

Gridded Population of the World

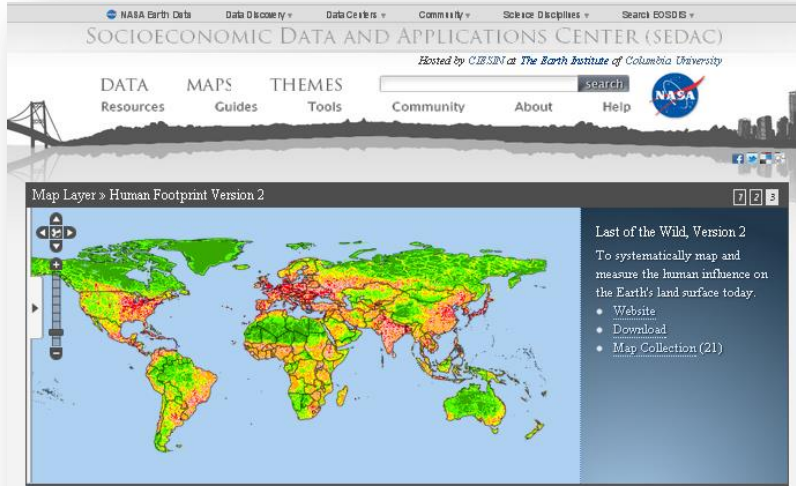
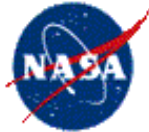
1st Global Human Settlement Layer Workshop

JRC Ispra, Italy

October 21, 2014

Kytt MacManus – CIESIN/SEDAC

Socioeconomic Data & Applications Center (SEDAC)



- Integration of social and earth science data
- Focus on human dimensions of environmental change
- Direct support to scientists, applied and operational users, decision makers, and policy communities

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Multiple Status Matrix - Netscape 6

home | treaty locator | country explorer

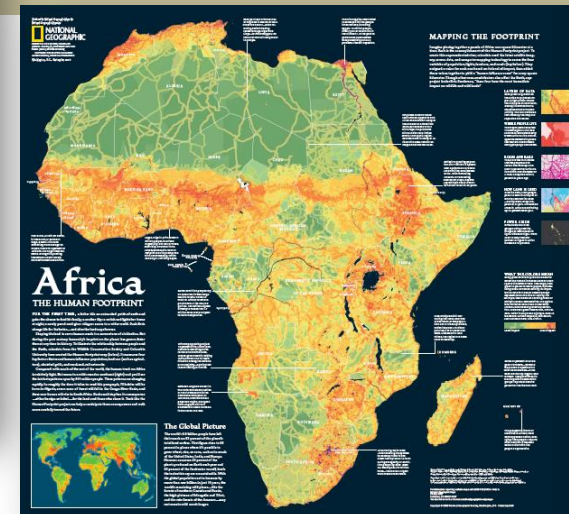
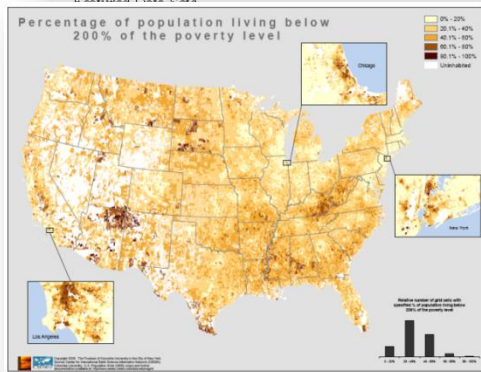
Status Matrix

-Definitions for Signatory | Party | Former Party
-Remove items from either columns or rows by unchecking them, then click refresh page.
-Add items to sort by checking, then click refresh page or view cart.
-Clicking on an agreement or party will take you to a summary for that item.

download this matrix | treaty results set | country results set

View in matrix: All Relevant Countries | Display this variable: Status

Transpose Table	<input checked="" type="checkbox"/> Convention concerning the Protection of Alps	<input checked="" type="checkbox"/> Protocol for the implementation of the Alpine Convention in the field of mountain agriculture	<input checked="" type="checkbox"/> Protocol for the implementation of the Alpine Convention in the field of nature protection and landscape conservation	<input type="checkbox"/> Protocol for the implementation of the Alpine Convention in the field of town and country planning and sustainable development
<input type="checkbox"/> Austria	Party
<input type="checkbox"/> EC European Communities	Party	Signatory	Signatory	Signatory
<input type="checkbox"/> France	Party	Signatory	Signatory	Signatory
<input type="checkbox"/> Germany	Party	Signatory	Signatory	Signatory
<input type="checkbox"/> Italy	Signatory	Signatory	Signatory	Signatory
<input type="checkbox"/> Liechtenstein	Party	Signatory	Signatory	Signatory
<input type="checkbox"/> Monaco	...	Signatory	Signatory	Signatory

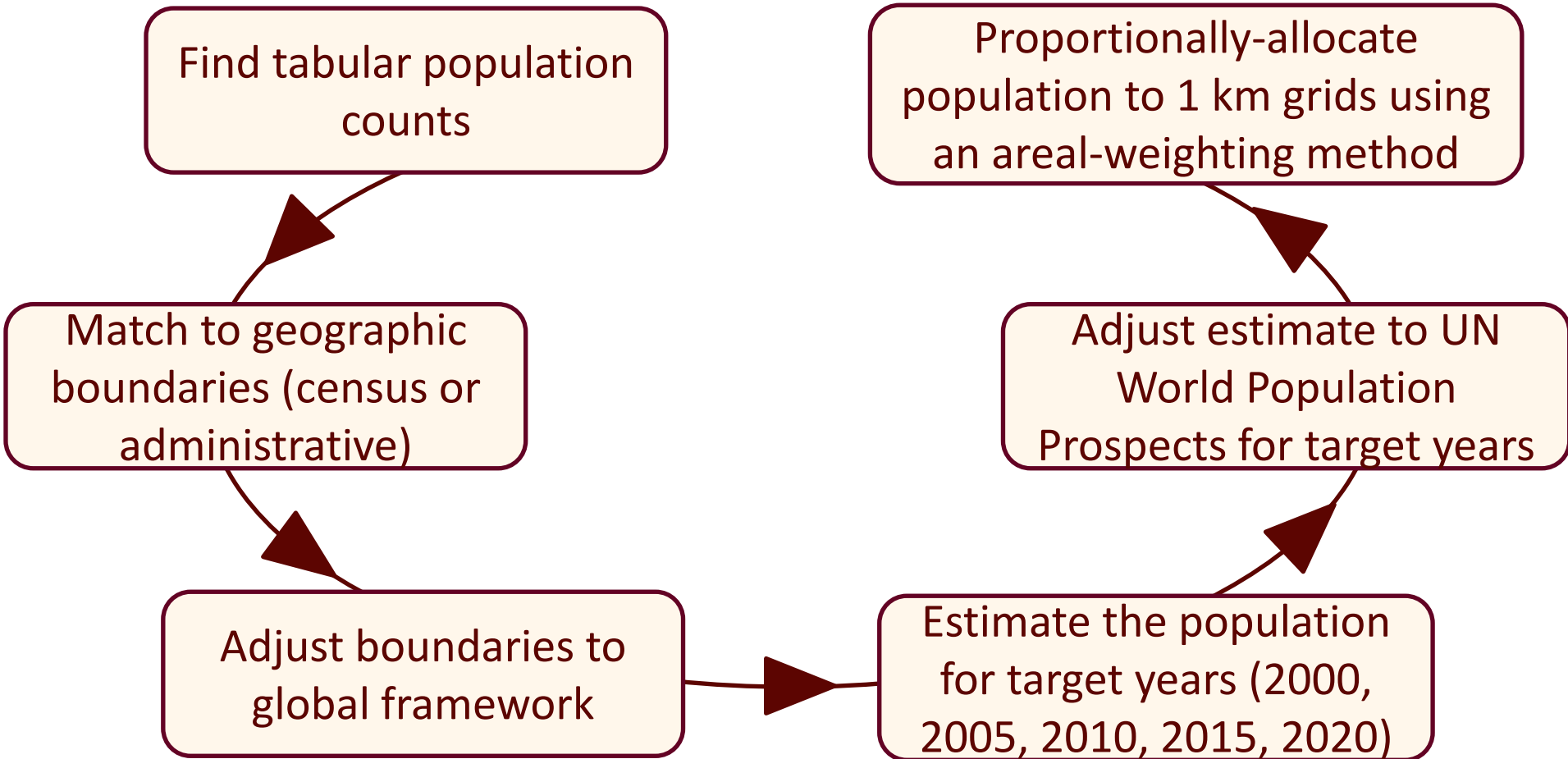


History of GPW

- GPWv1 was an outgrowth of a Global Demography Workshop held at CIESIN in 1994
- Consensus that a consistent global database of population totals in raster format would be invaluable for interdisciplinary study (Deichmann et al., 2001)

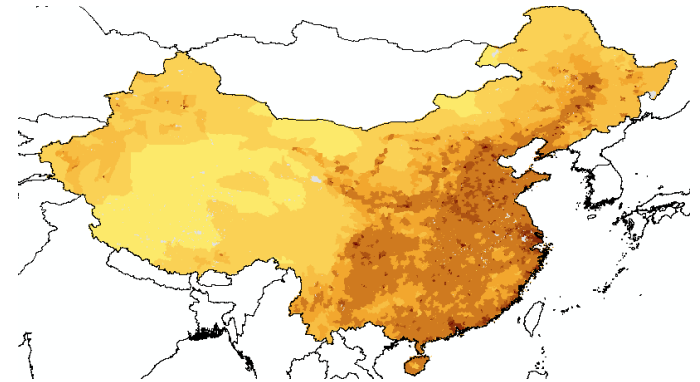
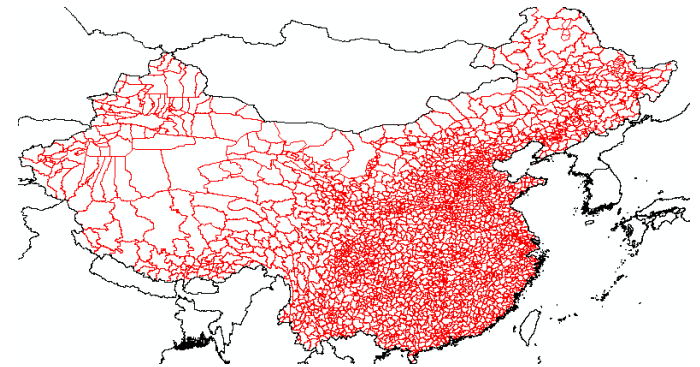
	GPWv1	GPWv2	GPWv3	GPWv4
Publication Year	1995	2000	2005	2014/2015
Years of Estimation	1994	1990, 1995	1990, 1995, 2000	2000, 2005, 2010, 2015, 2020
Number of Input Units (subnational geographic units)	19,000	127,000	c. 400,000	~ 12,500,000
Grid Resolution	2.5 arc-minute	2.5 arc-minute	2.5 arc-minute	30 arc-second (1 km)
Census variables	Total Population	Total Population	Total Population	Total Population, Sex, Age, Urban/Rural status

Methods for GPWv4



GPW is minimally-modeled

- GPW uses the areal-weighting method
 - Does not incorporate ancillary data (e.g. land use/land cover, transportation networks, elevation, etc.)
 - Distributes population based on land area
- The accuracy of GPW pixel estimate is directly related to the size of the input areal units



Higher resolution boundaries in eastern China lead to more precise pixel estimates

Characteristics of GPWv4

Increased spatial resolution of input data

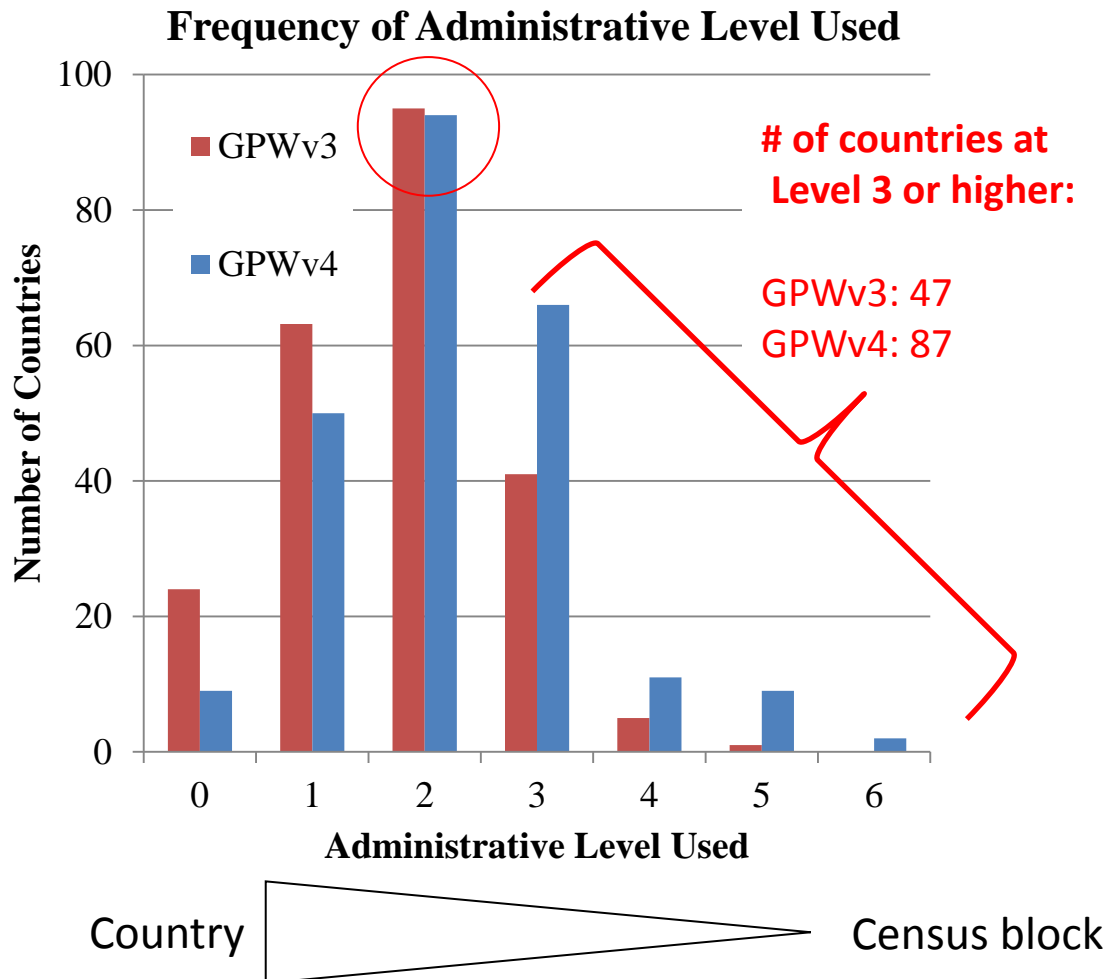
Pixel level accuracy of GPW depends upon the size of the input census units

Number of Input Census Units

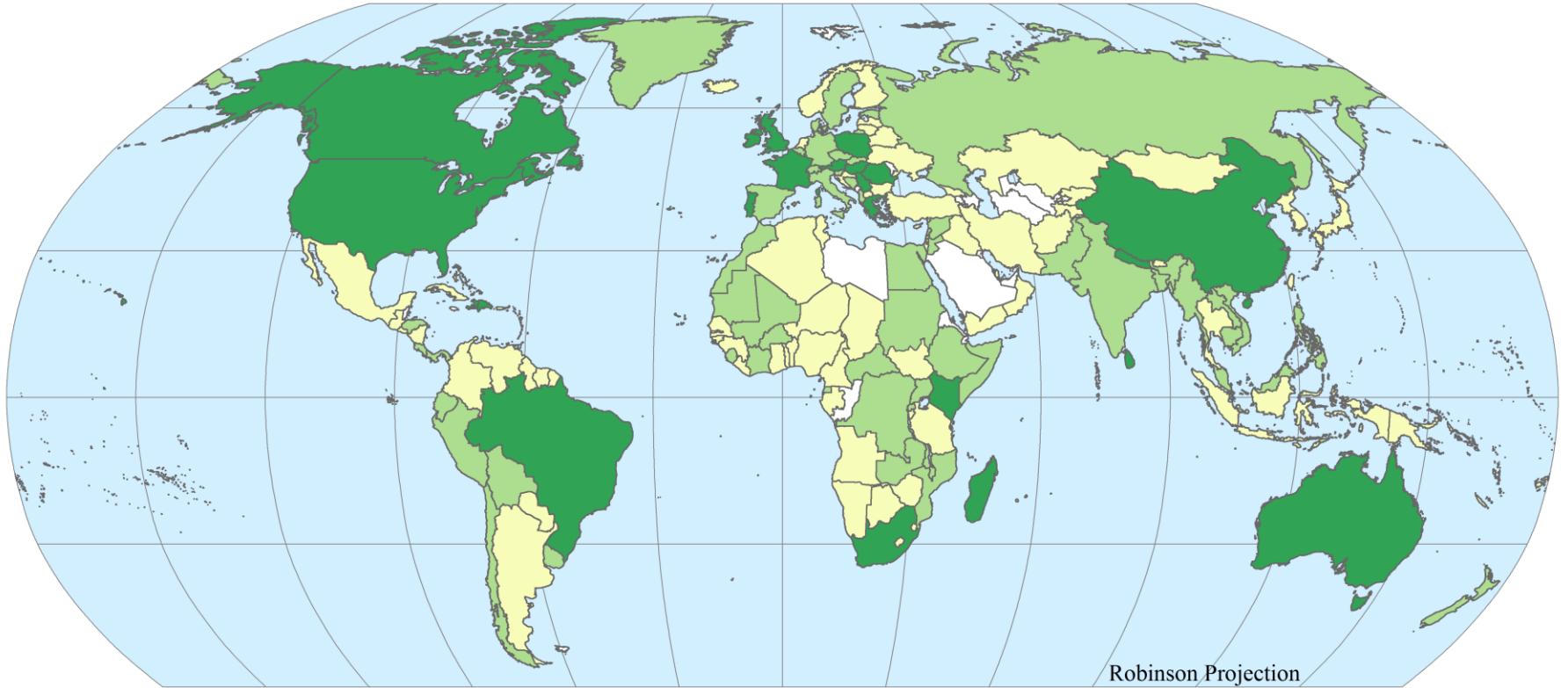
	GPWv3	GPWv4
Global	399,747	12,497,563
USA	60,884	10,608,747
Outside USA	338,863	1,888,816

Characteristics of GPWv4

Leverages greater availability of Census information

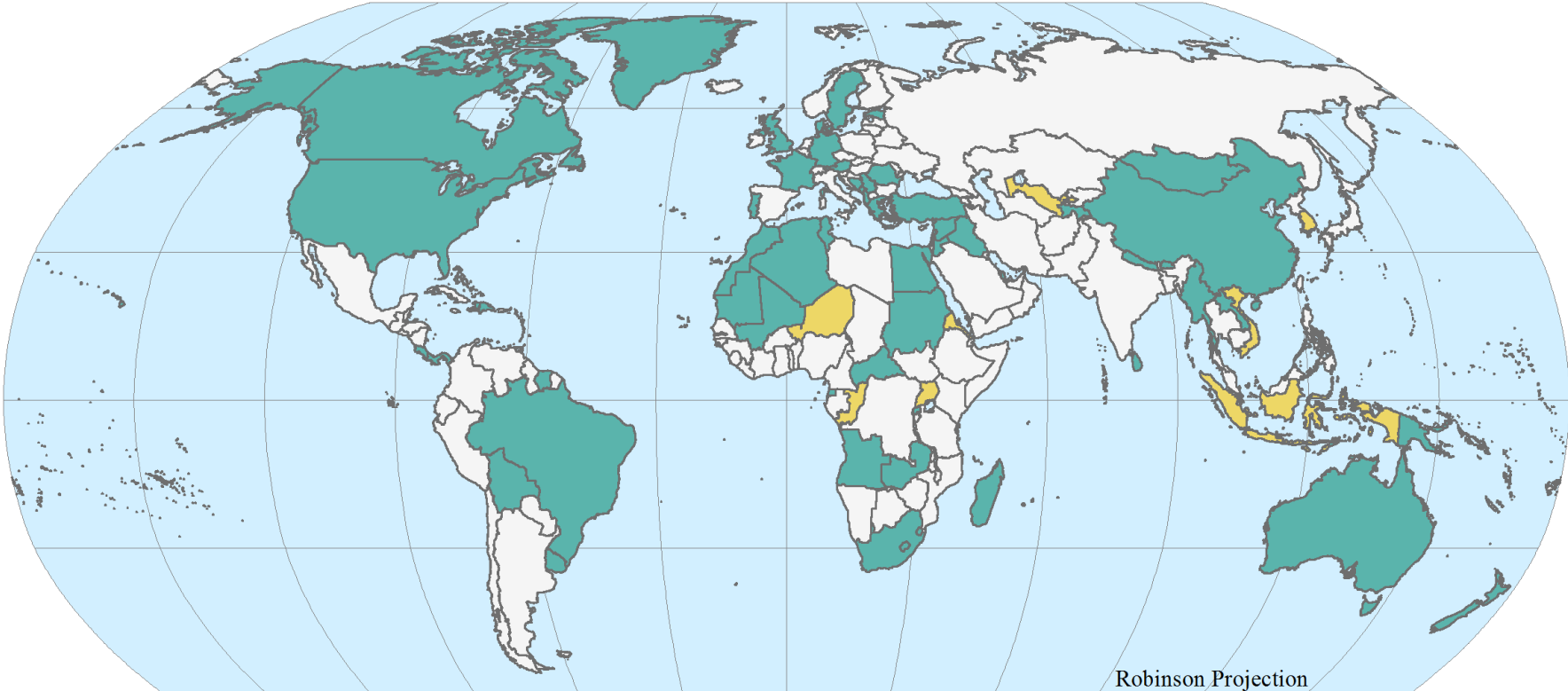





GPWv4 Administrative Level



Level 0-1 Level 2 Level 3 Level 4-6

Improvements in Input Data Resolution



-  Lower resolution than GPWv3
11 countries
-  Same as GPWv3
132 countries
-  Higher resolution than GPWv3
98 countries

Characteristics of GPWv4

Additional census variables

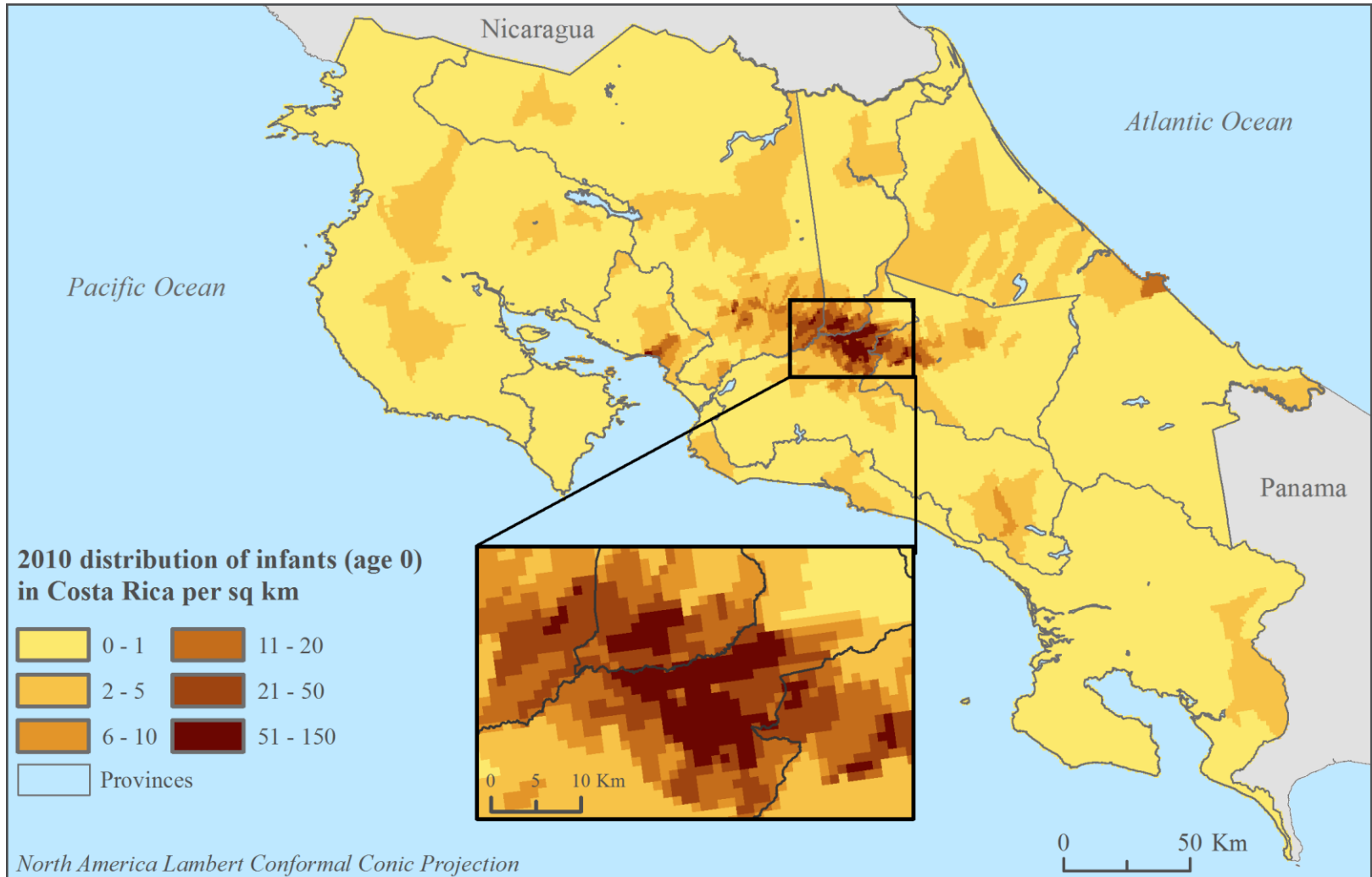
Demographic information in population grids

GPWv4 will include grids for:

- Sex
- Age (single year or 5-year age groups)
- Urban/Rural status

Costa Rica Example

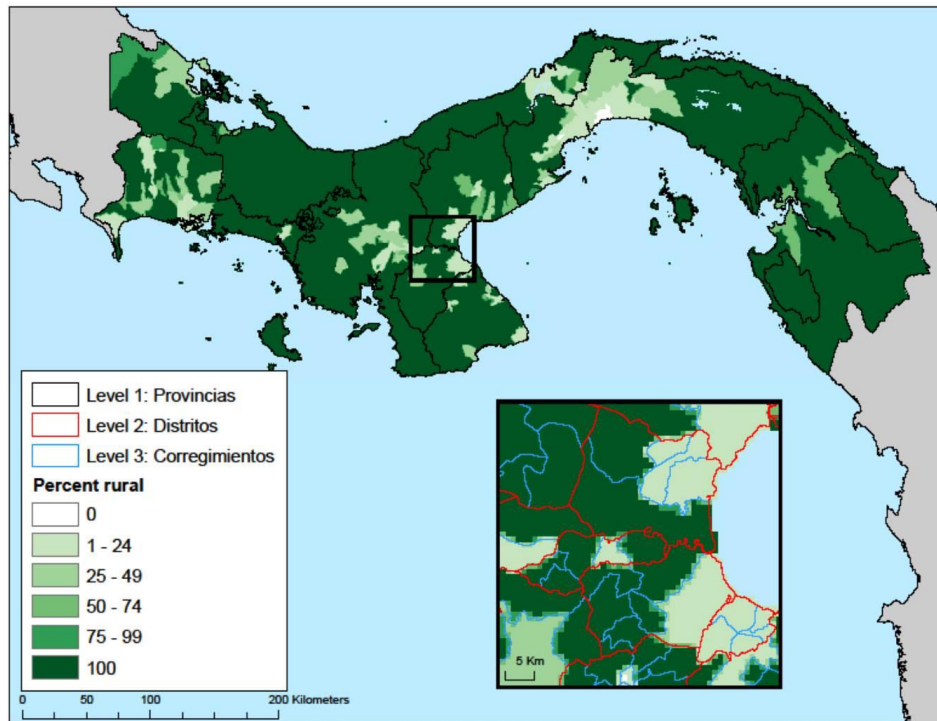
Concentrations of demographic variables



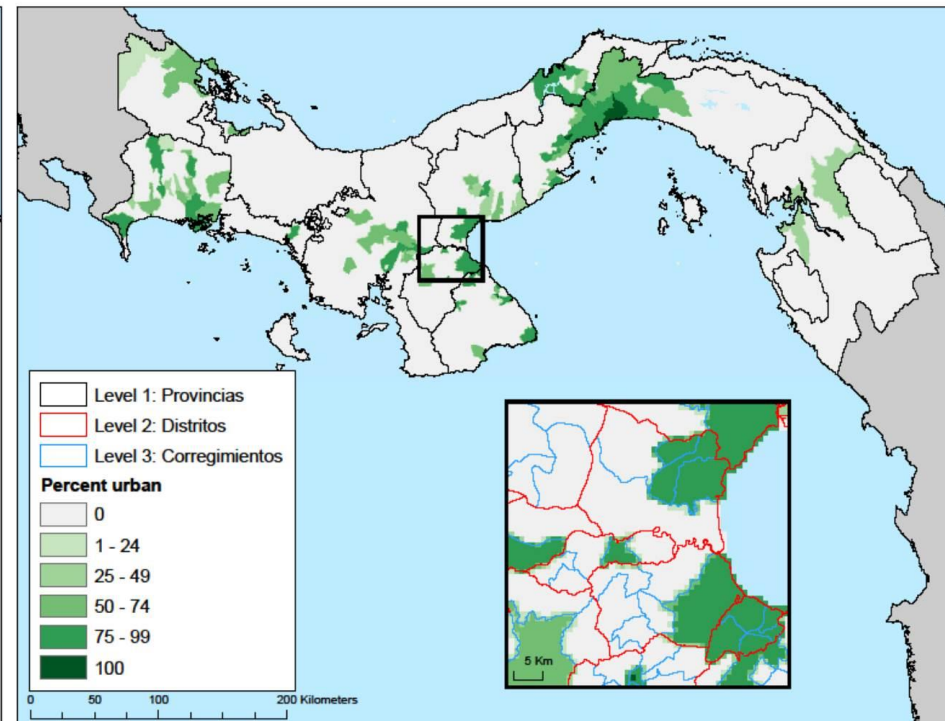
Panama Example

Sub-National Urban Rural Fractions

2010 % rural population, Panama



2010 % urban population, Panama



Challenges with census data and boundaries

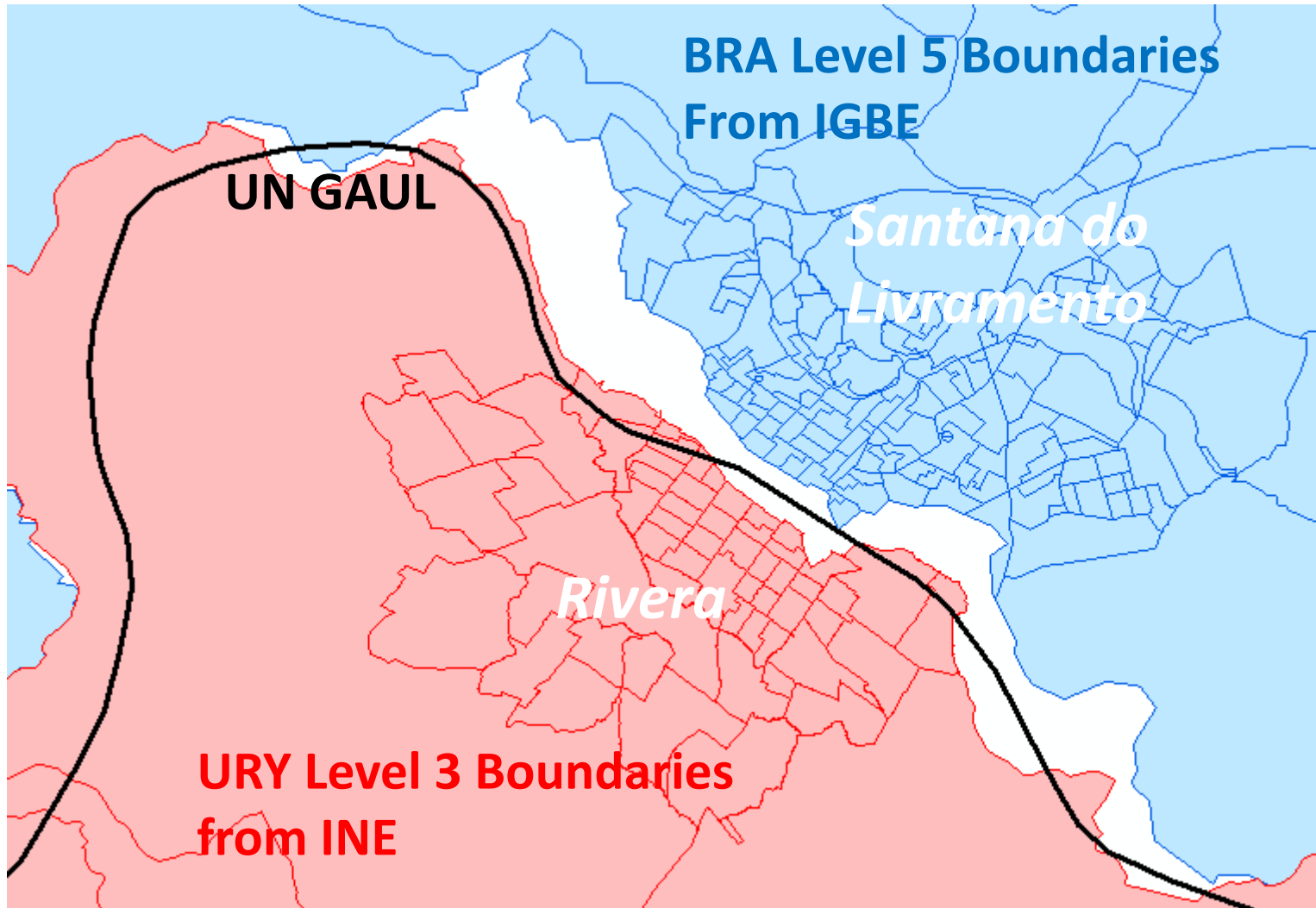
- Room for ongoing improvements with online dissemination
- Asymmetry between availability of tabular census data and census geography
- Significant research required to reconcile census areas with those present in the GIS data and to assign common identifiers

Primary method of census data dissemination	Percent of respondents (121 countries)
Paper publications	52%
Static web pages (html, excel, PDF)	28%
Interactive online databases	14%
CD/DVD	4%
Other	2%

Source: 2011/2012 survey for the review of the 2010 World Programme on Population and Housing Censuses; UN Statistics Division, 2013.

Boundary Integration

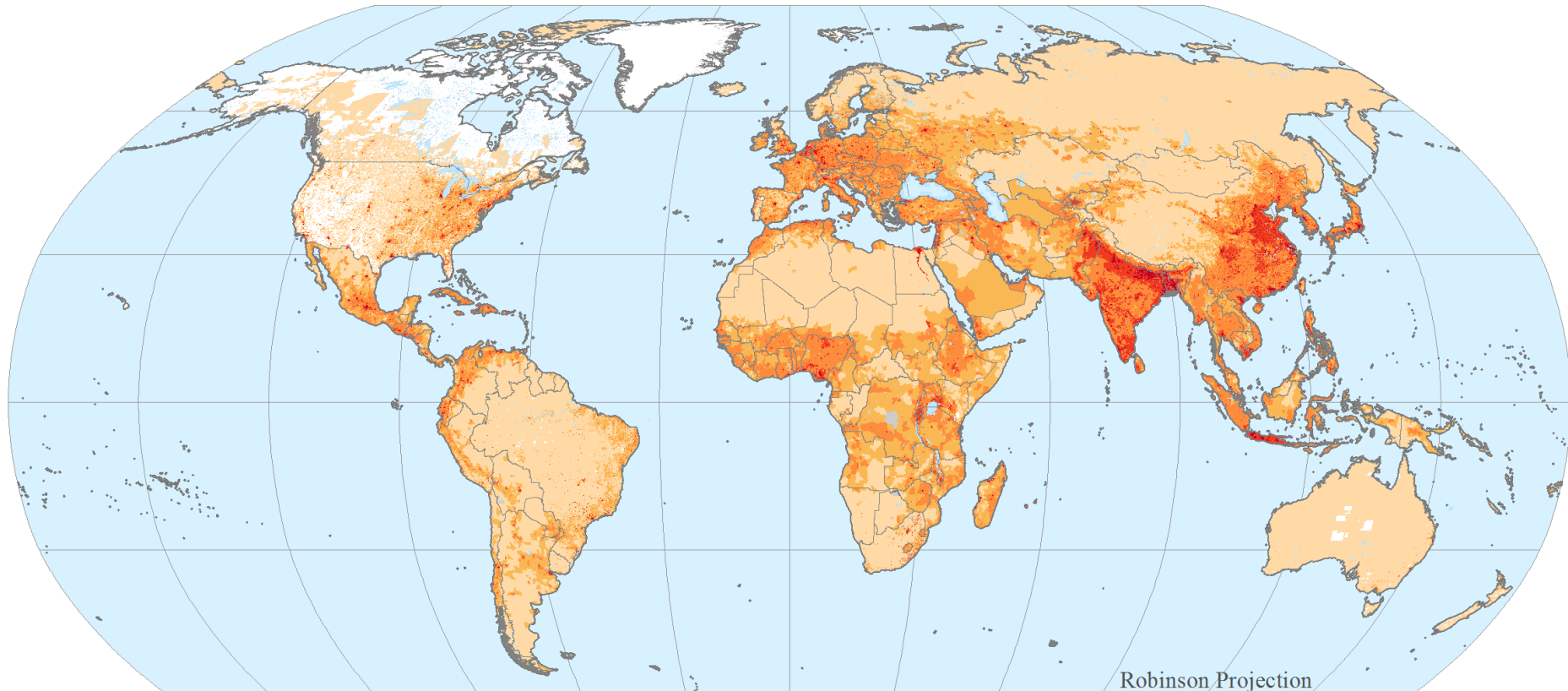
- Disagreements without territorial disputes



Future Work

- GPW4 Alpha release of Total Population available soon
- Demographic variables to follow
- Additional datasets quantifying census data quality are in the works
- GPW4 is well suited as an **input**
 - To dasymetric population models
 - To mix with any data that might already be factored in to alternative global pop data products

GPWv4 2010 Population Density Estimates



Persons
per km²

0

1–4

5–24

25–249

250–1000

>1000

No Data