

Population data for the Common Case Study in INTARESE and HEIMTSA

County totals

Age group fractions on a country level

Age group totals on a country level

Age group totals on a grid level (Emep 50 km x 50 km grid)

For the years 2000, 2010, 2020, 2030 and 2050

Different variants for the years 2020, 2030 and 2050

(For available tables see Annex 1, part C)

Data sets have mainly been derived by **Alexandra Kuhn (USTUTT)** and partly by **Danielle Vinneau (IC)**, partly based on data sets provided by **Danielle Vinneau (IC)**, with the help of **Aileen Yang (NILU)** and **Joachim Roos (USTUTT)**.

1) Data needs

Population data are needed for estimating the health impacts due to emission of pollutants and other stressors. As for the case study the Emep¹ 50 km x 50 km grid is used as a basis for emission, concentration, health effect and impact assessment, also the population data are needed on this grid.

- Spatial information about the population data is needed to understand where the receptors are and thus to be able to indicate where health effects occur to which extend.

It is furthermore relevant that the population data are stratified by gender and age groups.

- Information about age groups and gender is relevant to be able to apply exposure response functions as some of them apply only to certain age groups and may differ by gender. Also, for the “personal” exposure modelling to PM_{2.5} splitting into age groups by gender is needed.

Projections to the years 2020, 2030 and 2050 are required as well. Growth rates for age groups, separated by gender, may differ from each other.

- Temporal information is required to estimate health impacts for future years, including different scenarios for each future year.

2) Data sources

A) **Census data** are available on LAU² level 2 for the year 2001. They are stratified by gender and age. (See also Annex 1, part A, section 2)

Usage:

- These data are used as basis data set for 2000/2001.
- They give spatial information as well as information on age groups and gender.

Drawbacks:

- They do not give information about the development in the future.
- Only data for 23 countries are available. BG, CY, LV, RO, CH, and NO are missing.

B) **UN data**³ are available by country for the years 1950 to 2050 stratified by gender and 5-year age groups. (See also Annex 1, part A, section 3)

Usage:

- First usage: Filling of information gaps on country totals and gender and age stratification for those countries for which no LAU census data is available.
- Second usage: Deriving growth rates of population subgroups for future years.

¹ <http://www.eea.europa.eu/data-and-maps/data/emep-grids-reprojected-by-eea>

² http://en.wikipedia.org/wiki/Local_administrative_unit

³ <http://esa.un.org/unpp/index.asp?panel=2>

- Third usage: If for some reason not gridded data are needed but country totals, UN data can be taken.

Drawbacks:

- They give information on a country level. No further spatial information is available.

C) **GWP**⁴ (Gridded World Population) data are available from CIESIN/SEDAC. They provide gridded data on several resolutions for several regions. Interesting for this study are the data for 2000 and 2010 for a resolution of ½°. (See also Annex 1, part A, section 1)

Usage:

- Filling of spatial information gaps for those countries for which no LAU census data is available.
- Give some feeling for spatial shift of population from 2000 to 2010.

Drawbacks:

- No information for the years 2020, 2030 and 2050 is available.
- No stratification regarding gender or age groups is available.

D) **EUROSTAT**⁵ data and projections are available for all required years.

Usage:

- EUROSTAT data, including projections to the future, are used as one basic assumption for the energy modelling, which in turn is an important basis for emission scenario modelling.

Drawbacks:

- No stratification regarding gender or age groups is available for future years.

Comparisons (see Annex 1, part B, section 1) indicate that EUROSTAT data, including projections, does not differ much from UN data, including projections. Thus, consistency is preserved.

Rationale for choosing data sets

First of all a basic data set for 2000 needs to be selected / generated from all sources, that forms the basis for projections to the future. It needs to provide gridded information on age groups and gender.

LAU census data are chosen – filled with UN data for those countries for which there is no LAU census data available (supplemented with spatial information from GWP data). The reasons are that i) all data sources for 2000 fit quite well (see Annex 1, part B, section 1) so there is no reason for not taking any of them and ii) that it is the most comprehensive and informative data set available regarding age groups and gender. UN data can be used to fill

⁴ <http://sedac.ciesin.columbia.edu/gpw/global.jsp>

⁵ <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=de&pcode=tps00002&plugin=1>

gaps in the LAU census data ([see Annex 1, part B, section 1](#)) as country totals correspond well (supplemented with spatial information from GWP data).

GWP data, despite the fact that they provide already the population on the Emep grid for 2000 and also for 2010! (spatial shift of population), are not chosen as i) other data sets also have information on the spatial shift of the population (at least on a country level, though not on the grid level) and ii) no statement about the age and gender structure of the population in each grid cell is available. One cannot simply convey the percentages of the LAU data to the 2010 GWP data, either, because i) they correspond to 2000 and not to 2010 and ii) GWP gridded data do not sufficiently correspond to LAU/UN data for such a transfer ([see Annex 1, part B, section 3](#)).

Based on this data set for 2000, further data sets for the future (2020, 2030 and 2050) are needed. Thus, a data source needs to be chosen that serves as basis for estimating the future growth rates. Those growth rates, for each population subgroup, are taken from UN data. The reasons are that i) UN data have several growth rates (middle, high, low) which gives some kind of uncertainty bounds, ii) EUROSTAT growth rates fit quite well with the UN data growth rates ([see Annex 1, part B, section 1](#)). So for consistency reasons UN data are used wherever possible.

3) Steps to generate the required data sets

Step 1a: Processing LAU census data to fit it to the Emep grid cell ([see Annex 1, part A, section 2](#))

- Filling gaps in the available data sets (e.g. for some countries for some LAU regions only the total number of persons was available, not split by age and gender)
- Filling missing age groups (e.g. for some countries no 5-year age bands were given but e.g. 15-year bands: they were further split up using age group fractions derived from the UN data)
- Intersection with Emep 50 km x 50 km grid
- Summing up per grid cell, age and gender

Step 1b: Filling gaps: Filling data for those countries for which no LAU census data was available ([see Annex 1, part A, section 2](#))

- Using UN data for country totals
- Splitting into subgroups on a country level using UN data (subgroup fractions)
- Area-weight total population using GWP data (using percentages of grid cells compared to the total GWP population)

UN data are used for country totals as country totals for all sources are relatively small, so there is no reason against using them ([see Annex 1, part B, section 1](#)). Furthermore, UN data country totals and growth rates are used for projections to the future (see step 2). Thus, consistency is preserved.

Step 1c: Summing up data from both sources (see [Annex 1, part A, section 2](#))

- Summing up values for each grid cell from both sources

Step 2: Projections to the future (see [Annex 1, part A, section 3](#))

- Growth rates from UN data (for each subgroup separately) are taken to project the basic data set to the future.
- Result: Data set including for each grid cell the number of persons of each subgroup in the years 2000, 2010, 2020, 2030 and 2050. For 2020, 2030 and 2050, medium, high and low estimates are available.

Growth rates from UN data are taken because i) UN data are taken whenever possible for consistency reasons (see also Rationale for choosing data sets), ii) UN data have several growth rates (middle, high, low) which gives some kind of uncertainty bounds, and iii) EUROSTAT growth rates fit quite well with the UN data growth rates so there is no inconsistency here.

Issues that can only partly be taken into account

- People move along the time around places; inside a country, around the continent or to and from other continents. These movements may differ with the age; younger people are often more flexible and moving more freely than elderly. A nation can increase or decrease with time depending in birth rates, death rates and migration.

Differences can be seen e.g. between 2000 and 2010, according to the GWP data (see [Annex 1, part B, section 2.2](#)). Some countries grow or shrink in total, for others the movement within the country is maybe even more relevant.

It is possible with the described methods to take into account the growth (shrink) rates of total countries. Movements within a country cannot be tackled. Neither can movements due to land use change be tackled with these methods (this might make more sense on a basis of higher resolution anyway).

Annex 1

A) Data sources and data processing

1) CIESIN / SEDAC data: Gridded World Population (GWP)

- 1.1) Source: <http://sedac.ciesin.org/gpw/global.jsp>
- 1.2) Years: 2000 and 2010, ½°
- 1.3) Properties: Gridded in several resolutions, downloaded for ½°, available for 2000, 2005, 2010, 2015, downloaded 2000 and 2010 available for several regions, downloaded for Europe.
- 1.3) Processing: intersection with the Emep 50x50 grid, resulting into a table which tells how many persons live in each Emep grid cell; Spatial information for 6 countries was extracted for area-weighting country totals (see also 2.4)).

2) Census data on LAU⁶ level 2 individual Country Statistics offices

- 2.1) Source: individual Country Statistics offices
- 2.2) Years: mostly for 2001 (otherwise 1999, 2000 and 2002), LAU level 2
- 2.3) Properties: stratified by gender and age groups

Country	Year	Age groups
AT	2001	0-5, 5-10, 10-15, 15-20, 20-25, 25-30, 35-40, 45-50, 50-55, 55-60, 60-65, 65-70, 70-75, 75-80, 80PLUS
BE	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95PLUS
CZ	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85PLUS
DK	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99, 100-104, 105-109, 110PLUS
EE	2000	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85PLUS

⁶ http://en.wikipedia.org/wiki/Local_administrative_unit

FI	2001	0-5, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99, 100PLUS
FR	1999	0-5, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95PLUS
DE	2001	0-5, 6-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-74, 75PLUS
GR, HU, IT, UK	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85PLUS
ES	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90PLUS
IE	2001	0-4, 5-9, 10-14, 15-24, 25-44, 45-64, 65PLUS
SI	2002	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85PLUS
LT	2001	0-14, 15-24, 25-39, 40-54, 55-64, 65-74, 75-84, 85PLUS
LU	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75PLUS
MT	2001	0-14, 15-24, 25-49, 50-64, 65-79, 80PLUS
NL	2001	0-14, 15-24, 25-39, 40-54, 55-64, 65-74, 75-84, 85PLUS
PL	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65PLUS
PT	2001	0-14, 15-24, 25-39, 40-54, 55-64, 65-74,

		75-84, 85PLUS
SK	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99, 100PLUS
SE	2001	0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99, 100PLUS

2.4) Processing: filling gaps, filling missing age groups; intersection with Emep 50x50 grid and summing up per grid cell, age and gender.

Filling gaps

Country	Remark
AT	
BE	
CZ	No data problems, but formatting problems: saved as .cvs to fill into the database
DK	
DE	Obstacle 1: solved manually; first two age groups weird (0-5, 6-9), otherwise age groups "normal" (10-14, 15-19,...) → ignored and just assumed that the first age groups are 0-4, 5-9
EE	"unknown" (obstacle 2): inserted into database but neglected; filled up with zeros instead of dashes
FI	
FR	
GR	No data problems, but formatting problems: saved as .cvs to fill into the database
HU	
IE	Obstacle 3: only problem for "totals" not for "male"

	and "female"; neglected "totals": not uploaded into database
IT	
LT	Obstacle 2 "unknown": inserted into database but neglected
LU	
MT	No data problems, but formatting problems for "females": saved as .csv to fill into the database
NL	
PO	
PT	
SK	SHN 32B518875 F90-94 is a negative figure: neglected
SI	Obstacle 3: solved manually
ES	
SE	
UK	

Obstacle 1:

Several villages do not give a value for each age band but only as a total.

Solution 1:

Sum up over each age group for the whole country and calculate the fraction of each age group compared to the total. Apply these fractions to the gaps to get a possible distribution of the total values per village to the age groups.

Obstacle 2:

For LT and EE there is a field "unknown" when it is not clear how old some people are.

Solution 2:

In LT 325 people or 0.01% are affected; and in EE 441 people or 0.03%. Given the very small numbers, the "unknowns" are ignored.

Obstacle 3:

In Ireland and Slovenia, for some villages, there are one or several fields left empty, leaving all the others not to sum up to the total value given for this village.

Solution 3:

IE: In Ireland the problem only existed for the “total” population, not for “female” and “male”. Do not use the total tables but the female and the male only. SI: If there is only one field missing in one line just insert the number of missing people. If there are several fields missing, use the average percentages of age groups to split up the difference of the total number of people per village and the sum of those listed proportionally.

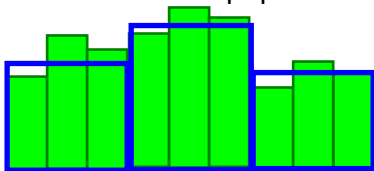
Filling missing age groups

For all countries:

Bring the data into a shape that all countries have the same age groups:

0-4, 5-9 ... 60-64, 65PLUS.

For this, the UN data fractions were used to split bigger age groups. E.g. if there is the big group AB in the LAU data consisting of group A and group B: The percentage of A in AB is calculated and the percentage of B in AB. Those percentages are used to split up the LAU data of the group AB into group A and group B. (number of AB in population file * (%UN A / (%UN A + %UN B)), and number of AB in population file * (%UN B / %UN A + %UN B))



A help file was created containing the fraction of each of the age groups in the UN data and those in the LAU data (and one with percentages combined for EU29: based on LAU fractions but filled up with UN fractions for those countries for which no LAU data is available). These fraction are country averages. Further calculations, as far as possible, are based on the data for each LAU unit, i.e. country averages (UN) are only used for those countries for which no LAU data is available at all. (See Part C, table Age_group_fractions_LAU-UN_2000_country_level)

Intersection with Emep 50x50

The intersection file defines the fraction of the LAU-area sitting in an Emep cell. It also contains information about the country the LAU-area is lying in.

A unique ID was created for identification: <SHN>_<Emep_ID>_<Country_ID>.

The intersection file was generated from the files given for each country separately including information on the area of an SHN inside the Emep grid cell and the area of each SHN (administrative unit).

Country_ID ‘VT’ and ‘SM’ were renamed to ‘IT’.

For some countries, in the intersection file there occurred SHN-codes that consisted only of XXXXX and that lay in adjacent countries. Thus, no use could be made of this information and those lines were deleted in the intersection file.

For IE the SHN-codes in the country specific file and the population data file did not match as in one file they started with 0 and the other the leading 0 did not exist. For the affected SHN's the 0 was deleted and thus the files matched.

Summing up per Emeq 50x50 grid cell, age and gender

For all countries (separately) for which LAU data were available the values for each age group and gender was summed up for each Emeq 50x50 grid cell. Result: Per Emeq 50x50 grid cell a value is available for each 5-year age group and gender.

Secondly, these country specific files are summed up to a file containing all EU countries, e.g. for each grid cell and for each subgroup there is one value available.

Filling data gaps of LAU data with other sources

For those countries for which no LAU census data were available it is necessary to fill the data gaps. The steps are using UN data for country totals, splitting into subgroups on a country level using UN data, area-weight total population using GWP data.

Using UN data for country totals

UN country totals are used for BG, CH, CY, LV, RO and NO.

Splitting into subgroups on a country level using UN data

From UN data the fractions of each age group had already been derived (see above) on a country level. These fractions were applied to the country totals to result in numbers for each subgroup for each of the six countries.

Area-weight total population using GWP data

The percentage of each grid cell compared to the total GWP population for each of the six countries was derived (taking into account that border cells belong to different countries):

$\% \text{GWP}_{i,c} = \text{GWP}_i * \text{intersection}_{i,c} / \text{country total}_c$ (i = grid cell, c = country).



Summing up both sources

Gridded data of LAU census data and gridded data for 'non-LAU census data countries' were added for each subgroup to result in a comprehensive data set for EU29 countries.

3) UN data

3.1) Source: <http://esa.un.org/UNPP/index.asp?panel=1>
<http://esa.un.org/UNPP/index.asp?panel=2>

3.2) Years: 1950 – 2050

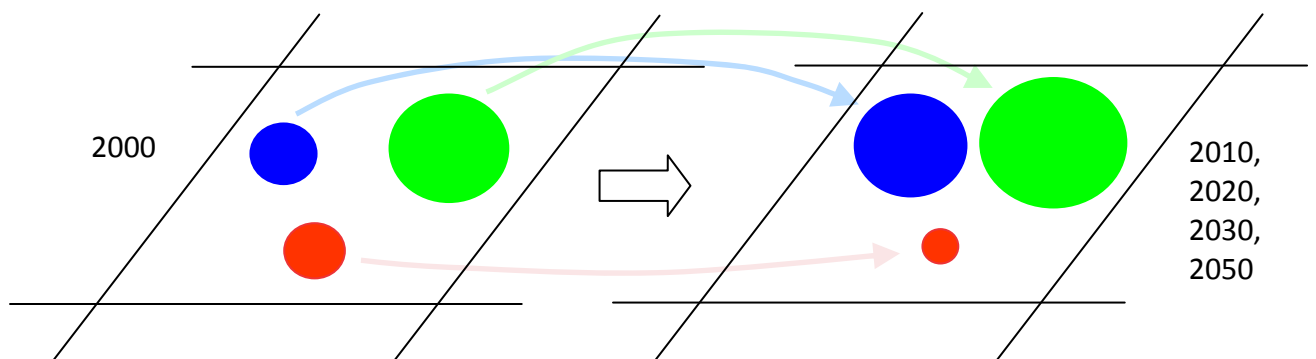
3.3) Properties: Stratification by gender and 5-year age groups

3.4) Processing: Country totals as well as numbers for each age group were gathered for all EU29 countries. Age group fractions were calculated (see also 2.4)).

Projection to the future:

Future growth rates taken from the UN data were applied to the LAU/UN basic data set for 2000/2001. An example equation is shown: calculating the future values of the basic data set (2000) for 2020, by subgroup s and country c (intersected with Emep grid cells to result in a gridded data set):

$$BasicSet_{2020,s,c} = \frac{BasicSet_{2000,s,c} * UN_{2020,s,c}}{UN_{2000,s,c}} .$$



4) EUROSTAT

4.1) Source: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=de&pcode=tps00002&plugin=1>

4.2) Years: 2000, 2010, 2015, 2020, 2025, 2030, 2035, 2040, 2045, 2050, 2055, 2060

4.3) Properties: 5-year intervals may be used for energy models to cover years in between those looked at in this study

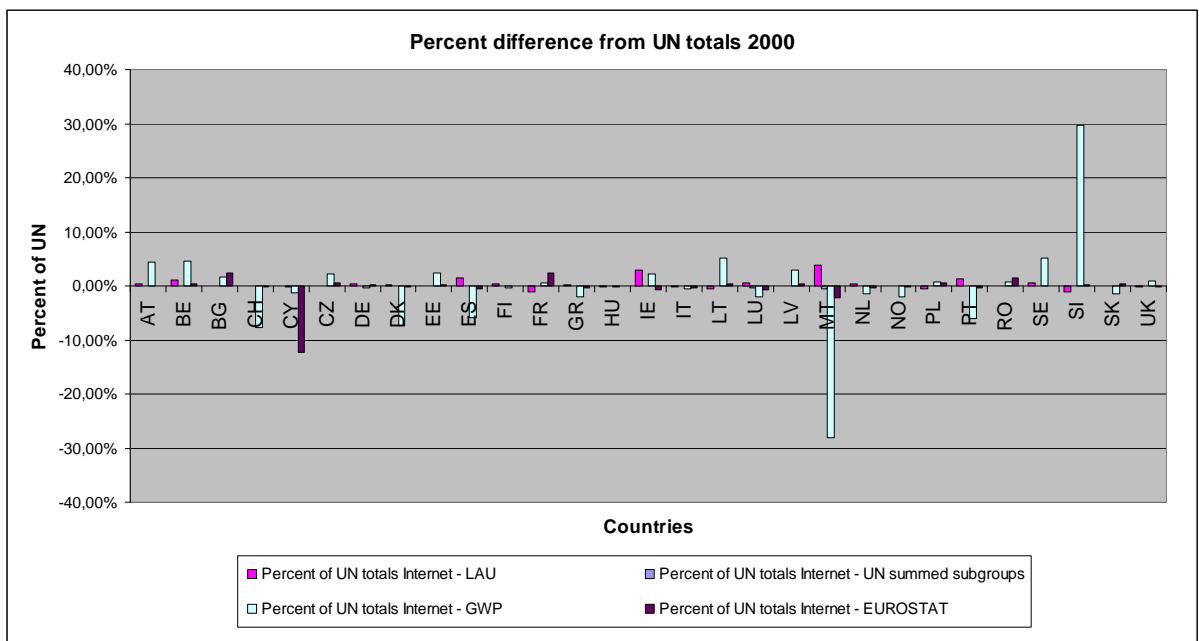
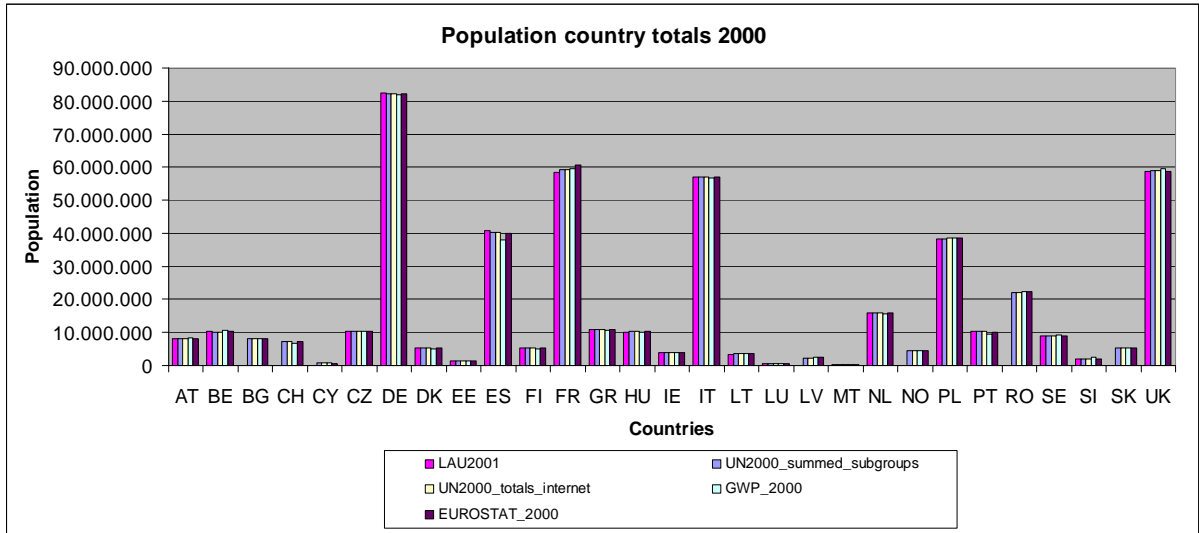
4.4) Processing: no processing was needed for providing the population data sets

B) Data comparison

1) Compare country totals

1.1) Compare all sources within each year

2000



Negative means: country totals are lower than UN country totals; positive means they are higher

Country totals 2000

Country ID	LAU 2001	UN 2000 summed subgroups	UN 2000 totals Internet	GWP 2000	EUROSTAT 2000
AT	8,032,926	8,005,000	8,005,000	8,355,839	8,002,186
BE	10,296,350	10,193,000	10,193,000	10,660,130	10,239,085
BG		8,009,000	8,006,000	8,143,510	8,190,876
CH		7,185,000	7,184,000	6,630,674	7,164,444
CY		785,000	787,000	776,786	690,497
CZ	10,224,836	10,227,000	10,224,000	10,453,945	10,278,098
DE	82,440,309	82,074,000	82,075,000	81,821,343	82,163,475
DK	5,349,212	5,336,000	5,335,000	4,942,446	5,330,020
EE	1,370,052	1,370,000	1,370,000	1,402,851	1,372,071
ES	40,847,371	40,266,000	40,264,000	37,887,229	40,049,708
FI	5,194,901	5,176,000	5,173,000	5,151,914	5,171,302
FR	58,520,688	59,127,000	59,128,000	59,431,232	60,537,977
GR	10,964,020	10,946,000	10,942,000	10,728,148	10,903,757
HU	10,196,782	10,210,000	10,215,000	10,199,762	10,221,644
IE	3,917,203	3,801,000	3,804,000	3,885,084	3,777,763
IT	56,995,744	57,117,000	57,116,000	56,782,766	56,923,524
LT	3,483,971	3,503,000	3,501,000	3,680,405	3,512,074
LU	439,539	435,000	437,000	428,262	433,600
LV		2,374,000	2,374,000	2,445,392	2,381,715
MT	404,039	387,000	389,000	279,955	380,201
NL	15,985,538	15,915,000	15,915,000	15,692,754	15,863,950
NO		4,483,000	4,484,000	4,389,503	4,478,497
PL	38,242,197	38,431,000	38,433,000	38,687,194	38,653,559
PT	10,356,117	10,228,000	10,226,000	9,612,392	10,195,014
RO		22,139,000	22,138,000	22,296,042	22,455,485
SE	8,909,128	8,860,000	8,860,000	9,313,072	8,861,426
SI	1,964,036	1,986,000	1,985,000	2,576,581	1,987,755
SK		5,378,000	5,379,000	5,298,750	5,398,657
UK	58,791,867	58,906,000	58,907,000	59,500,344	58,785,246

Country totals for the GWP data source were aggregated from the grid cell level to the country level. They do not necessarily correspond to the country total values given in the Internet⁷.

⁷ <http://sedac.ciesin.columbia.edu/gpw/global.jsp>

Percent difference of each source from UN totals from the Internet

Country ID	Percent of UN totals Internet - LAU	Percent of UN totals Internet - UN summed subgroups	Percent of UN totals Internet - GWP	Percent of UN totals Internet - EUROSTAT
AT	0.35%	0.00%	4.38%	-0.04%
BE	1.01%	0.00%	4.58%	0.45%
BG		0.04%	1.72%	2.31%
CH		0.01%	-7.70%	-0.27%
CY		-0.25%	-1.30%	-12.26%
CZ	0.01%	0.03%	2.25%	0.53%
DE	0.45%	0.00%	-0.31%	0.11%
DK	0.27%	0.02%	-7.36%	-0.09%
EE	-0.00%	0.00%	2.40%	0.15%
ES	-1.45%	0.00%	-5.90%	-0.53%
FI	0.42%	0.06%	-0.41%	-0.03%
FR	-1.03%	0.00%	0.51%	2.38%
GR	0.20%	0.04%	-1.95%	-0.35%
HU	-0.18%	-0.05%	-0.15%	0.07%
IE	-2.98%	-0.08%	2.13%	-0.69%
IT	-0.21%	-0.00%	-0.58%	-0.34%
LT	-0.49%	0.06%	5.12%	0.32%
LU	0.58%	-0.46%	-2.00%	-0.78%
LV		0.00%	3.01%	0.32%
MT	3.87%	-0.51%	-28.03%	-2.26%
NL	0.44%	0.00%	-1.40%	-0.32%
NO		-0.02%	-2.11%	-0.12%
PL	-0.50%	-0.01%	0.66%	0.57%
PT	-1.27%	0.02%	-6.00%	-0.30%
RO		0.00%	0.71%	1.43%
SE	0.55%	0.00%	5.11%	0.02%
SI	-1.06%	0.05%	29.80%	0.14%
SK		-0.02%	-1.49%	0.37%
UK	-0.20%	0.00%	1.01%	-0.21%

Colour coding: black: smaller than 1; green: between 1 and 10; blue: greater than 10

Conclusions:

LAU country totals do not vary more than 4% from the UN country totals. One reason for differences might be that the LAU census data was not always for the year 2000 but also for 2001, 2002 or 1999.

As the LAU census data and the UN data are similar, for filling the gaps (countries for which LAU do not exist) UN country totals can be used.

EUROSTAT country totals do not vary more than 3% from the UN country totals – except for Cyprus; for most countries the variation is less than 1%.

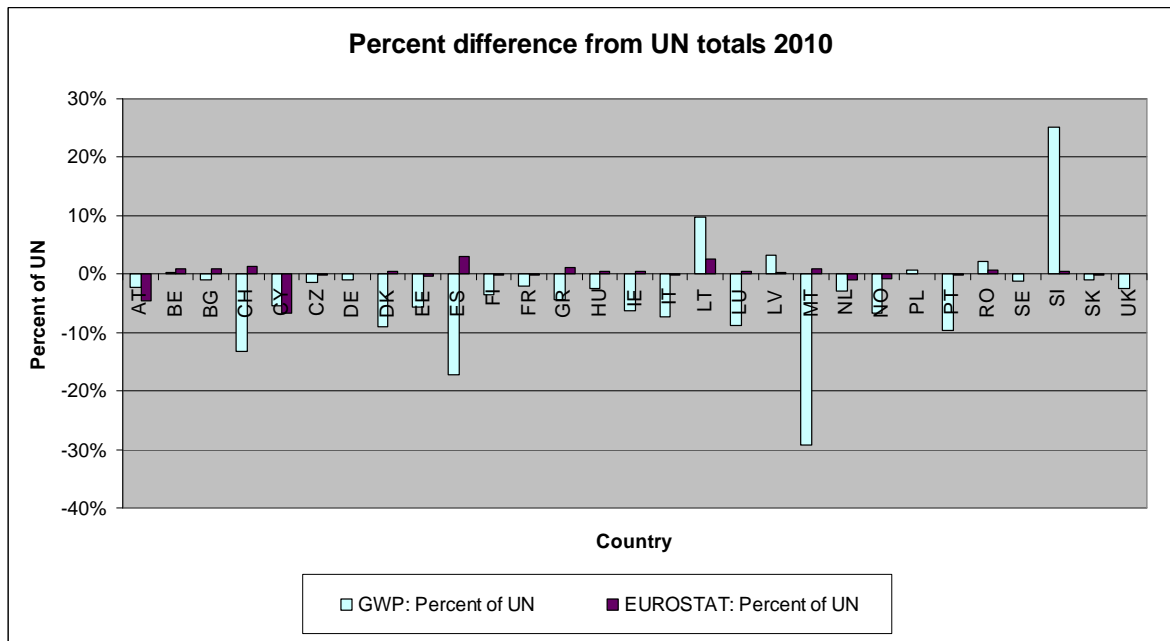
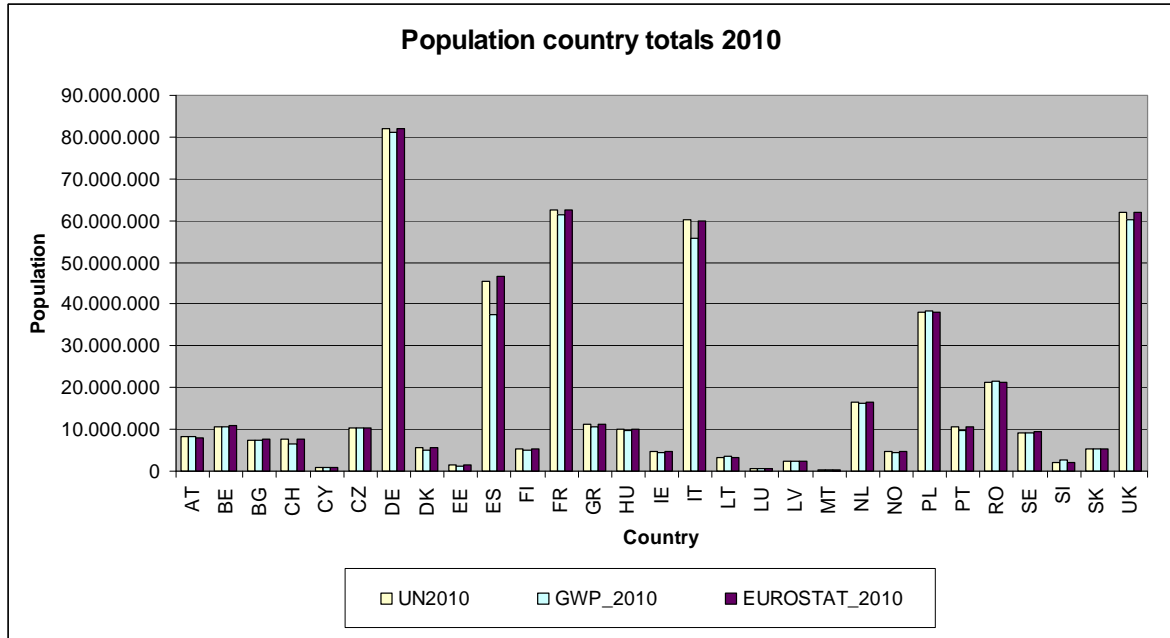
GWP country totals, as aggregated from the grid data, differs around 5%, sometimes being much lower, sometimes going up to 8%. For MT and SI the difference goes up to nearly 30%. This might be caused because the grids are so big and some information might get lost during the intersection and aggregation phases as the weighing scheme is purely area-based. Country total values given in the Internet⁸ fit better than the aggregated gridded version.

In general, no shift into any direction of any data set is observed. Thus, there is no general shift (over- or underestimation) of any data set.

⁸ <http://sedac.ciesin.columbia.edu/gpw/global.jsp>

2010

From here onwards. for UN country totals we use those directly from the Internet (not summing up subgroups). The reason is that the difference is minimal (s. 1.3). For comparison, only EUROSTAT, UN and GWP data remain.



Negative means: country totals are lower than UN country totals; positive means they are higher.

Country totals 2010

Country_ID	UN2010	GWP_2010	EUROSTAT_2010
AT	8,387,000	8,200,437	8,002,186
BE	10,698,000	10,725,918	10,783,738
BG	7,497,000	7,424,099	7,564,300
CH	7,595,000	6,598,559	7,694,796
CY	880,000	833,075	820,709
CZ	10,411,000	10,269,306	10,394,112
DE	82,057,000	81,195,420	82,144,902
DK	5,481,000	4,982,251	5,512,296
EE	1,339,000	1,264,806	1,333,210
ES	45,317,000	37,484,605	46,673,372
FI	5,346,000	5,155,887	5,337,461
FR	62,637,000	61,355,048	62,582,650
GR	11,183,000	10,687,098	11,306,765
HU	9,973,000	9,727,543	10,023,453
IE	4,589,000	4,297,500	4,614,218
IT	60,098,000	55,702,603	60,017,346
LT	3,255,000	3,575,928	3,337,008
LU	492,000	448,601	494,153
LV	2,240,000	2,313,316	2,247,275
MT	410,000	290,126	413,542
NL	16,653,000	16,156,615	16,503,473
NO	4,855,000	4,532,342	4,816,156
PL	38,038,000	38,317,653	38,092,173
PT	10,732,000	9,706,381	10,723,195
RO	21,190,000	21,628,625	21,333,838
SE	9,293,000	9,188,792	9,305,631
SI	2,025,000	2,536,050	2,034,220
SK	5,412,000	5,359,609	5,407,491
UK	61,899,000	60,341,893	61,983,950

Country totals for the GWP data source were aggregated from the grid cell level to the country level. They do not necessarily correspond to the country total values given in the Internet⁹.

⁹ <http://sedac.ciesin.columbia.edu/gpw/global.jsp>

Percent difference of each source from UN country totals

Country_ID	GWP: Percent of UN	EUROSTAT: Percent of UN
AT	-2.22%	-4,59%
BE	0.26%	0.8%
BG	-0.97%	-0.90%
CH	-13.12%	1.31%
CY	-5.33%	-6.74%
CZ	-1.36%	-0.16%
DE	-1.05%	-0.11%
DK	-9.10%	0.57%
EE	-5.54%	-0.43%
ES	-17.28%	2.99%
FI	-3.56%	-0.16%
FR	-2.05%	-0.09%
GR	-4.43%	1.11%
HU	-2.46%	0.51%
IE	-6.35%	0.55%
IT	-7.31%	-0.13%
LT	9.86%	2.52%
LU	-8.82%	0.44%
LV	3.27%	0.32%
MT	-29.24%	0.86%
NL	-2.98%	-0.90%
NO	-6.65%	-0.80%
PL	0.74%	0.14%
PT	-9.56%	-0.08%
RO	2.07%	0,68%
SE	-1.12%	0.14%
SI	25.24%	0.46%
SK	-0.97%	-0.08%
UK	-2.52%	0.14%

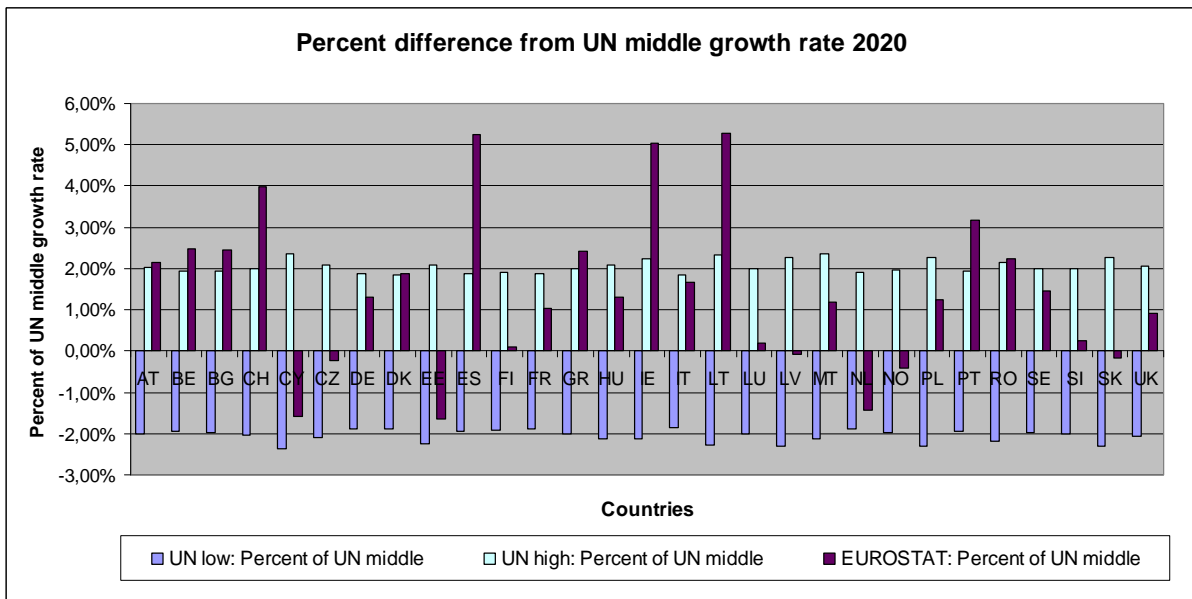
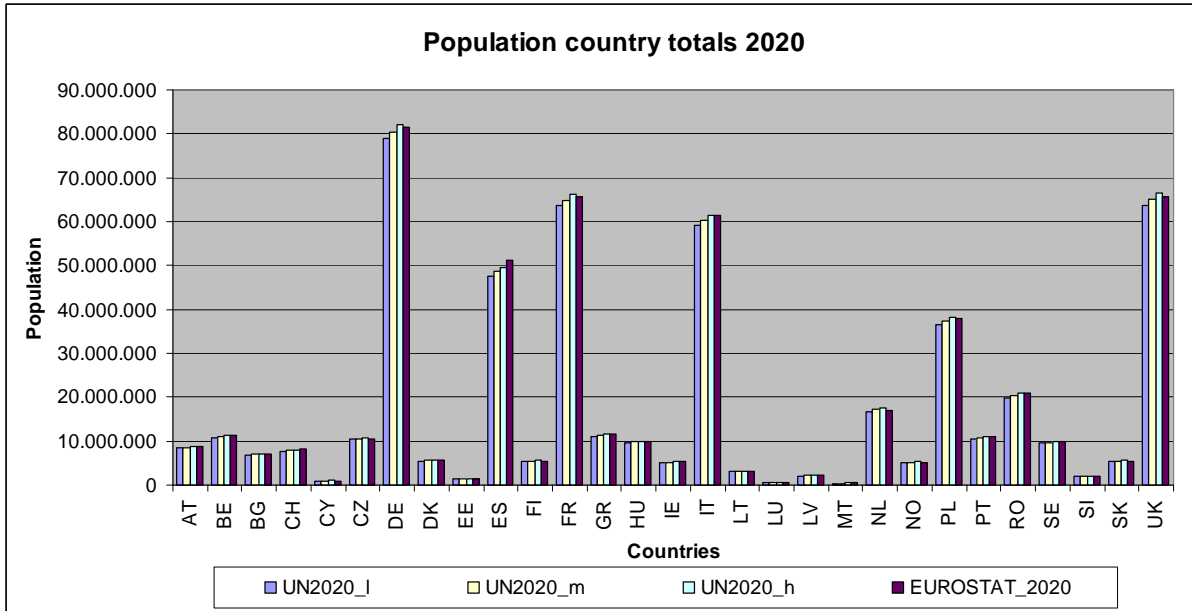
Colour coding: black: smaller than 1; green: between 1 and 10; blue: greater than 10

Conclusions:

EUROSTAT data for 2010 shows slightly bigger variations from the UN data than for 2000; but for most countries the variation is still less than 1%. GWP data shows bigger differences for 2010 than for 2000 (cf. reasoning for 2000); but they have the same tendencies.

2020

There is no data available from GWP for 2020. For comparison, only EUROSTAT and UN data remain. The UN data is projected to the future by using several growth rates. Low, medium and high are depicted here.



Negative means: country totals are lower than UN country totals (middle growth rate); positive means they are higher.

Country totals 2020

Country ID	UN2020 low	UN2020 middle	UN2020 high	EUROSTAT 2020
AT	8,367,000	8,539,000	8,711,000	8,723,363
BE	10,834,000	11,048,000	11,263,000	11,321,733
BG	6,879,000	7,017,000	7,152,000	7,187,743
CH	7,719,000	7,879,000	8,037,000	8,192,198
CY	947,000	970,000	993,000	954,522
CZ	10,346,000	10,568,000	10,789,000	10,543,351
DE	78,895,000	80,422,000	81,938,000	81,471,598
DK	5,453,000	5,557,000	5,660,000	5,661,099
EE	1,303,000	1,333,000	1,361,000	1,310,993
ES	47,620,000	48,564,000	49,480,000	51,108,563
FI	5,390,000	5,496,000	5,601,000	5,500,929
FR	63,699,000	64,931,000	66,158,000	65,606,558
GR	11,059,000	11,284,000	11,508,000	11,555,829
HU	9,558,000	9,766,000	9,971,000	9,892,967
IE	5,035,000	5,145,000	5,260,000	5,404,231
IT	59,287,000	60,408,000	61,530,000	61,420,962
LT	2,988,000	3,058,000	3,129,000	3,219,837
LU	539,000	550,000	561,000	551,045
LV	2,103,000	2,153,000	2,202,000	2,151,445
MT	413,000	422,000	432,000	427,045
NL	16,818,000	17,143,000	17,468,000	16,895,747
NO	5,098,000	5,200,000	5,303,000	5,177,999
PL	36,630,000	37,497,000	38,345,000	37,959,838
PT	10,556,000	10,767,000	10,974,000	11,108,159
RO	19,934,000	20,380,000	20,816,000	20,833,786
SE	9,520,000	9,713,000	9,907,000	9,852,965
SI	2,012,000	2,053,000	2,094,000	2,058,003
SK	5,316,000	5,442,000	5,565,000	5,432,265
UK	63,749,000	65,090,000	66,430,000	65,683,056

Percent difference of each source from UN country totals middle growth rate

Country_ID	UN low: Percent of UN middle	UN high: Percent of UN middle	EUROSTAT: Percent of UN middle
AT	-2.01%	2.01%	2.16%
BE	-1.94%	1.95%	2.48%
BG	-1.97%	1.92%	2.43%
CH	-2.03%	2.01%	3.98%
CY	-2.37%	2.37%	-1.60%
CZ	-2.10%	2.09%	-0.23%
DE	-1.90%	1.89%	1.31%
DK	-1.87%	1.85%	1.87%
EE	-2.25%	2.10%	-1.65%
ES	-1.94%	1.89%	5.24%
FI	-1.93%	1.91%	0.09%
FR	-1.90%	1.89%	1.04%
GR	-1.99%	1.99%	2.41%
HU	-2.13%	2.10%	1.30%
IE	-2.14%	2.24%	5.04%
IT	-1.86%	1.86%	1.68%
LT	-2.29%	2.32%	5.29%
LU	-2.00%	2.00%	0.19%
LV	-2.32%	2.28%	-0.07%
MT	-2.13%	2.37%	1.20%
NL	-1.90%	1.90%	-1.44%
NO	-1.96%	1.98%	-0.42%
PL	-2.31%	2.26%	1.23%
PT	-1.96%	1.92%	3.17%
RO	-2.19%	2.14%	2.23%
SE	-1.99%	2.00%	1.44%
SI	-2.00%	2.00%	0.24%
SK	-2.32%	2.26%	-0.18%
UK	-2.06%	2.06%	0.91%

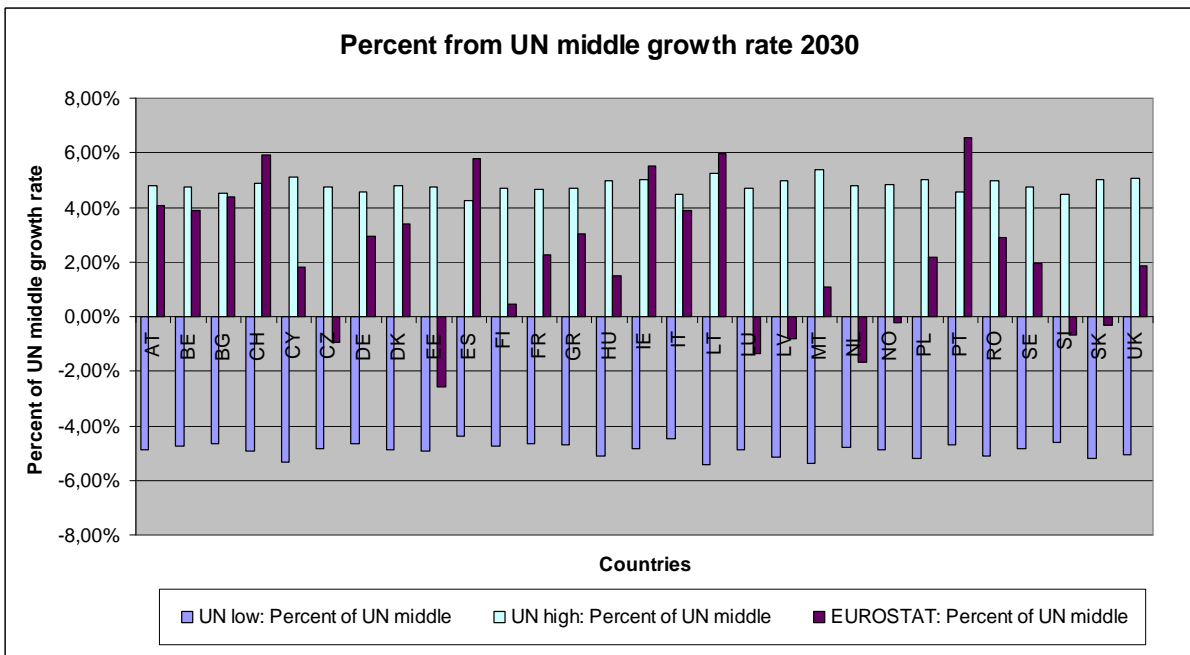
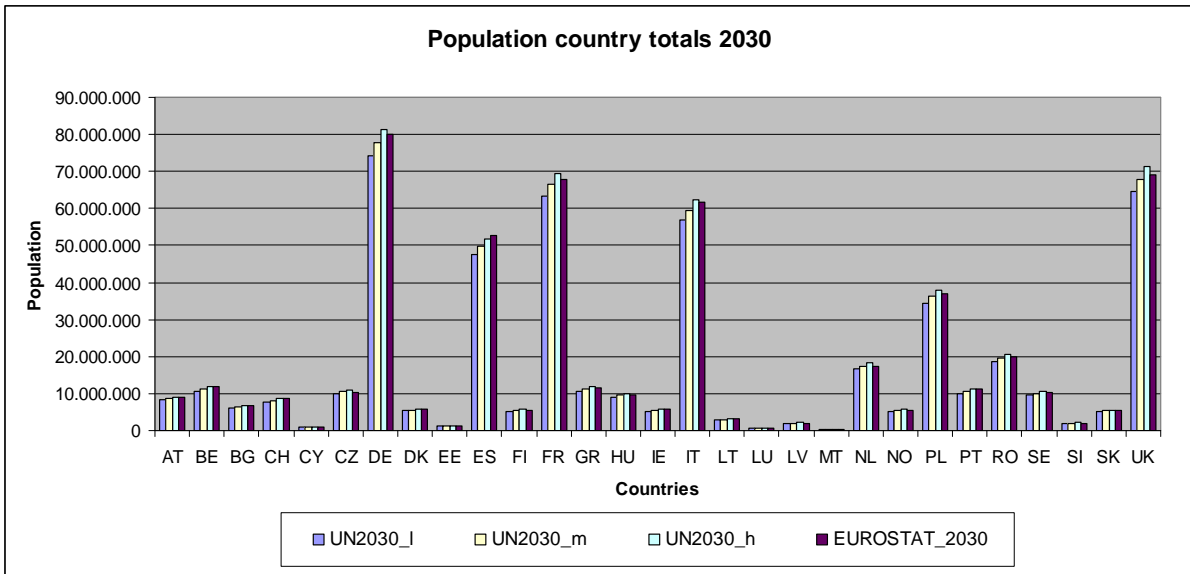
Colour coding: black: smaller than 1; green: between 1 and 10; blue: greater than 10

Conclusions:

Lower & higher growth rates (UN data) vary \approx 1.5-2.5 % from the middle one.

EUROSTAT data differs around 2% from the UN middle growth rate; some countries differ up to 5%. Most estimates are higher than the UN data ones.

2030



Negative means: country totals are lower than UN country totals (middle growth rate); positive means they are higher.

Country totals 2030

Country ID	UN2030 low	UN2030 middle	UN2030 high	EUROSTAT 2030
AT	8,217,000	8,637,000	9,049,000	8,988,139
BE	10,765,000	11,303,000	11,840,000	11,744,723
BG	6,168,000	6,469,000	6,761,000	6,752,644
CH	7,745,000	8,148,000	8,544,000	8,631,216
CY	997,000	1,053,000	1,107,000	1,071,966
CZ	10,013,000	10,520,000	11,018,000	10,420,166
DE	74,226,000	77,854,000	81,405,000	80,151,642
DK	5,343,000	5,616,000	5,885,000	5,807,527
EE	1,237,000	1,301,000	1,363,000	1,267,356
ES	47,599,000	49,772,000	51,893,000	52,660,674
FI	5,281,000	5,544,000	5,804,000	5,569,395
FR	63,374,000	66,474,000	69,573,000	67,982,012
GR	10,707,000	11,234,000	11,762,000	11,573,142
HU	9,024,000	9,509,000	9,981,000	9,651,197
IE	5,303,000	5,573,000	5,853,000	5,881,335
IT	56,887,000	59,549,000	62,213,000	61,868,177
LT	2,751,000	2,909,000	3,062,000	3,082,993
LU	585,000	615,000	644,000	606,654
LV	1,943,000	2,049,000	2,151,000	2,032,593
MT	404,000	427,000	450,000	431,601
NL	16,662,000	17,498,000	18,334,000	17,207,677
NO	5,249,000	5,518,000	5,786,000	5,506,470
PL	34,302,000	36,187,000	38,008,000	36,974,977
PT	10,123,000	10,620,000	11,107,000	11,317,257
RO	18,498,000	19,489,000	20,454,000	20,049,059
SE	9,590,000	10,076,000	10,555,000	10,270,173
SI	1,943,000	2,037,000	2,128,000	2,022,872
SK	5,071,000	5,348,000	5,616,000	5,332,069
UK	64,525,000	67,956,000	71,388,000	69,224,059

Percent difference of each source from UN country totals middle growth rate

Country_ID	UN low: Percent of UN middle	UN high: Percent of UN middle	EUROSTAT: Percent of UN middle
AT	-4.86%	4.77%	4.07%
BE	-4.76%	4.75%	3.91%
BG	-4.65%	4.51%	4.38%
CH	-4.95%	4.86%	5.93%
CY	-5.32%	5.13%	1.80%
CZ	-4.82%	4.73%	-0.95%
DE	-4.66%	4.56%	2.95%
DK	-4.86%	4.79%	3.41%
EE	-4.92%	4.77%	-2.59%
ES	-4.37%	4.26%	5.80%
FI	-4.74%	4.69%	0.46%
FR	-4.66%	4.66%	2.27%
GR	-4.69%	4.70%	3.02%
HU	-5.10%	4.96%	1.50%
IE	-4.84%	5.02%	5.53%
IT	-4.47%	4.47%	3.89%
LT	-5.43%	5.26%	5.98%
LU	-4.88%	4.72%	-1.36%
LV	-5.17%	4.98%	-0.80%
MT	-5.39%	5.39%	1.08%
NL	-4.78%	4.78%	-1.66%
NO	-4.87%	4.86%	-0.21%
PL	-5.21%	5.03%	2.18%
PT	-4.68%	4.59%	6.57%
RO	-5.08%	4.95%	2.87%
SE	-4.82%	4.75%	1.93%
SI	-4.61%	4.47%	-0.69%
SK	-5.18%	5.01%	-0.30%
UK	-5.05%	5.05%	1.87%

Colour coding: black: smaller than 1; green: between 1 and 10; blue: greater than 10

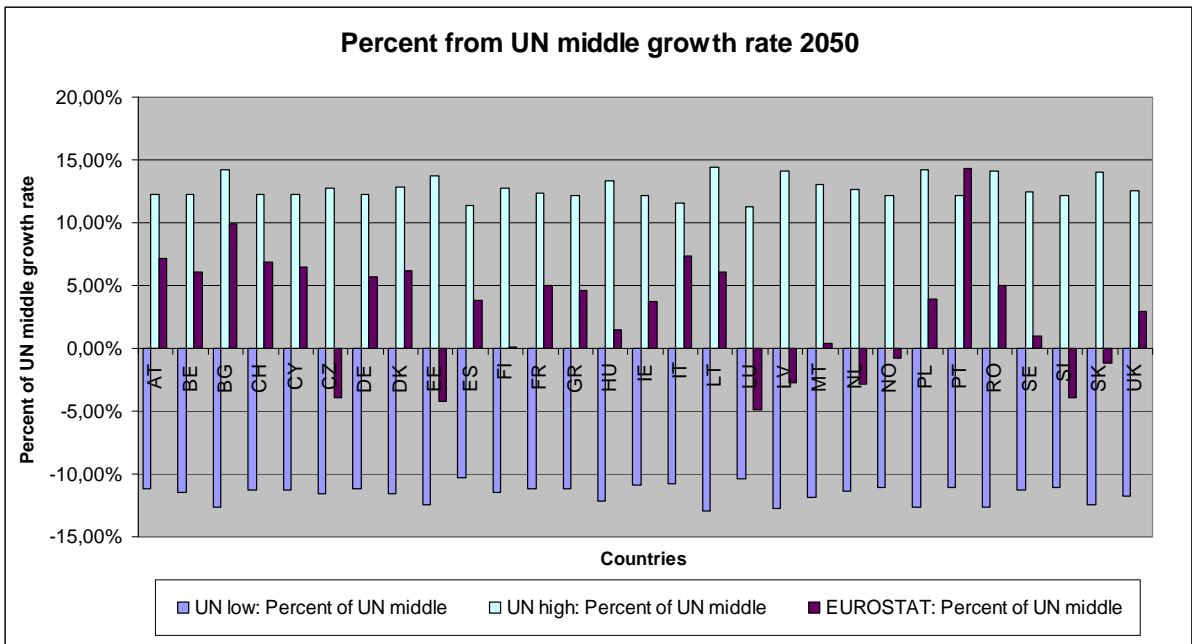
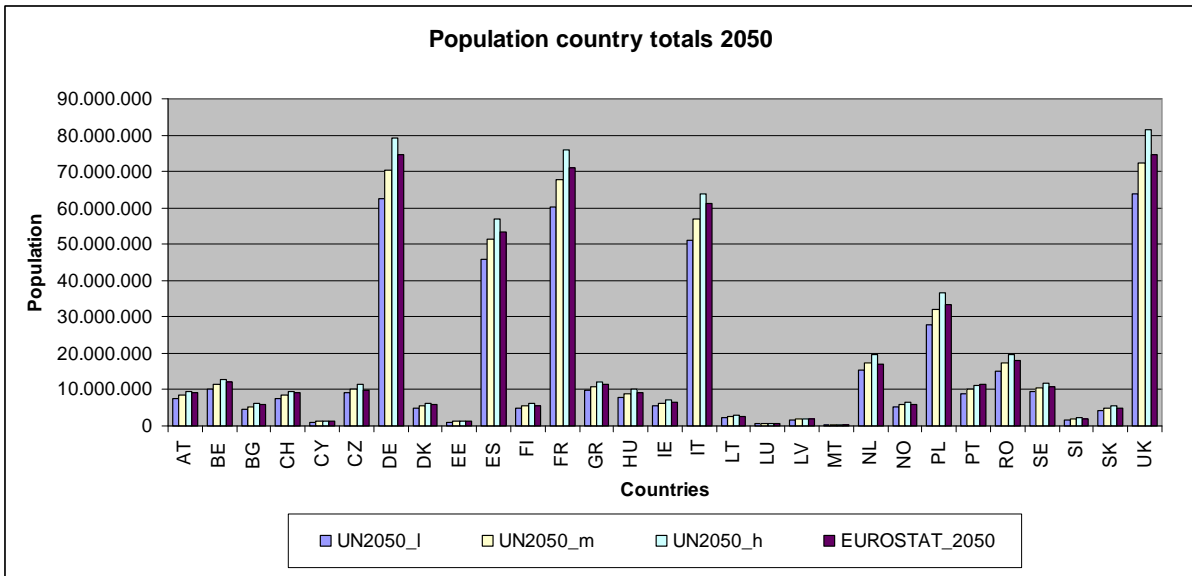
Conclusions:

Lower & higher growth rates (UN data) vary \approx 4-6 % from the middle one.

EUROSTAT data differs around up to 7% from the UN middle growth rate.

Most estimates are higher than the UN data ones.

2050



Negative means: country totals are lower than UN country totals (middle growth rate); positive means they are higher.

Country totals 2050

Country ID	UN2050 low	UN2050 middle	UN2050 high	EUROSTAT 2050
AT	7,565,000	8,515,000	9,560,000	9,127,487
BE	10,177,000	11,493,000	12,907,000	12,193,915
BG	4,711,000	5,392,000	6,160,000	5,923,361
CH	7,556,000	8,514,000	9,561,000	9,096,338
CY	1,043,000	1,175,000	1,319,000	1,251,488
CZ	9,103,000	10,294,000	11,611,000	9,891,885
DE	62,633,000	70,504,000	79,164,000	74,491,350
DK	4,907,000	5,551,000	6,266,000	5,895,057
EE	1,080,000	1,233,000	1,402,000	1,181,421
ES	45,960,000	51,260,000	57,071,000	53,228,962
FI	4,820,000	5,445,000	6,137,000	5,448,360
FR	60,118,000	67,668,000	76,029,000	71,044,478
GR	9,714,000	10,939,000	12,266,000	11,445,296
HU	7,848,000	8,934,000	10,127,000	9,061,131
IE	5,607,000	6,295,000	7,059,000	6,530,607
IT	50,901,000	57,066,000	63,694,000	61,239,852
LT	2,244,000	2,579,000	2,951,000	2,736,885
LU	657,000	733,000	816,000	697,206
LV	1,618,000	1,854,000	2,116,000	1,803,536
MT	364,000	413,000	467,000	414,781
NL	15,414,000	17,399,000	19,597,000	16,909,471
NO	5,290,000	5,947,000	6,668,000	5,897,500
PL	27,958,000	32,013,000	36,567,000	33,274,651
PT	8,902,000	10,015,000	11,235,000	11,448,641
RO	15,102,000	17,279,000	19,721,000	18,149,247
SE	9,379,000	10,571,000	11,883,000	10,671,512
SI	1,738,000	1,954,000	2,192,000	1,878,003
SK	4,304,000	4,917,000	5,604,000	4,859,108
UK	63,883,000	72,365,000	81,474,000	74,505,797

Percent difference of each source from UN country totals middle growth rate

Country_ID	UN low: Percent of UN middle	UN high: Percent of UN middle	EUROSTAT: Percent of UN middle
AT	-11,16%	12,27%	7,19%
BE	-11,45%	12,30%	6,10%
BG	-12,63%	14,24%	9,85%
CH	-11,25%	12,30%	6,84%
CY	-11,23%	12,26%	6,51%
CZ	-11,57%	12,79%	-3,91%
DE	-11,16%	12,28%	5,66%
DK	-11,60%	12,88%	6,20%
EE	-12,41%	13,71%	-4,18%
ES	-10,34%	11,34%	3,84%
FI	-11,48%	12,71%	0,06%
FR	-11,16%	12,36%	4,99%
GR	-11,20%	12,13%	4,63%
HU	-12,16%	13,35%	1,42%
IE	-10,93%	12,14%	3,74%
IT	-10,80%	11,61%	7,31%
LT	-12,99%	14,42%	6,12%
LU	-10,37%	11,32%	-4,88%
LV	-12,73%	14,13%	-2,72%
MT	-11,86%	13,08%	0,43%
NL	-11,41%	12,63%	-2,81%
NO	-11,05%	12,12%	-0,83%
PL	-12,67%	14,23%	3,94%
PT	-11,11%	12,18%	14,31%
RO	-12,60%	14,13%	5,04%
SE	-11,28%	12,41%	0,95%
SI	-11,05%	12,18%	-3,89%
SK	-12,47%	13,97%	-1,18%
UK	-11,72%	12,59%	2,96%

Colour coding: black: smaller than 1; green: between 1 and 10; blue: greater than 10

Conclusions:

Lower & higher growth rates (UN data) vary \approx 10.15 % from the middle one.

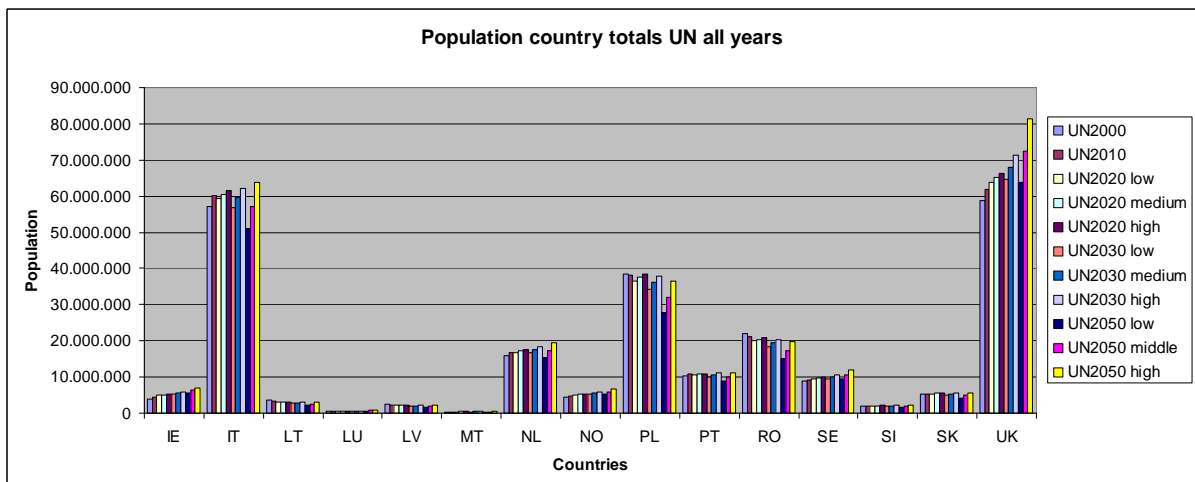
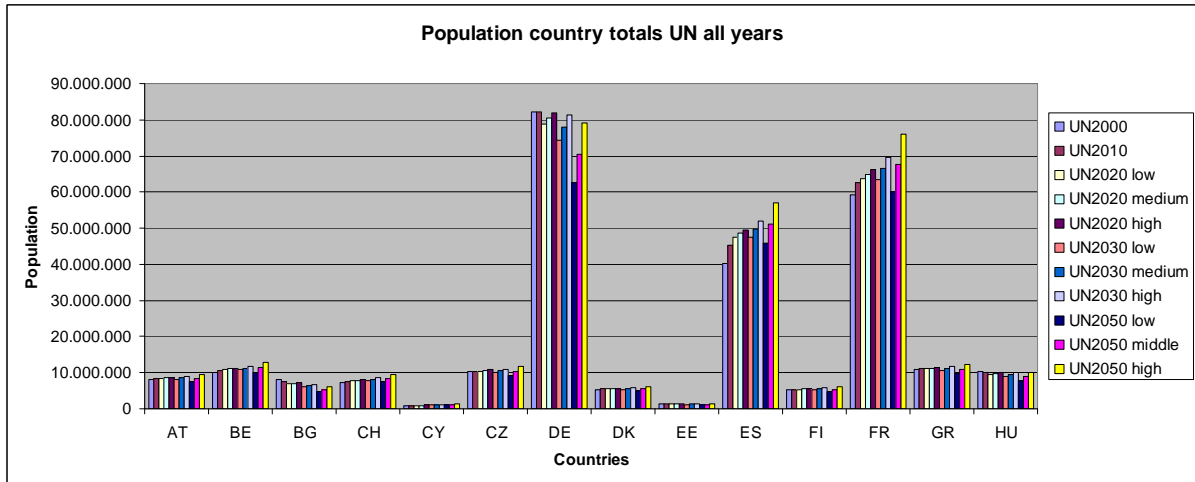
EUROSTAT data looks similar to 2030 but the differences are a bit higher (up to 15%).

1.2) Compare all years within one source

GWP

- [See section 2\).](#)

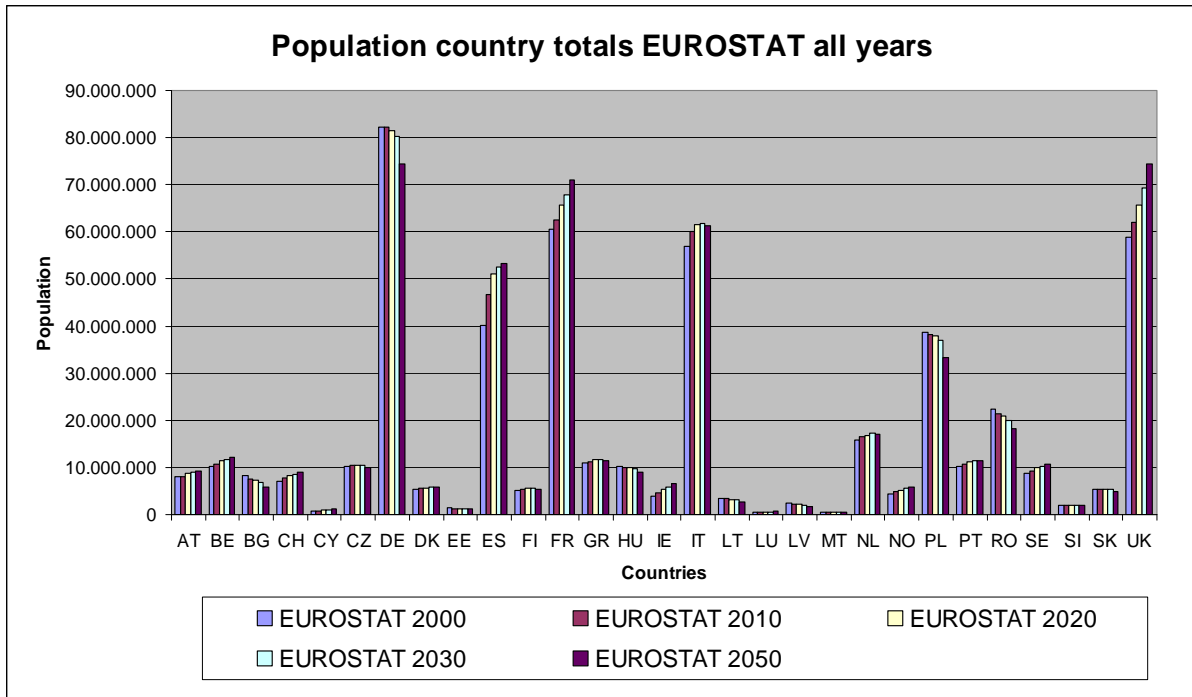
UN



Conclusion:

Some countries have the tendency to grow, e.g. UK, FR, IT, NL, BE and ES. Other countries seem to have a decrease in their population in the future, e.g. DE, PL, RO and BG. For some countries it is difficult to see a tendency. See also EUROSTAT data.

EUROSTAT



Conclusion:

Strong tendencies fit with those observed in the UN data: Some countries have the tendency to grow, e.g. UK, FR, IT, NL, BE and ES. Other countries seem to have a decrease in their population in the future, e.g. DE, PL, RO and BG.

For some countries it is difficult to see a tendency. See also UN data.

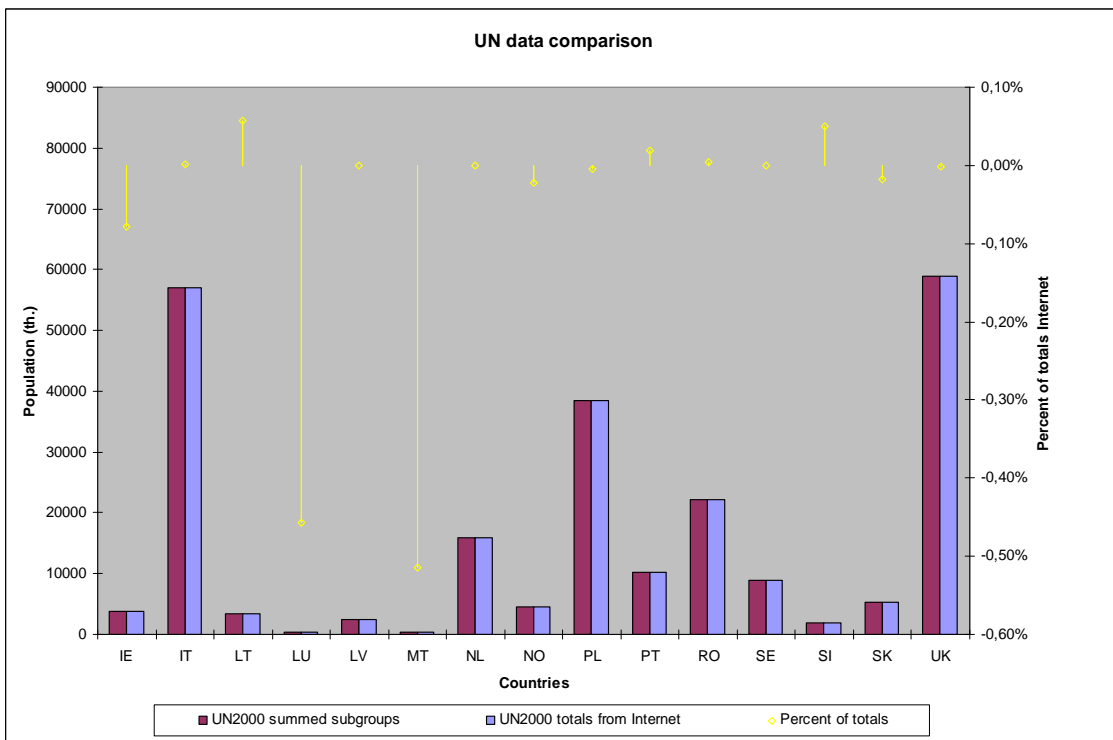
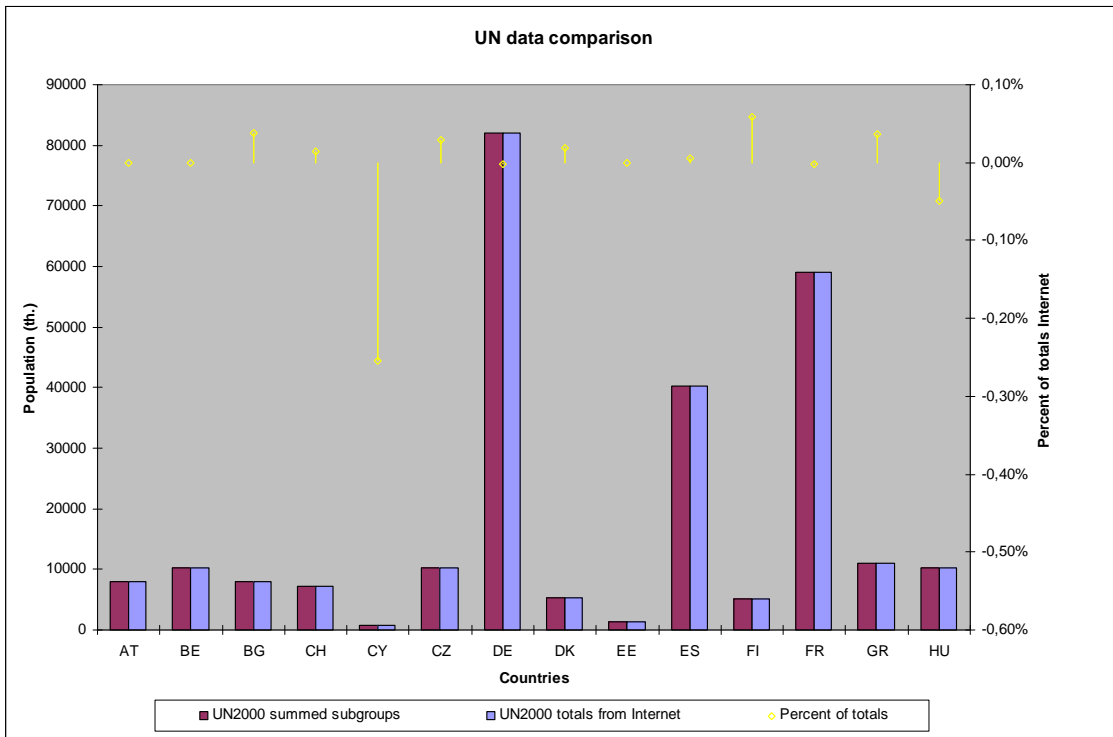
1.3) Compare UN totals given as totals in the Internet¹⁰ with those added up from all age groups given in the Internet¹¹

When downloading UN data from the Internet it is possible to choose between country totals and data per 5-year age group. Summing up the data for 5-year age groups does not always result in the country totals given separately.

Country ID	UN 2000 Summed subgroups	UN 2000 Totals from Internet	Difference	Percent of totals from Internet
AT	8.005.000	8.005.000	0	0.00%
BE	10.193.000	10.193.000	0	0.00%
BG	8.009.000	8.006.000	-3.000	0.04%
CH	7.185.000	7.184.000	-1.000	0.01%
CY	785.000	787.000	2.000	-0.25%
CZ	10.227.000	10.224.000	-3.000	0.03%
DE	82.074.000	82.075.000	1.000	0.00%
DK	5.336.000	5.335.000	-1.000	0.02%
EE	1.370.000	1.370.000	0	0.00%
ES	40.266.000	40.264.000	-2.000	0.00%
FI	5.176.000	5.173.000	-3.000	0.06%
FR	59.127.000	59.128.000	1.000	0.00%
GR	10.946.000	10.942.000	-4.000	0.04%
HU	10.210.000	10.215.000	5.000	-0.05%
IE	3.801.000	3.804.000	3.000	-0.08%
IT	57.117.000	57.116.000	-1.000	0.00%
LT	3.503.000	3.501.000	-2.000	0.06%
LU	435.000	437.000	2.000	-0.46%
LV	2.374.000	2.374.000	0	0.00%
MT	387.000	389.000	2.000	-0.51%
NL	15.915.000	15.915.000	0	0.00%
NO	4.483.000	4.484.000	1.000	-0.02%
PL	38.431.000	38.433.000	2.000	-0.01%
PT	10.228.000	10.226.000	-2.000	0.02%
RO	22.139.000	22.138.000	-1.000	0.00%
SE	8.860.000	8.860.000	0	0.00%
SI	1.986.000	1.985.000	-1.000	0.05%
SK	5.378.000	5.379.000	1.000	-0.02%
UK	58.906.000	58.907.000	1.000	0.00%

¹⁰ <http://esa.un.org/UNPP/index.asp?panel=1>

¹¹ <http://esa.un.org/UNPP/index.asp?panel=2>



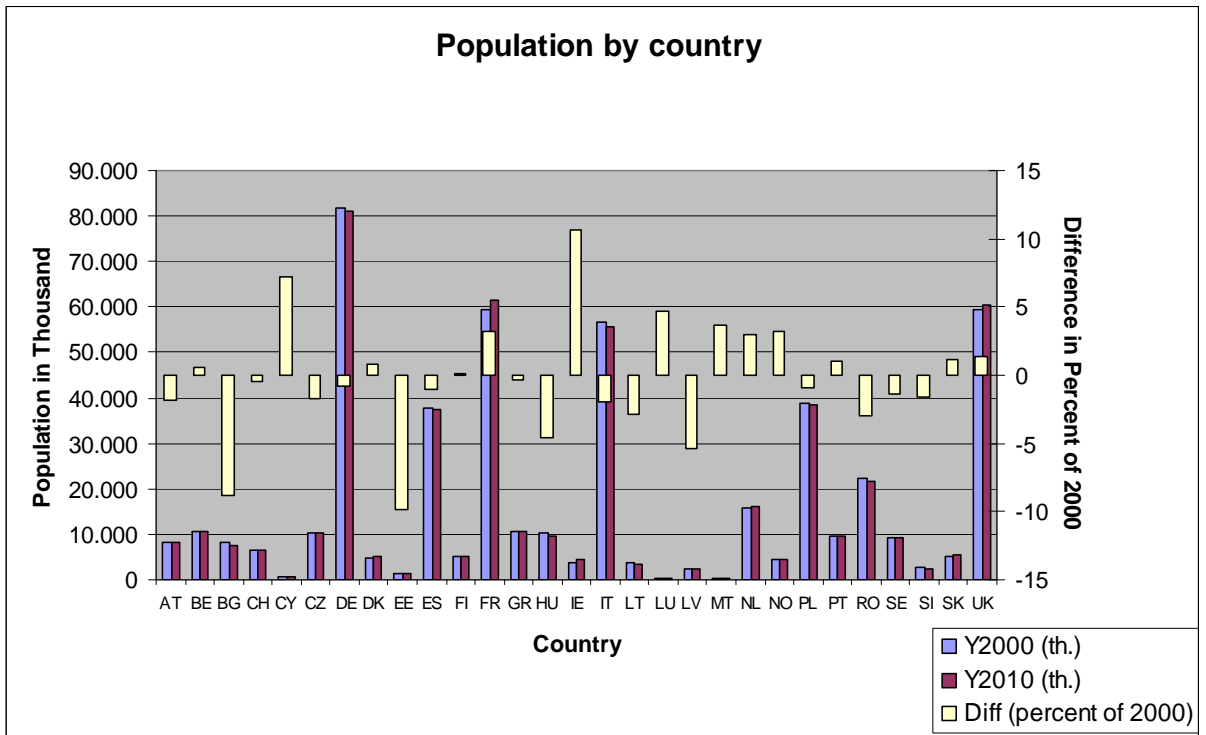
Conclusion:

Comparison shows that the difference between the totals and the summed subgroup data is small: mostly below 0.08%. Only for small countries the difference goes up to half a percent (CY 0.25% LU 0.46%. MT 0.51). One can conclude that for further calculations it does not matter too much which values are used. Compared to the differences of the UN data to other data sources, the difference between the UN country totals and the summed subgroups is very small. To be consistent, we use the country totals from the Internet whenever country total UN data are needed.

2) GWP CIESIN / SEDAC: Compare 2000 with 2010

2.1) Country total basis

Country ID	Y2000 (th.)	Y2010 (th.)	Difference (th.) (2010 – 2000)	Difference (percent of 2000)
AT	8.356	8.200	-155	-1.9
BE	10.660	10.726	66	0.6
BG	8.144	7.424	-719	-8.8
CH	6.631	6.599	-32	-0.5
CY	777	833	56	7.2
CZ	10.454	10.269	-185	-1.8
DE	81.821	81.195	-626	-0.8
DK	4.942	4.982	40	0.8
EE	1.403	1.265	-138	-9.8
ES	37.887	37.485	-403	-1.1
FI	5.152	5.156	4	0.1
FR	59.431	61.355	1.924	3.2
GR	10.728	10.687	-41	-0.4
HU	10.200	9.728	-472	-4.6
IE	3.885	4.298	412	10.6
IT	56.783	55.703	-1.080	-1.9
LT	3.680	3.576	-104	-2.8
LU	428	449	20	4.7
LV	2.445	2.313	-132	-5.4
MT	280	290	10	3.6
NL	15.693	16.157	464	3.0
NO	4.390	4.532	143	3.3
PL	38.687	38.318	-370	-1.0
PT	9.612	9.706	94	1.0
RO	22.296	21.629	-667	-3.0
SE	9.313	9.189	-124	-1.3
SI	2.577	2.536	-41	-1.6
SK	5.299	5.360	61	1.1
UK	59.500	60.342	842	1.4



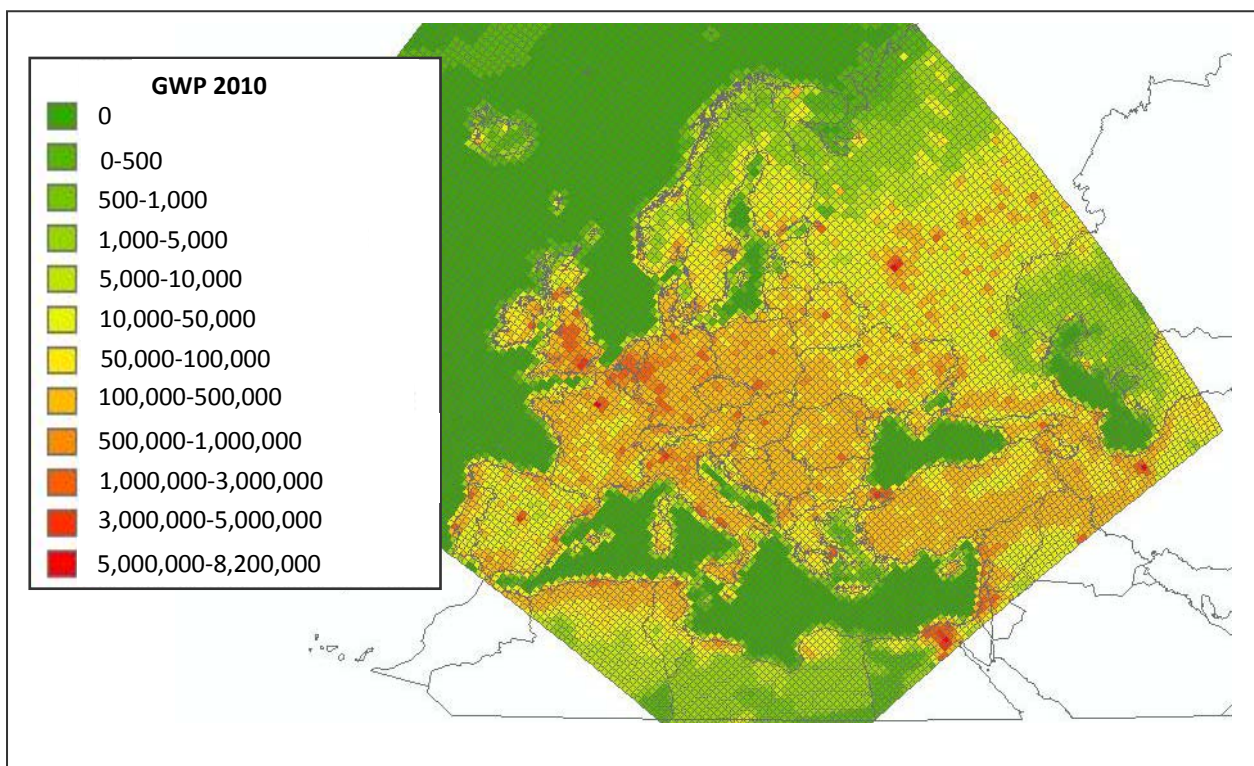
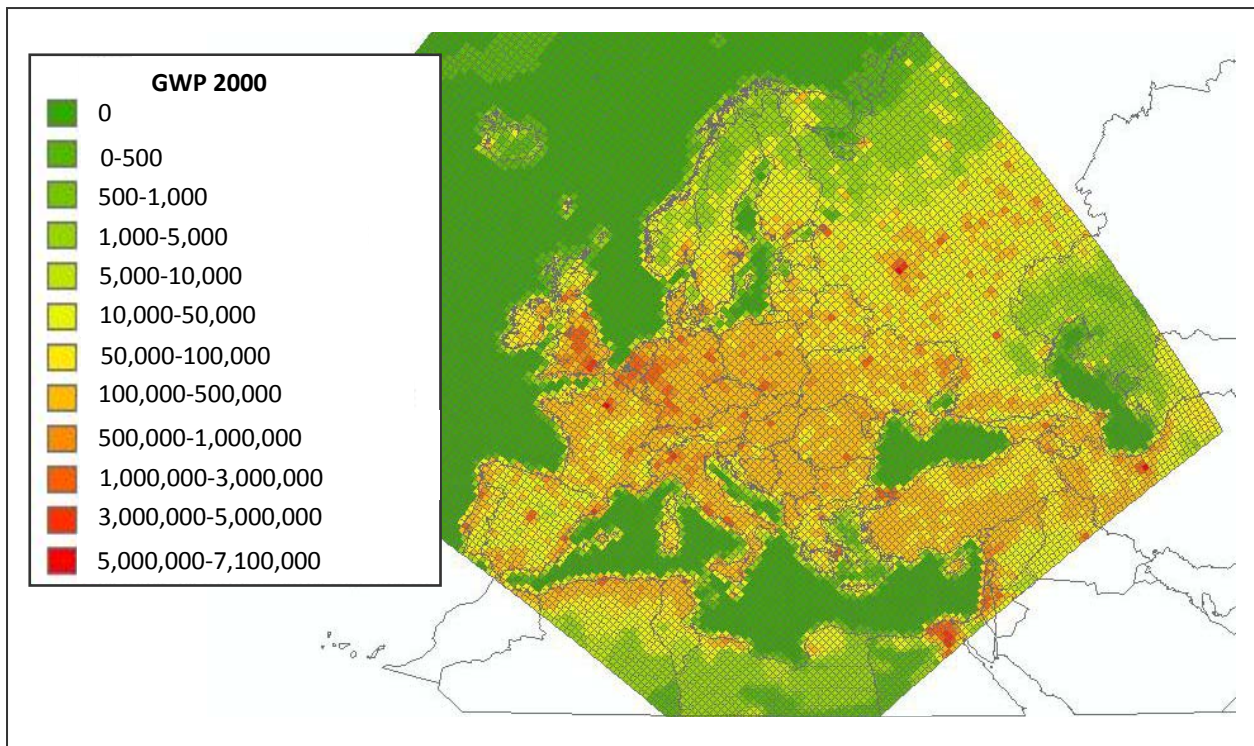
All countries summed up: 2000: 491.454.000 capita; 2010: 490.300.000 capita, giving a difference (2010 – 2000) of -1.154.000 capita or 0.2 % less.

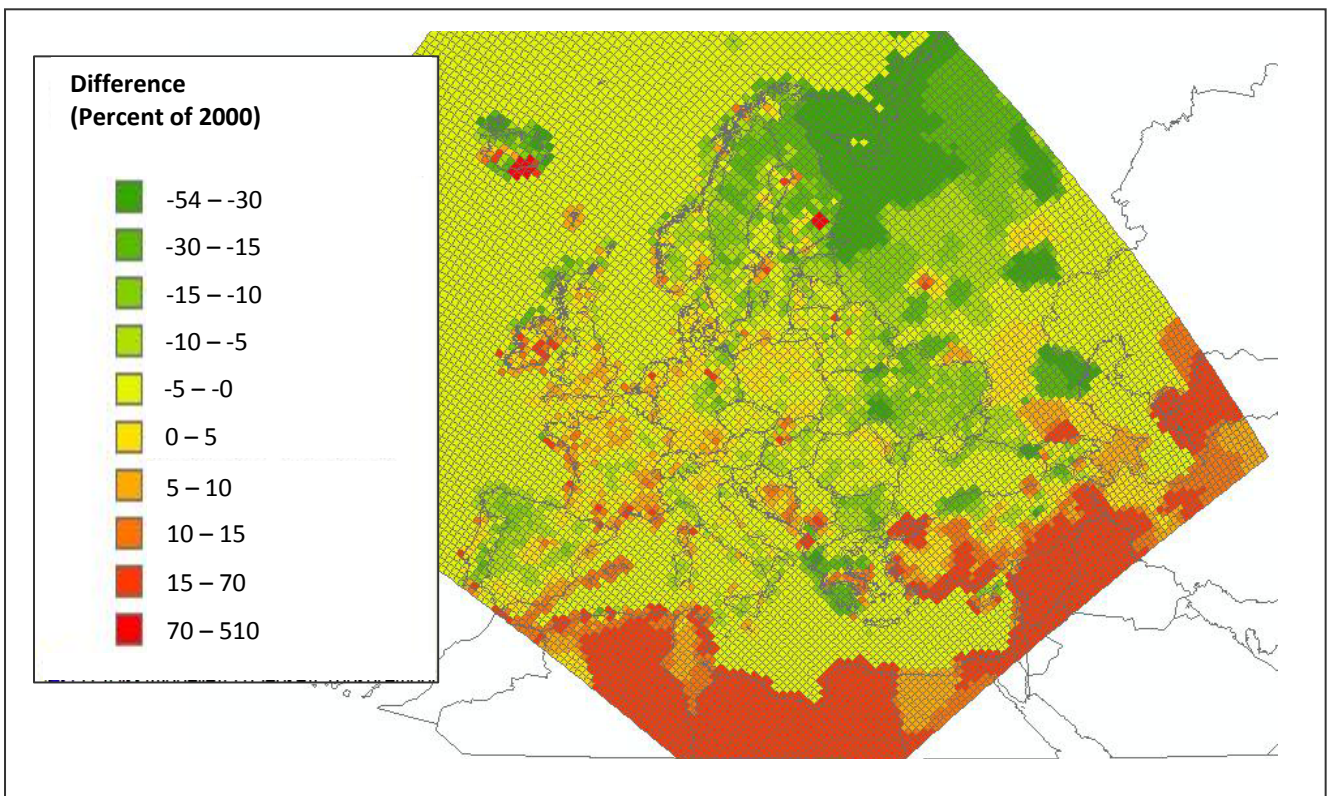
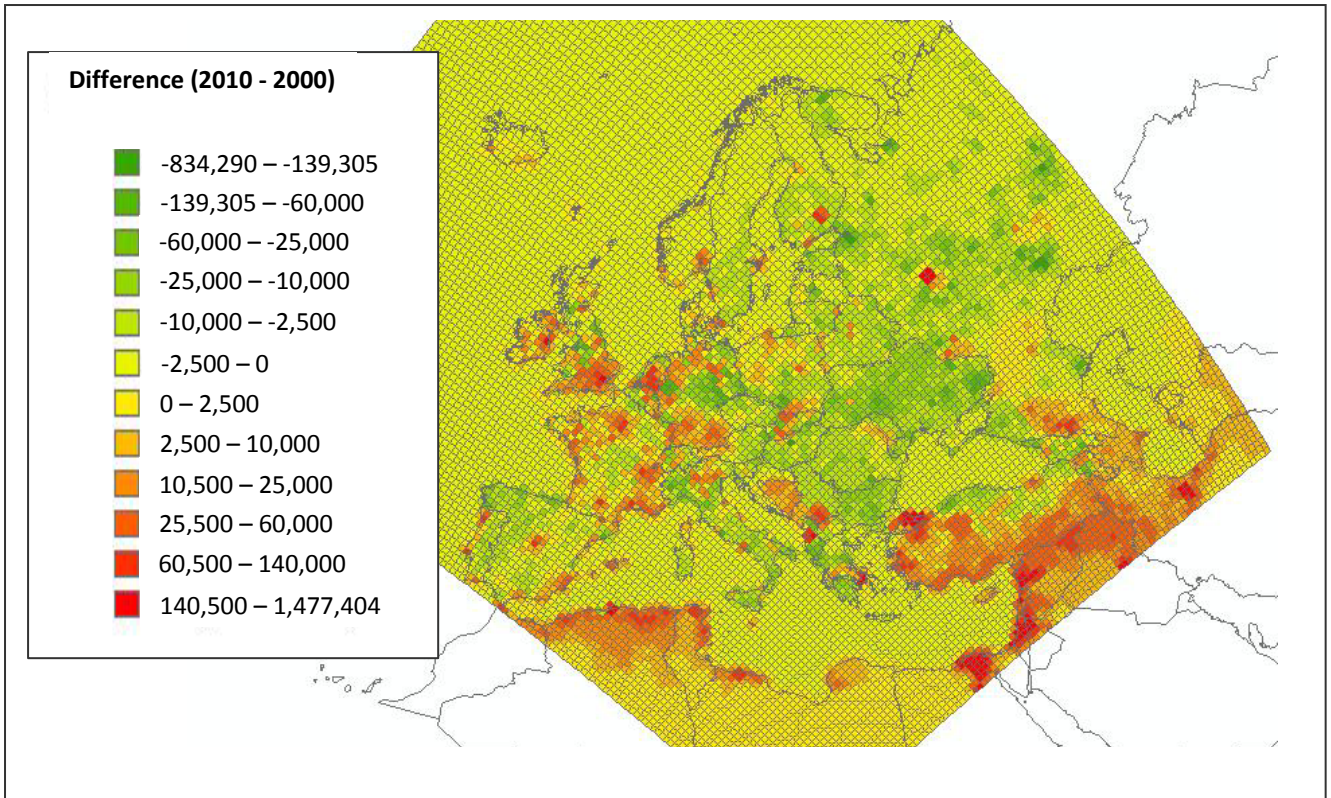
Conclusion:

Some countries have the tendency to grow, e.g. CY, FR, IE, LU, MT, NL and NO. Others seem to loose population, e.g. BG, EE, HU, LV and RO.

Compared to the UN and EUROSTAT data ([see section 1.2](#)), some of these countries have the same tendency in the other data sources as well, e.g. NL, UK, FR, RO and BG. See also the comparison of GWP 2000/2010 data on a grid basis ([section 2.2](#)).

2.2) Grid basis



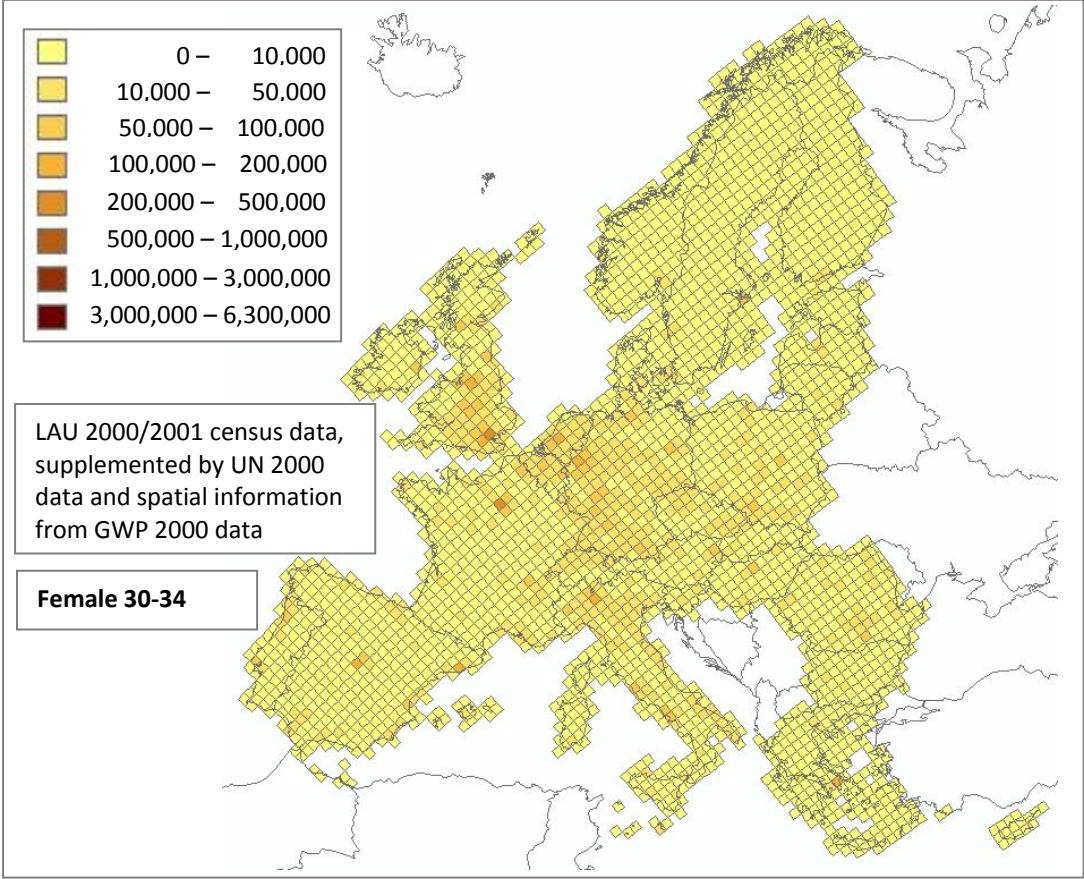
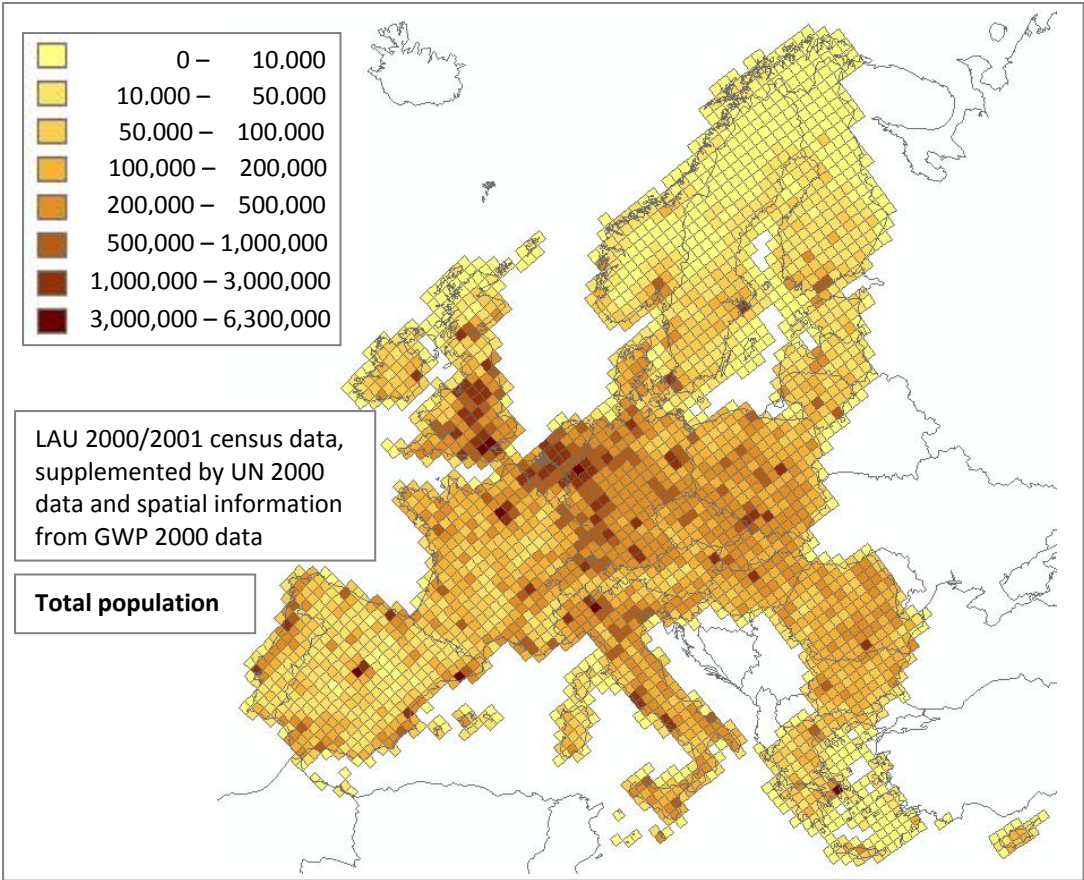


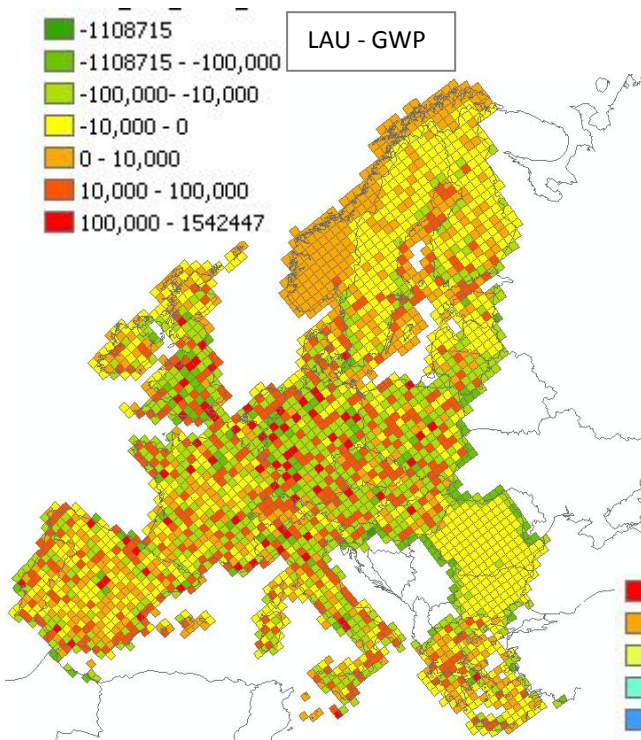
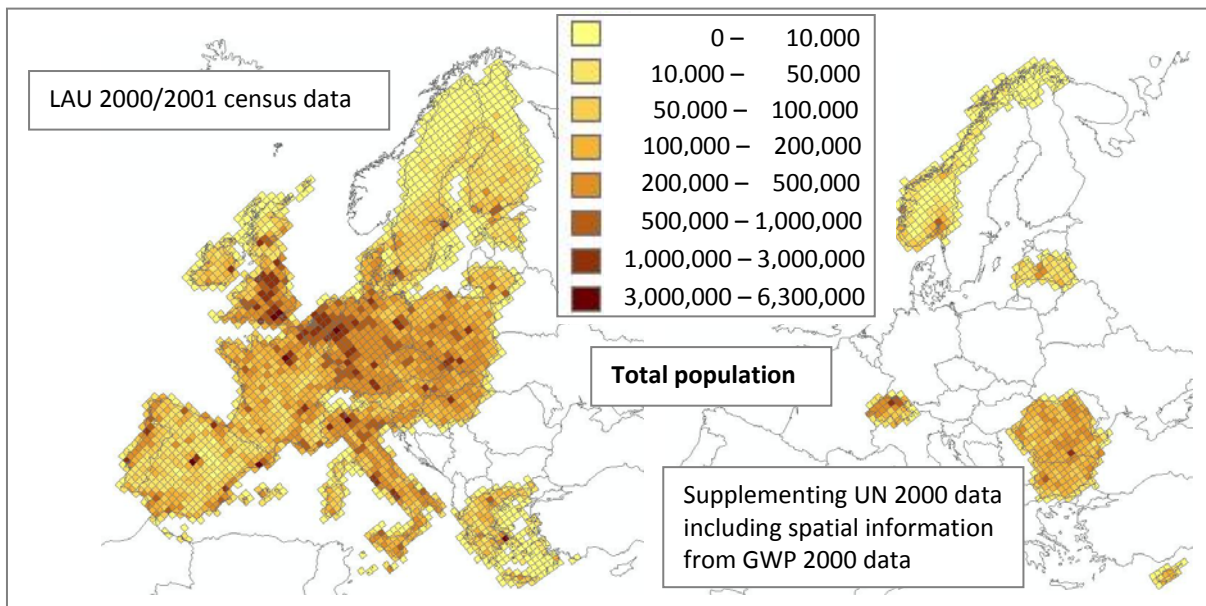
Conclusion:

For some countries one can see tendency to grow, e.g. NL, UK and FR; for others one can see the tendency to loose population, e.g. RO and BG.

For other countries it is not so clear: e.g. the country total values of GWP, UN and EUROSTAT tell that DE looses population from 2000 to 2010. But this is not so clear from the map. It looks more like there are shifts inside the country without being able to say much about a change in the country total.

3) Compare GWP CIESIN/SEDAC 2000 data with basic dataset (LAU 2000/2001 / UN data)

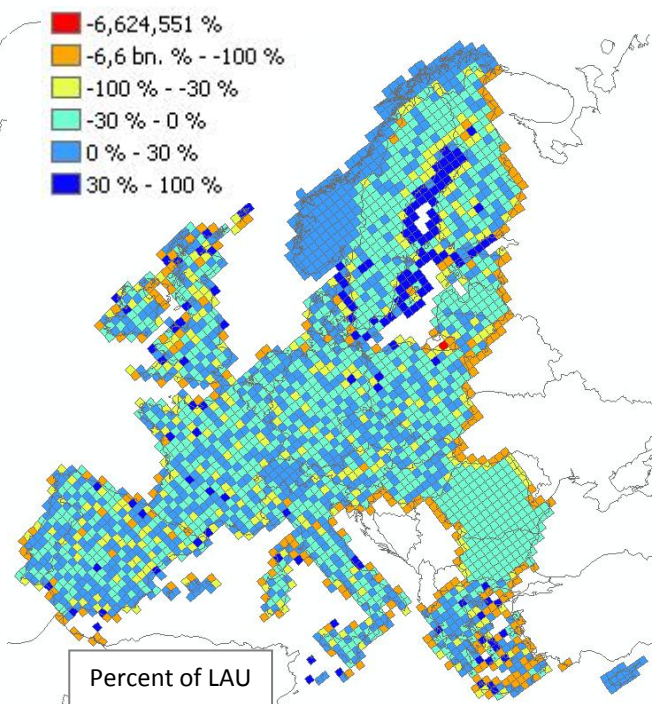




Comparison of LAU 2000/2001 data with GWP 2000 data shows that the data do differ.

(For those countries for which no LAU census data was available, i.e. CH, CY, NO, LV, RO and BG, the difference is very small. This was expected as the GWP had been used as proxy for spatially allocating the UN country totals.)

Differences are distributed evenly across the countries, i.e. no tendency into one direction can be observed.



Grid cells lying within countries mostly do not differ more than around 30 % (into each direction). Only about 10 % of the total grid cells (ca. 270) differ more than 100 %. Those cells (and also those that differ between 30 % and 100 %) are often border cells. Deviations are to be expected here due to the coarse resolution of 50 km x 50 km. The outlier is an artefact as it lies mostly in a non-European country where no LAU/UN data is available.

Statistics of the differences between LAU census and GWP data

	LAU – GWP	Percent ((LAU – GWP) / LAU)
Min	-1,108,714	-6,624,551 %
Max	1,542,447	100 %
Mean	-4,678	-3,600 %
Median	-1,008	-2.3 %

Totals (EU29)

	LAU/UN	GWP
Population totals (EU29)	482.295.831	491.456.305
Percent population totals (LAU-GWP)/LAU		-2 %

Conclusions:

As most of the deviations for on-land grid cells are less than 30 % one can say that the data sets do not fit very well; but no big inconsistencies can be stated, either. Due to this coarse resolution of 50 km x 50 km no better result can be expected, especially for border cells.

The median for the deviation is -2.3 %. Country totals of LAU and GWP differ about -2 %. So this difference is mostly due to the difference in country totals.

C) Data sets available:

Name	Description	Comment
Country_Totals_LAU-UN_2000	Country totals of the basic dataset for 2000.	For countries where no census data on LAU level 2 was available, UN data are taken (see part A of this Annex).
Country_Totals_UN_future	Country totals for the years 2010, 2020, 2030, 2050. Source: UN data	For 2020, 2030 and 2050 three variants are given: low (l), medium (m) and high (h). <i>The medium variant should be used for estimating health effects.</i>
Age_group_fractions_LAU-UN_2000_country_level	Age group fractions on a country level for 2000 (based on the basic dataset).	For countries where no census data on LAU level 2 was available, UN data are taken for deriving the age group fractions (see part A of this Annex).
Age_group_fractions_UN_future_country_level	Age group fractions on a country level for the years 2010, 2020, 2030 and 2050 (based on UN data).	For 2020, 2030 and 2050 age group fractions for three variants are given: low (l), medium (m) and high (h). <i>Age group fractions of the medium variant should be used for estimating health effects.</i>
Age_group_totals_country_level	Age group totals on a country level for 2000 (based on the fractions given in table <i>Age_group_fractions_LAU-UN_2000_country_level</i> and the country totals given in table <i>CountryTotals_LAU-UN_2000</i>) and for 2010, 2020, 2030 and 2050 (based on the fractions given in table <i>Age_group_fractions_UN_future_country_level</i> and the country totals given in table <i>CountryTotals_UN_future</i>).	
Emep_grid_LAU-UN_all_groups_2000	Population by Emep 50 km x 50 km grid cell, for 2000, for all age groups.	

Emep_grid_UN_all_groups_future	Population by Emep 50 km x 50 km grid cell, for the years 2010, 2020, 2030 and 2050, for all age groups and all variants.	
Emep_grid_LAU-UN_all_groups_2000_with_countries	Same as Emep_grid_LAU-UN_all_groups_2000 but including information on countries.	One grid cell occurs several times if it lies in different countries.
Emep_grid_UN_all_groups_future_with_countries	Same as Emep_grid_UN_all_groups_future but including information on countries.	One grid cell occurs several times if it lies in different countries.
Pop_UrbRur_EMEP50	Urban and rural population on the Emep 50 km x 50 km grid; also fractions of both	Prepared by Danielle Vinneau (IC); documentation will follow later
CountryID	CountryID, Country name and comments	
EmepID	Indexing for Emep 50 km x 50 km grid cells	Different indexing: Emep50_i_j is just concatenating Emep50i and Emep50j. EmepID is calculated via $(j-1)*132+i$ It is suggested to use Emep50_i_j as most partners are working with this index.
Intersection_country_Emep_grid_fraction	Intersection file for Country – Emep grid. Two columns: Area_Incl_Sea: means that the intersection is done by area-weighting; Area_Incl_Land: is the same BUT it includes that people are not living in the sea: so for cells lying at the sea the are is still 100% although maybe only 80% are land and 20% are sea → useful for allocating population data!	

Data sets have mainly been derived by **Alexandra Kuhn (USTUTT)** and partly by **Danielle Vinneau (IC)** (Emep_grid_urban_rural), partly based on data sets provided by **Danielle Vinneau (IC)**, with the help of **Aileen Yang (NILU)** and **Joachim Roos (USTUTT)**.