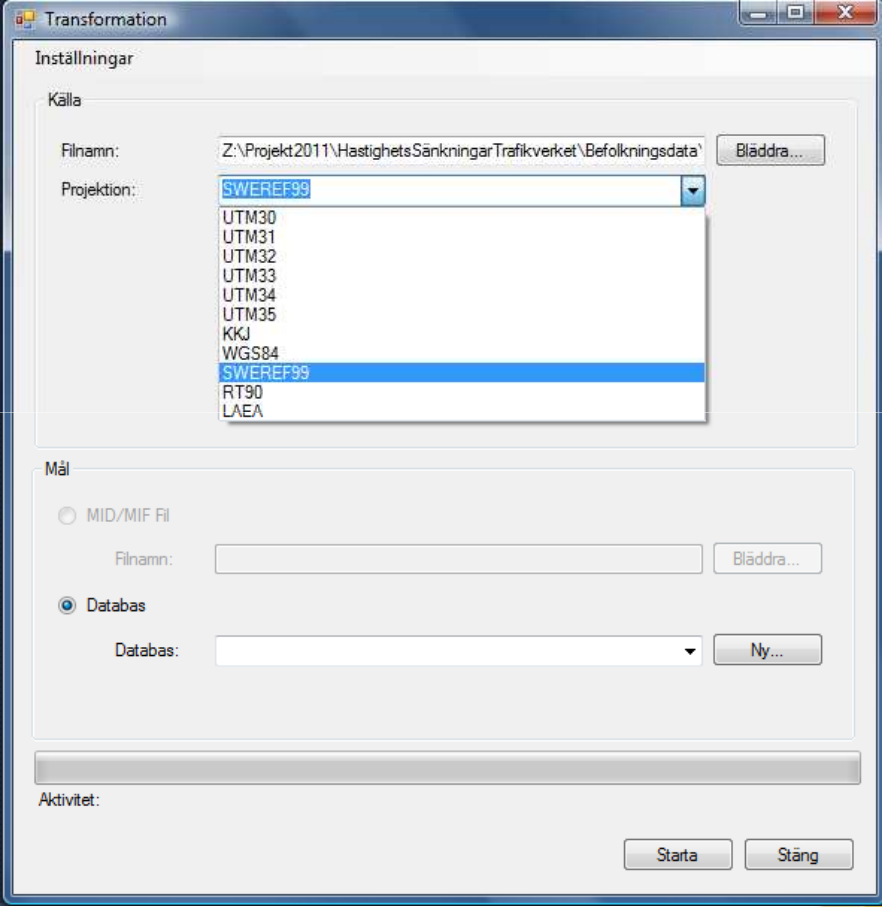
- **PiPoS as a small part (module) in a larger system.**

- Ex. Structural tax equalisation.



# Obtain & Import

- [-] dbf.Bef2010
  - [-] Columns
    - [-] Geometry1 (geometry, null)
    - [-] Geometry2 (geometry, null)
    - [-] ID (PK, int, not null)
    - [-] Population (int, null)
    - [-] AreaCode (nchar(4), null)
    - [-] Country (nchar(10), null)
    - [-] UrbanSize (int, null)



Transformation

Inställningar

Källa

Filnamn: Z:\Projekt2011\HastighetsSankningarTrafikverket\Befolkningsdata Bläddra...

Projektion: SWEREF99

- UTM30
- UTM31
- UTM32
- UTM33
- UTM34
- UTM35
- KKJ
- WGS84
- SWEREF99
- RT90
- LAEA

Mål

☐ MID/MIF Fil

Filnamn: Bläddra...

☒ Databas

Databas: Ny...

Aktivitet:

Starta Stäng



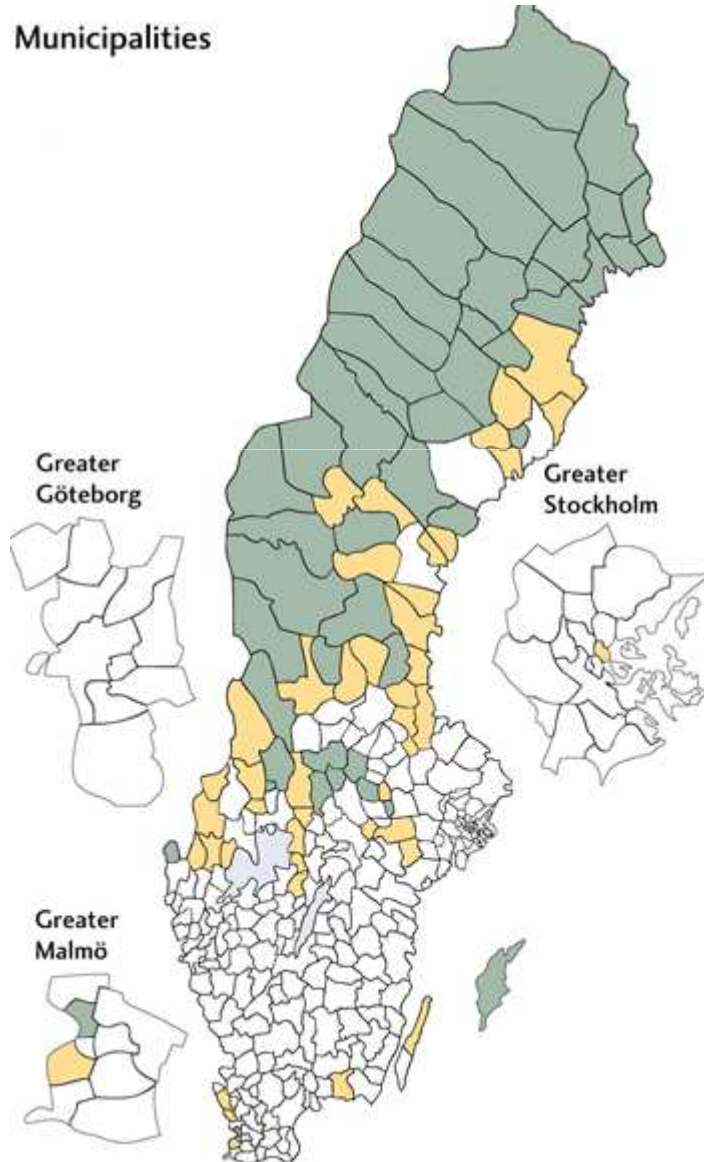
## Structural tax equalisation (Municipality & County)

- Schools (Primary to College)
- Elderly services
- Medical Centers
- Ambulance services
- Hospitals



## Local government financial equalisation - the structural part.

Municipalities



In the size of 270 miljon Euro is distributed on assignment of the Ministry of Finance:

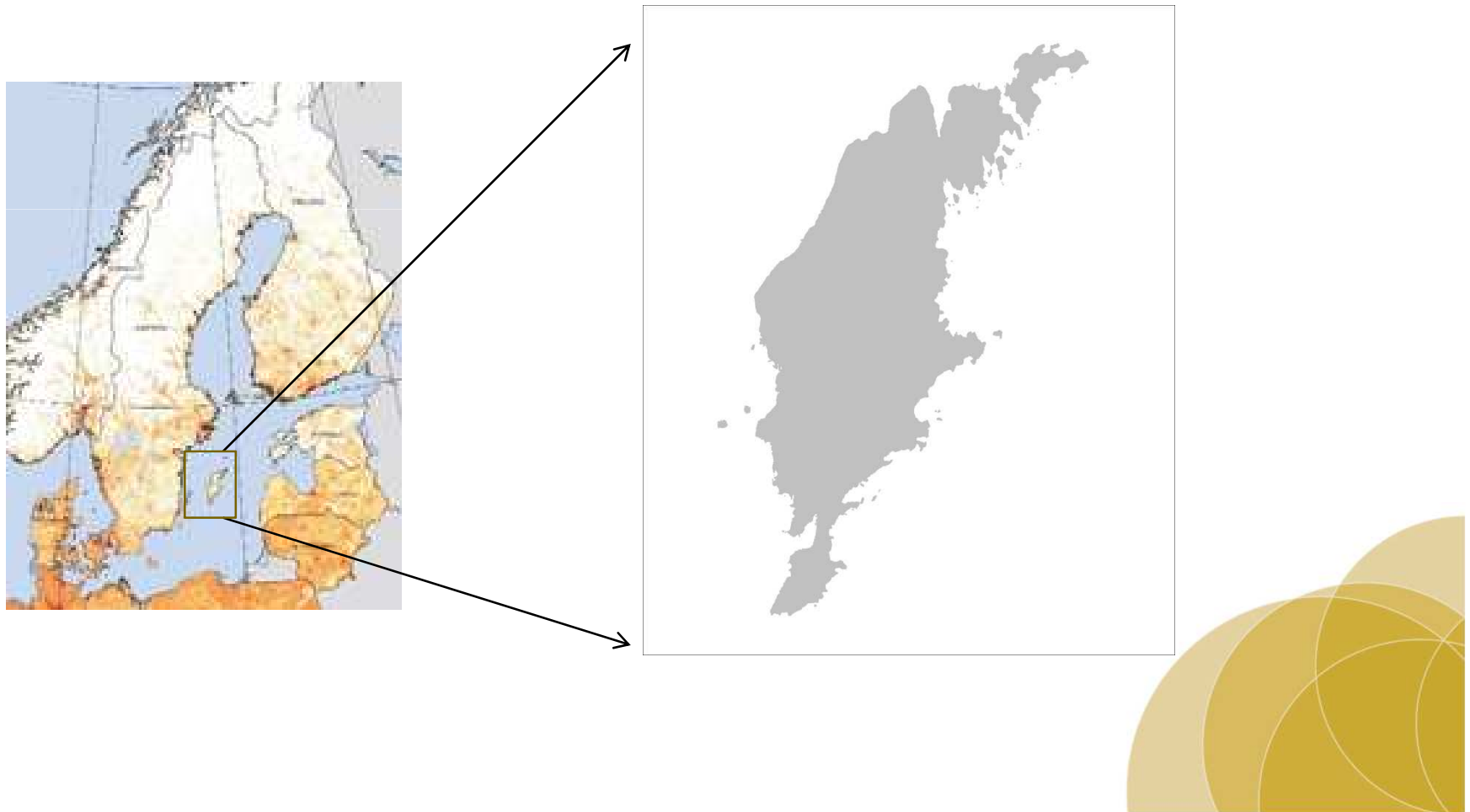
We need a structural measure !

What are the cost for a "bad" structured municipality?

- Small units
- Long distances to the units



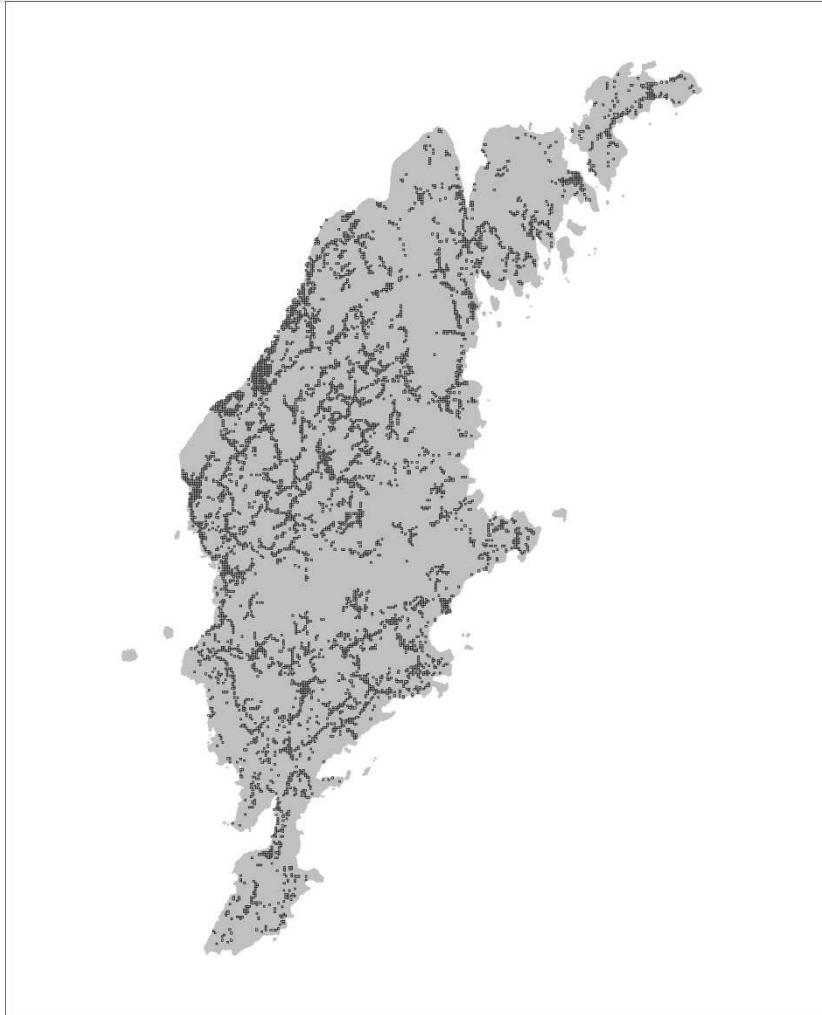
## The Island / Municipality / County of Gotland



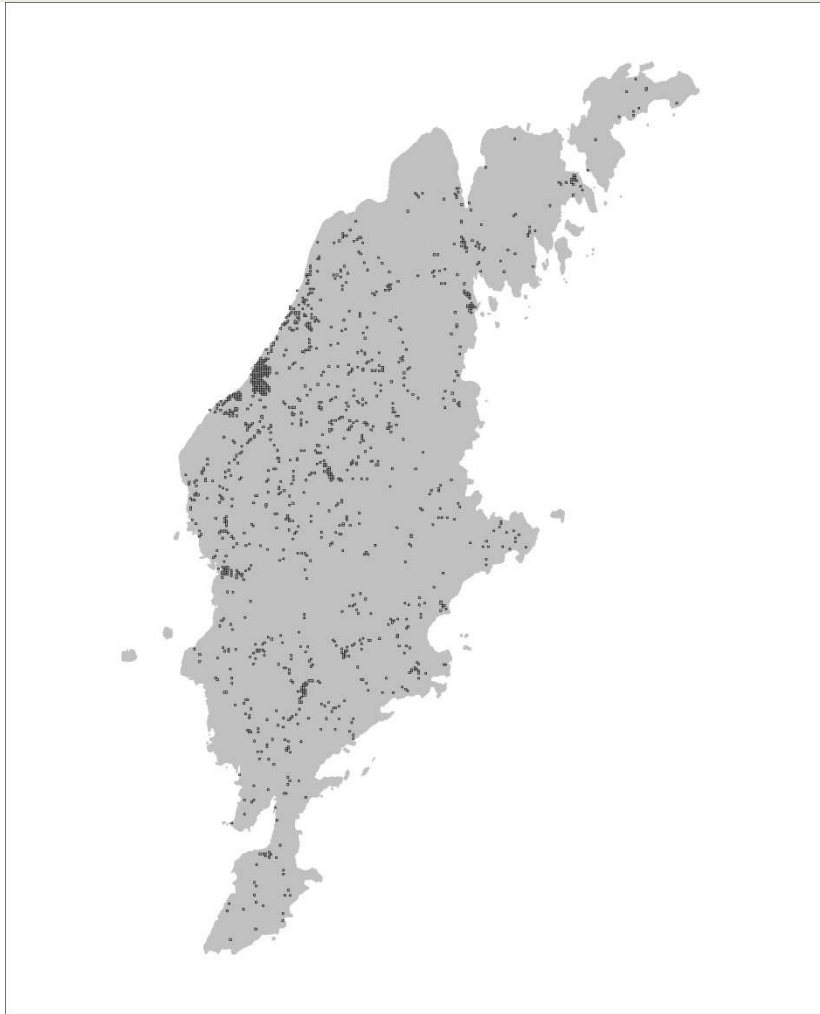




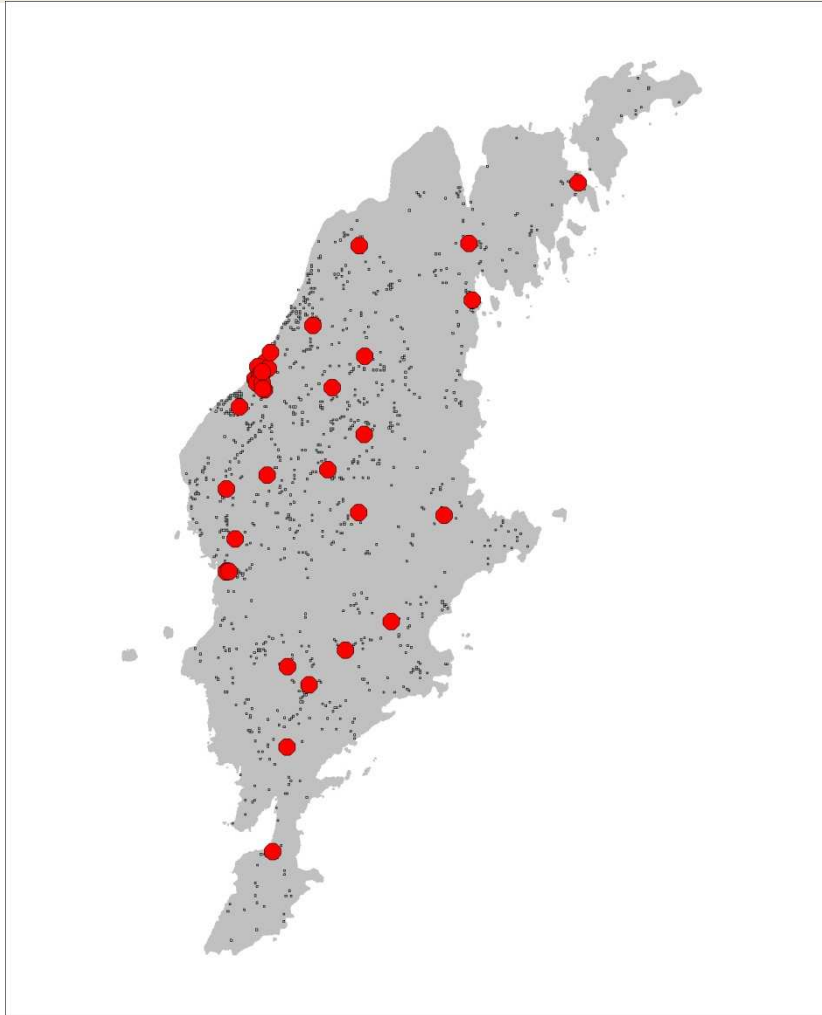
# 250m population grid



## 250m population grid (Age 6 to 12 )



# Primary schools on Gotland





# National Road Database

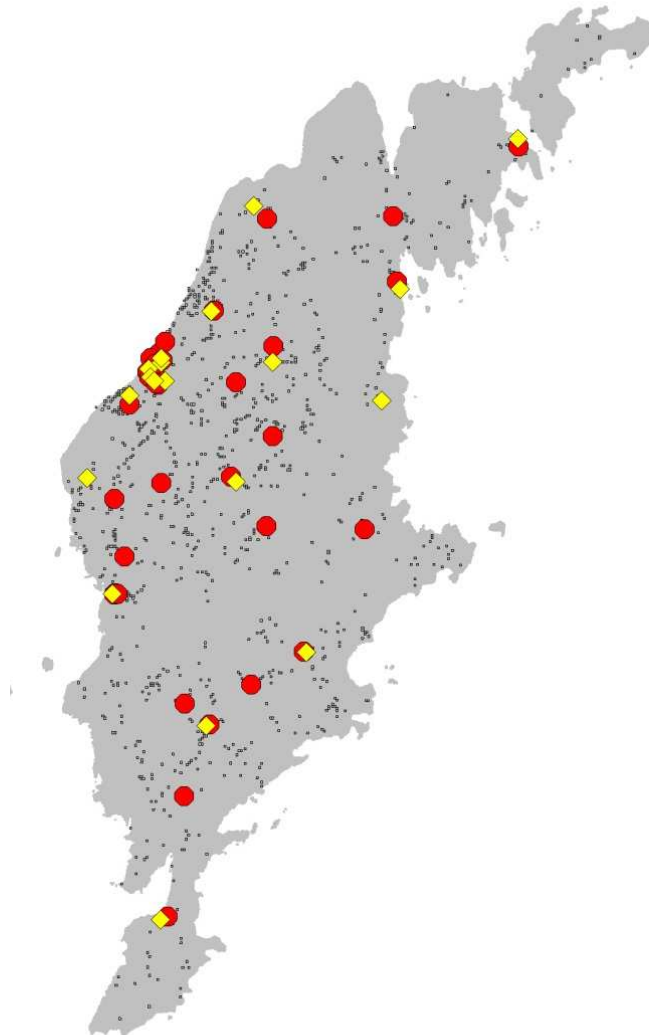
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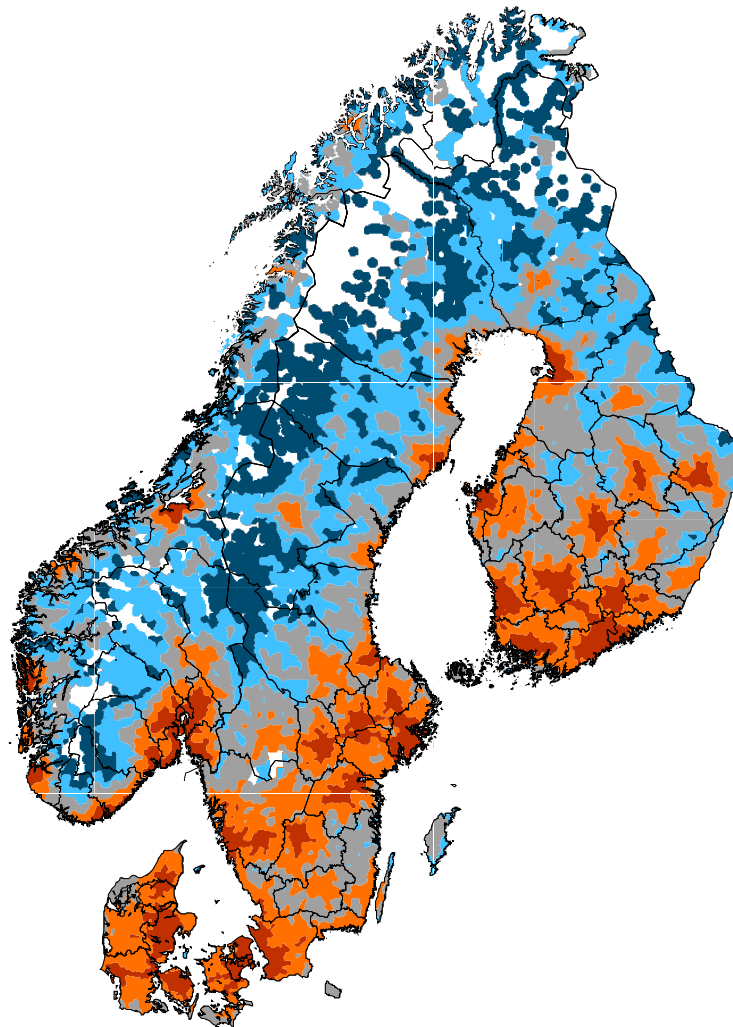
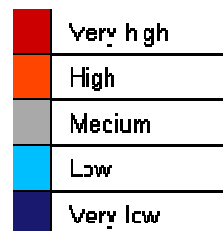
# Placement Algoritm

**2 small Schools 23 700 Euro**

**School bus 1 600 000 Euro**

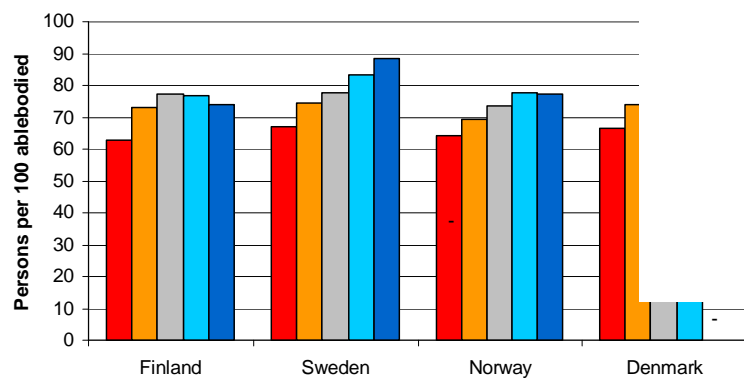


Degree of proximity  
to various sizes of  
localities

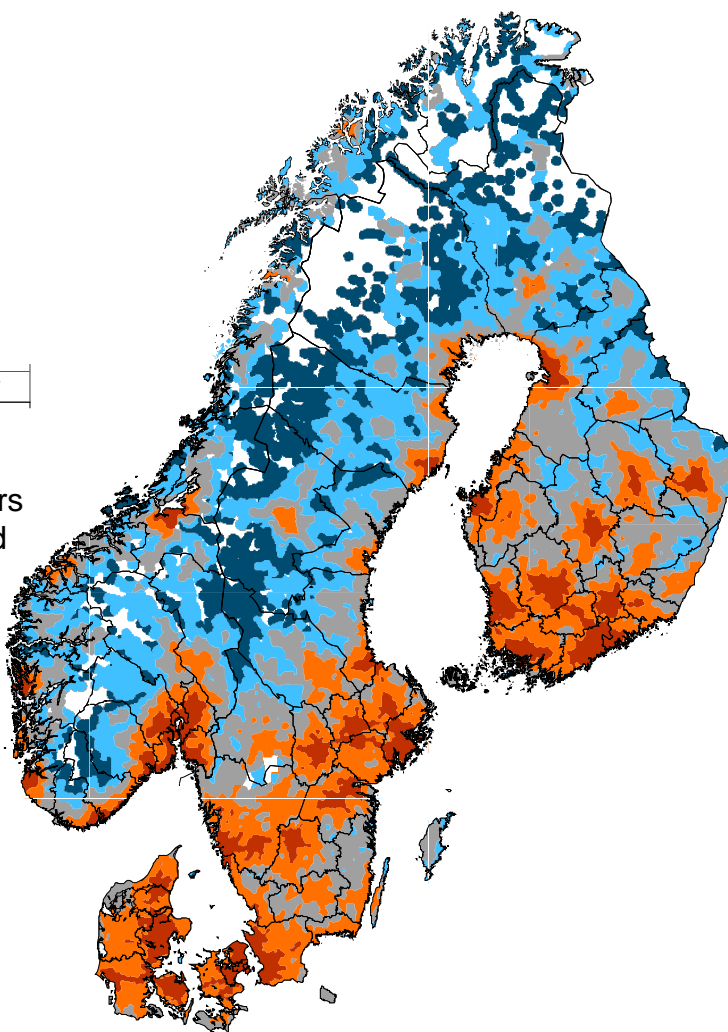


## Degree of proximity to various urba

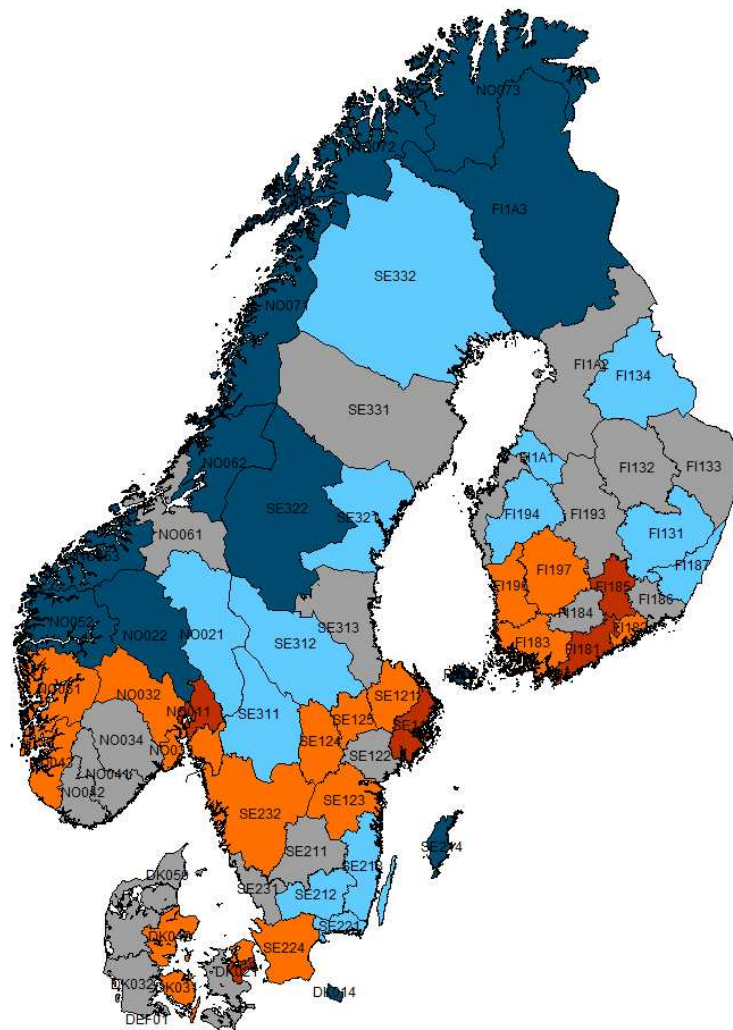
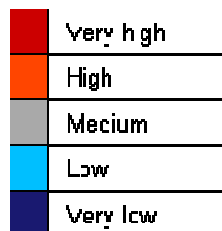
Demographic dependency ratio\* in 2



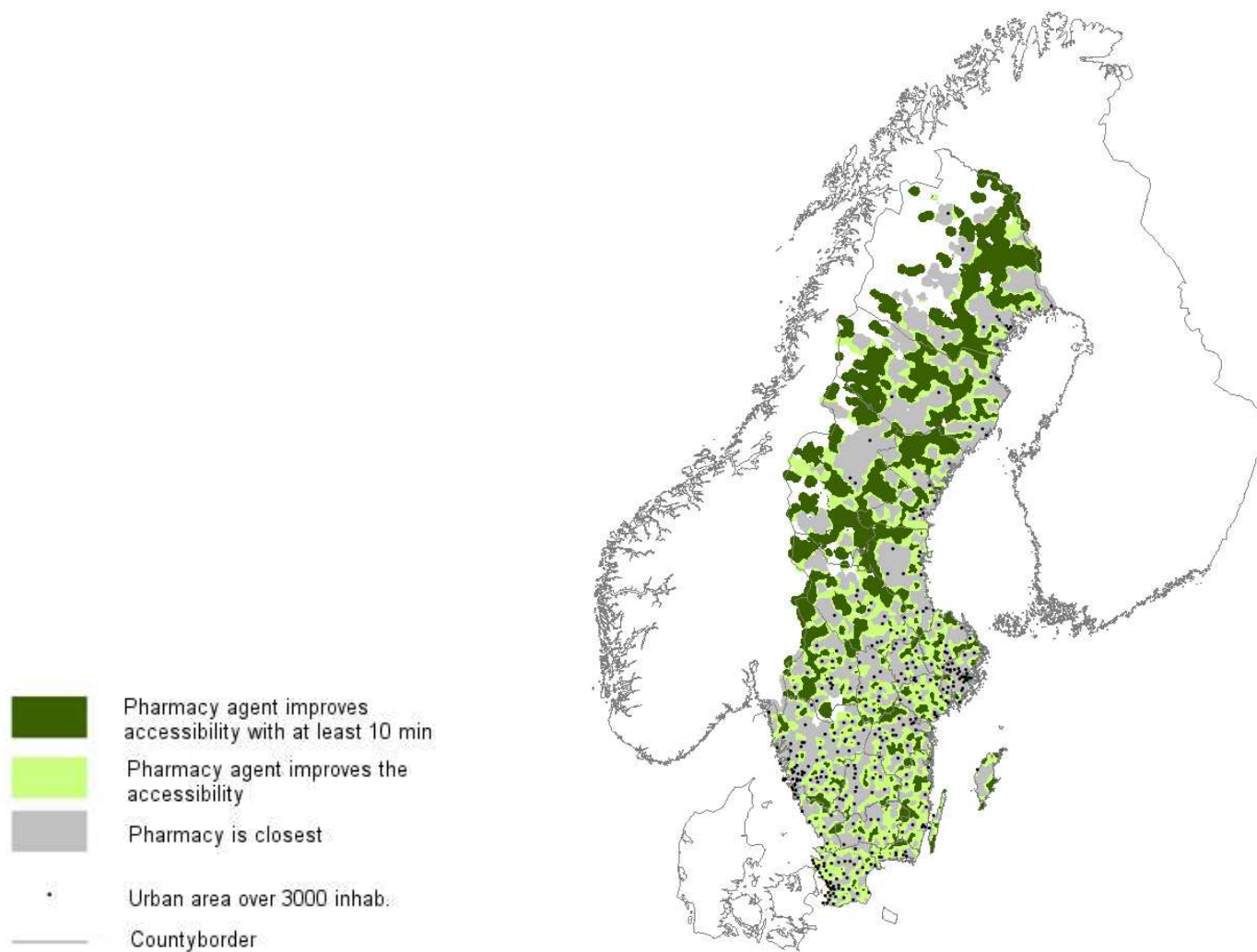
\*number of people aged 0-19 years and 65 years and over divided by the number of people aged 20-64 years, multiplied by 100.



Degree of proximity  
to various sizes of  
localities








# Five preferred conditions for our needs

- Comparability over time
- Corresponding resolution between grid and road networks
- One single contact person/place
- One common method to handle confidential data
- Different pricing and dissemination policy dependent on purpose





Thank you for your attention

Read more at [www.growthanalysis.se](http://www.growthanalysis.se)

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