The UN-GGIM challenge to develop integrated core datasets

Advantages and disadvantages of grid-based, population and administrative geography approaches

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Session 3: Progress on the UN EG-ISGI work program items.

Second Meeting of the Expert Group on the Integration of Statistical and Geospatial Information, 24 May 2015, Lisbon, Portugal.

Build Integrated Core Datasets to meet the UN GGIM challenge

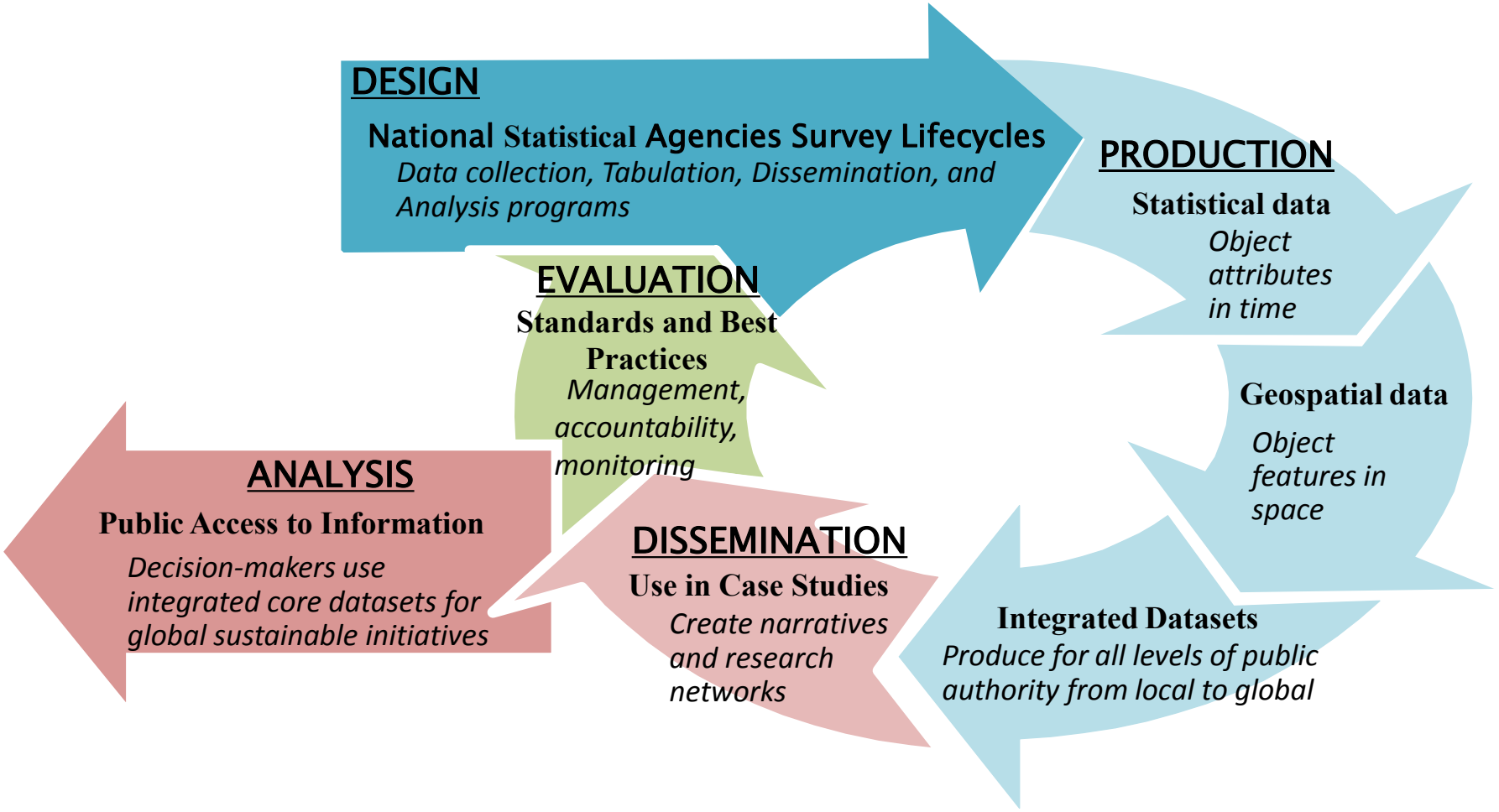
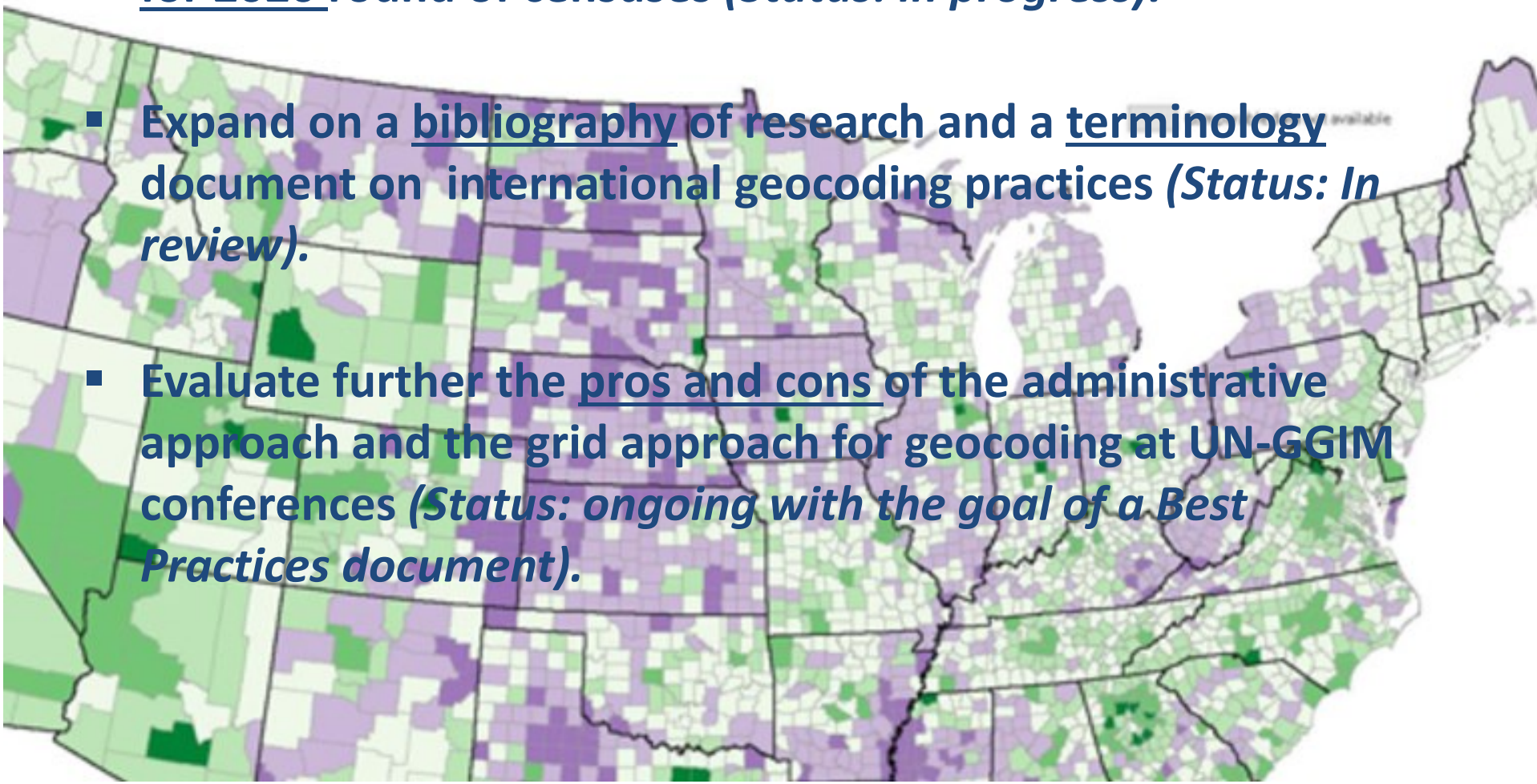


Diagram adapted from Lars H. Backer. "EFGS and the integration of Geography and Statistics" The EFGS 2014 Krakow Conference. October 22, 2014.

Tasks

- Identify technical, institutional, and information policy issues for 2020 round of censuses *(Status: in progress).*



- Expand on a bibliography of research and a terminology document on international geocoding practices *(Status: In review).*

- Evaluate further the pros and cons of the administrative approach and the grid approach for geocoding at UN-GGIM conferences *(Status: ongoing with the goal of a Best Practices document).*

PROS and CONS of Administrative Areas

PROS:

- Spatial accuracy of data
- Field verification
- Imagery verification
- Geocoding / address verification
- Authoritative sources
- Local government involvement
- Local knowledge
- Nesting relationship w/other geographic areas
- Cadastral boundaries
- Data thresholds
- Separate land & water area
- Response rates
- Response options
- Response quality
- Sample frame
- Controls on disclosure

CONS:

- Comparability
- Boundary changes
- Traditional census data collection is becoming more infrequent for countries
- Use of non-visible boundaries
- Number of different geographic areas
- Cartographic considerations / generalization of boundaries
- Varying participation
- Irregular sizes
- Irregular shapes
- Variable density measures
- High costs to maintain the data
- Legal variation
- Regional variation
- Topographic variation
- Insufficient understanding of micro characteristics inside macro-scale units
- Data integration is difficult

PROS and CONS of Grid-based Statistical Areas

PROS:

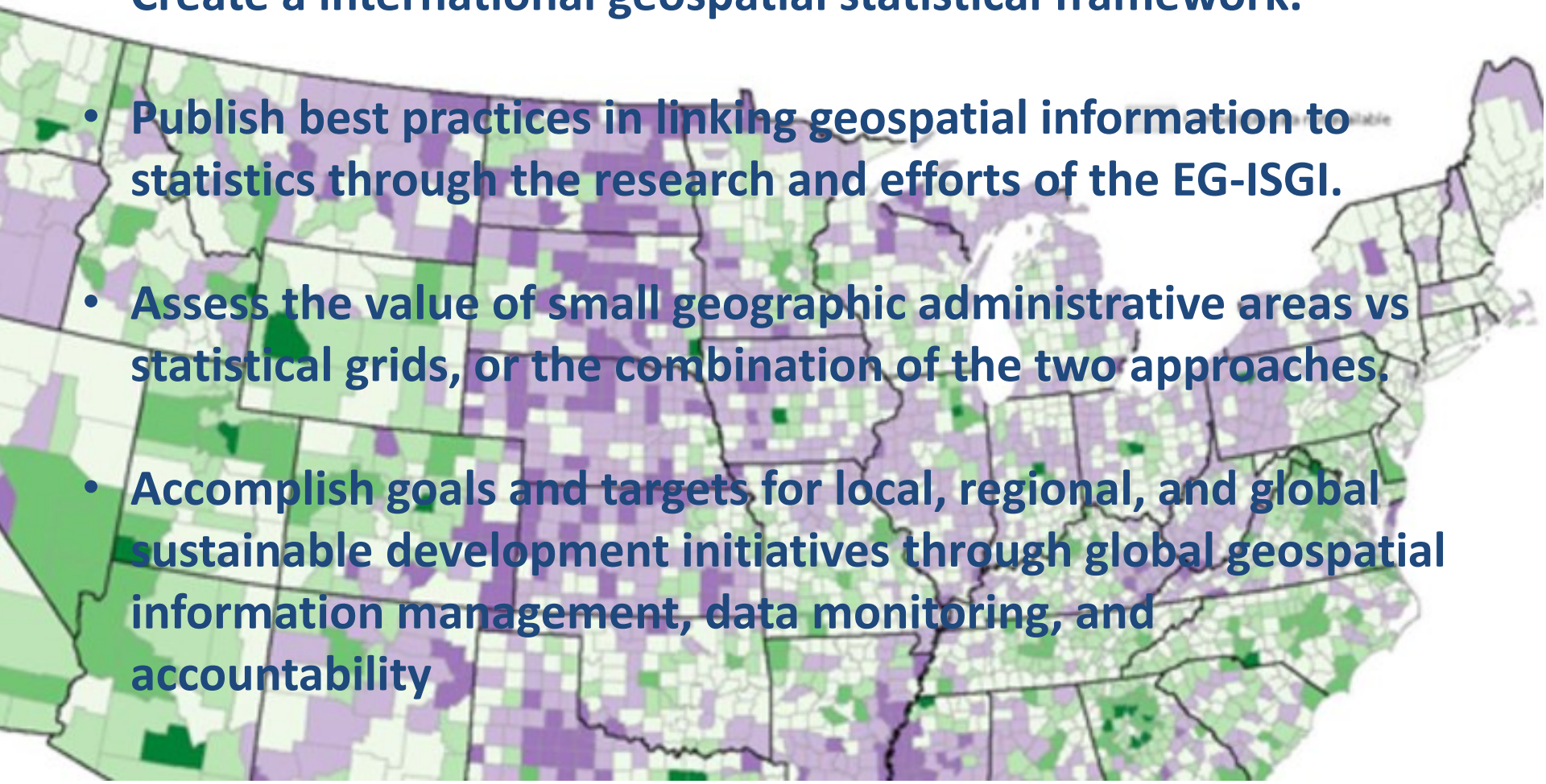
- Global and local scope—fully scalable
- Uniform scale conducive to cross-border studies
- Comparability; better suited for Spatial Data Infrastructures (SDI)
- More attention to problem-oriented science
- Can locate people in space with more precision
- Good territorial framework for sampling
- Can aggregate to different kinds of territorial units
- Ready to use with GIS analysis
- Easily generated from point-based georeferenced data
- Able to see clusters
- Easy and cost-efficient to collect
- Micro-scale analysis using flexible size grids
- Data integration is possible with newer data sources, (i.e. ground-based, imagery, internet)
- Stable over time; time-series not affected by admin unit changes
- Independent from traditional data collection procedures
- Widely used in science and practice

CONS:

- Disclosure control /cell size
- Grid cell sizes in rural areas
- When merging datasets, there is a need to change from one coordinate system to another before the data compilation into grids
- European terrestrial reference system (ETRS80) is based on Lambert Azimuthal Equal Area coordinate reference system with fixed projection center; different projections may be needed in other parts of the world
- Coding systems [scale intervals vs quadtree solutions
- Due to high data volume, errors are difficult to find and correct
- Various grids may be adopted within regions or countries
- Areas with dynamic or transient population fluctuations pose numerous complications for regional analysis
- Spatial and temporal cross-validation models using multiple sources of geographic, physiographic, and socio-economic data in conjunction with imagery analysis is necessary

UN GGIM is Looking forward

- Create a international geospatial statistical framework.
- Publish best practices in linking geospatial information to statistics through the research and efforts of the EG-ISGI.
- Assess the value of small geographic administrative areas vs statistical grids, or the combination of the two approaches.
- Accomplish goals and targets for local, regional, and global sustainable development initiatives through global geospatial information management, data monitoring, and accountability



Grid-based data (global to local) vs Administrative

10,000 km window/100 km grids
(Global scale)

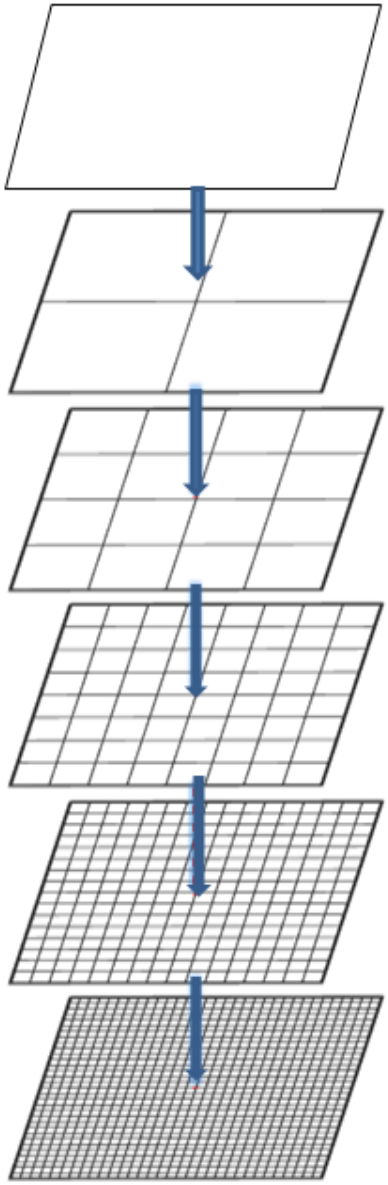
1,000 km window/10 km grids
(International regions)

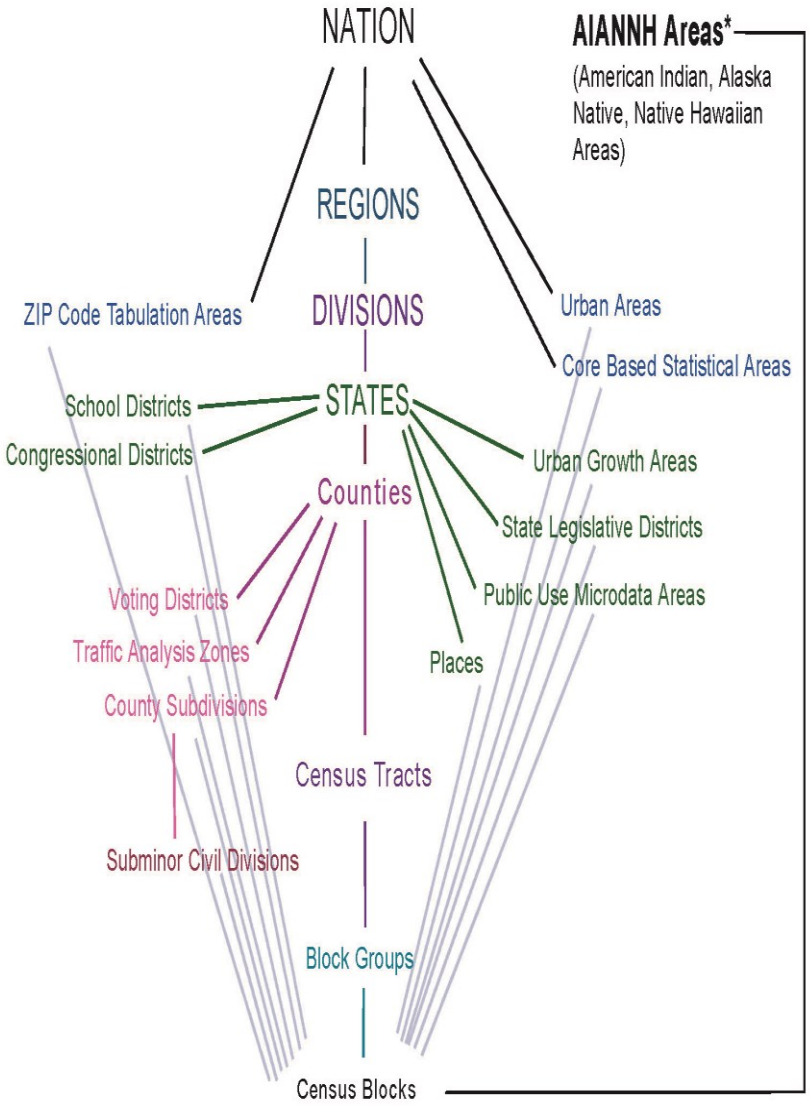
100 km window/1 km grids (National regions)

10 km window/100m grids
(Urban Districts)

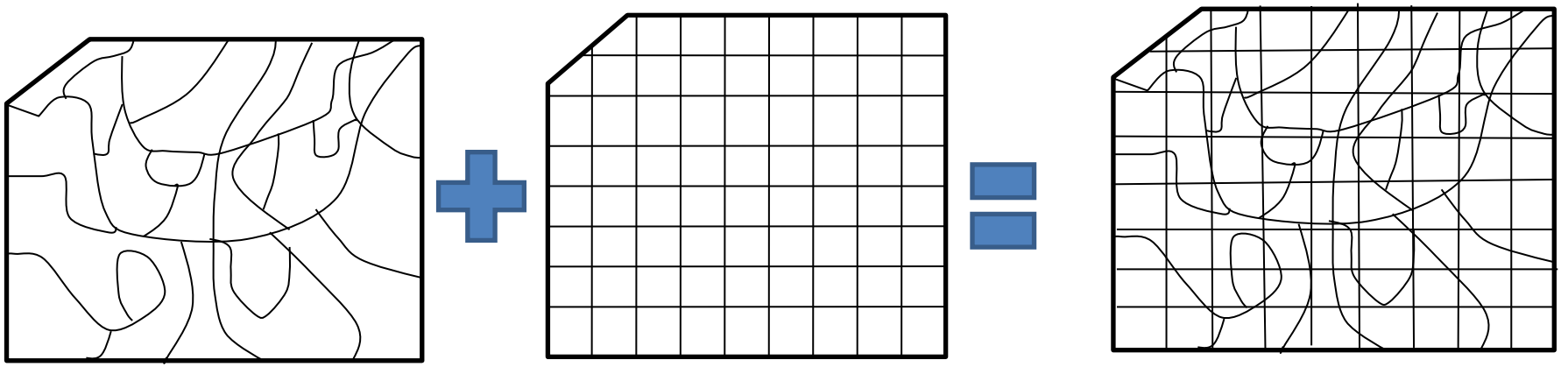
1 km window/10 m grids
(Urban neighborhoods)

100 m window/1 m grids
(Urban blocks)





The solution is perhaps not an either/or.
Can we combine administrative areas with grids to create an international geospatial framework or infrastructure?

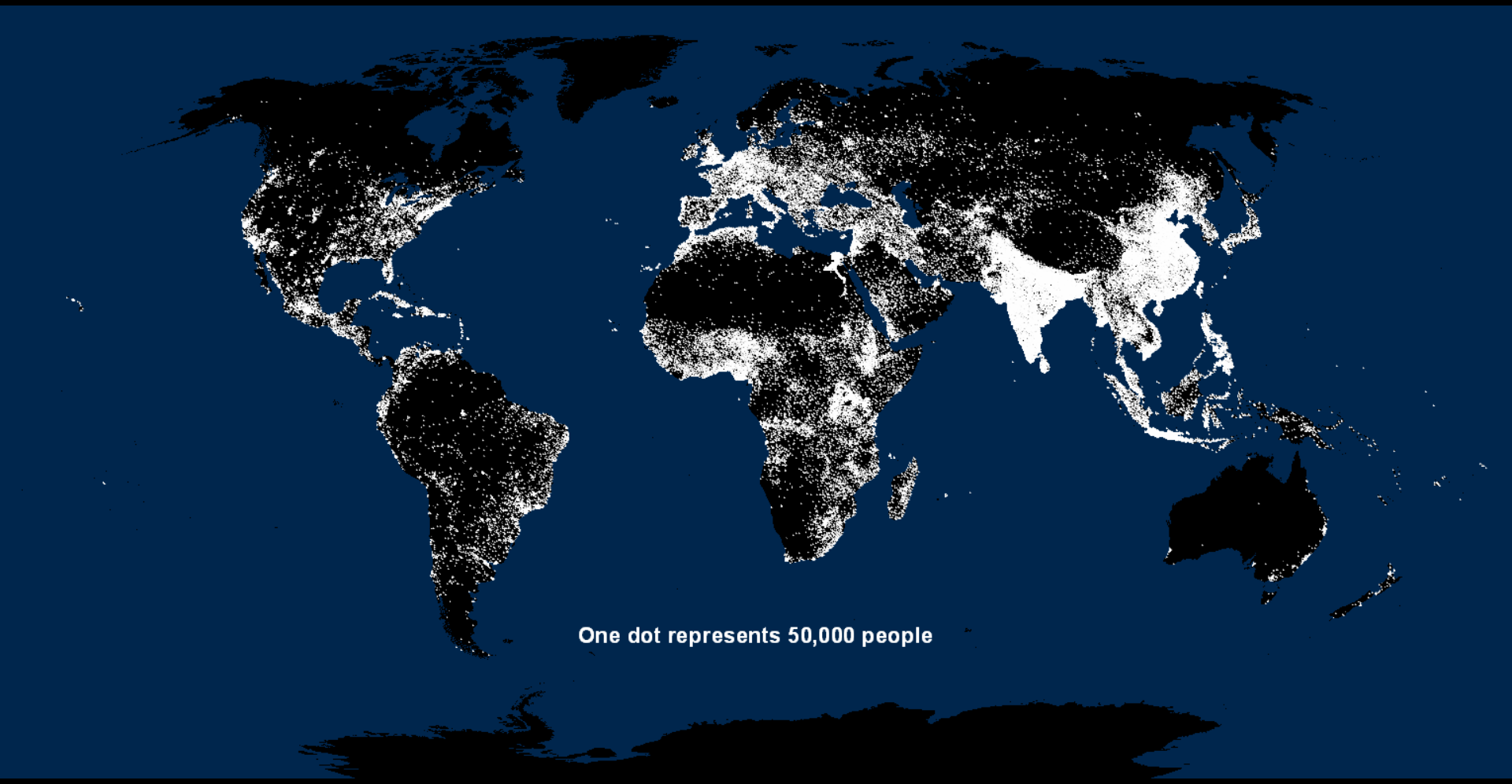


Administrative Areas | Regular Grid | Enhanced quality and accuracy

Case studies at the U.S. Census Bureau: the representation of population and agricultural systems.

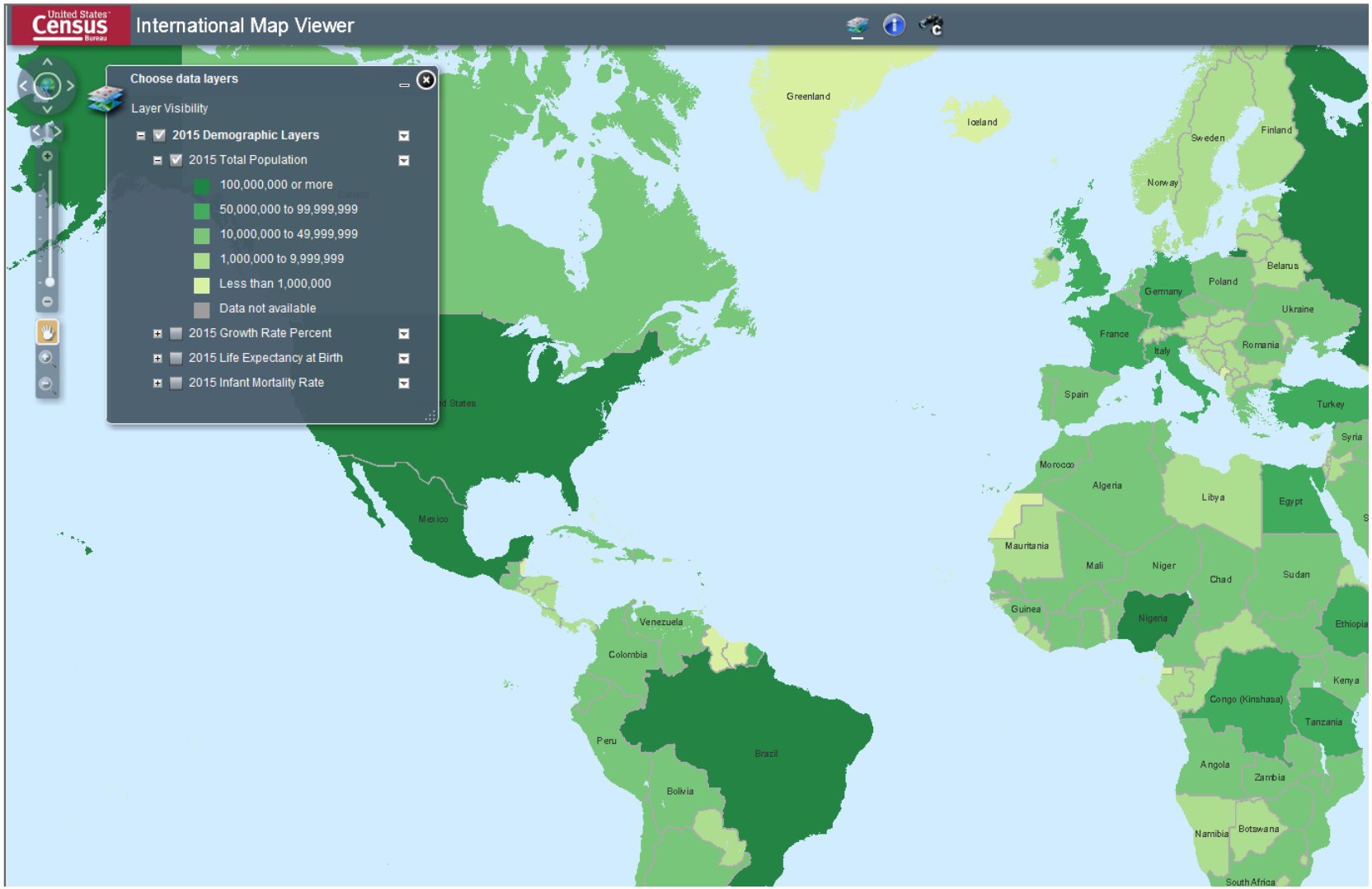
- 1992 *Agricultural Atlas of the United States*
- Haiti Demobase, 2010
- *Population Distribution of the World* (data provided to LandScan/Oak Ridge National Lab)

Population Distribution of the World



U.S. Census Bureau International Map Viewer

2015 population data for countries and territories



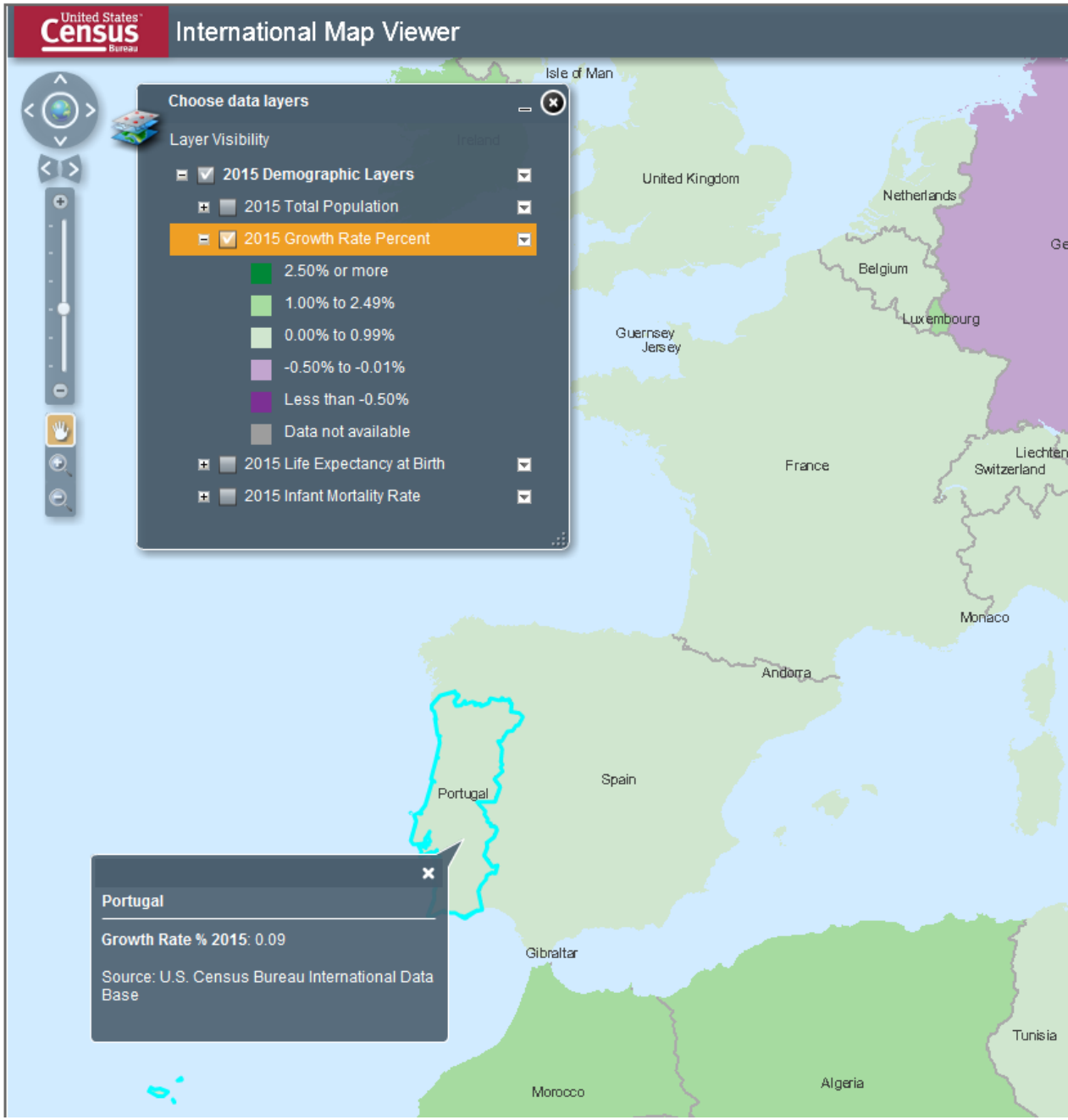
U.S. Census Bureau International Map Viewer

Data layers now online:

- Total population
- Growth rate
- Life expectancy
- Infant mortality rate

Future: More variables

www.census.gov/population/international/data/intlmapviewer.html



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