Why We Need Both Geography & Data Science to Achieve Sustainable Development

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The UN General Assembly Adopted the 2030 Agenda for Sustainable Development in September 2015, including 17 Sustainable Development Goals
4. As we embark on this great collective journey, we pledge that no one will be left behind. Recognizing that the dignity of the human person is fundamental, we wish to see the Goals and targets met for all nations and peoples and for all segments of society. And we will endeavour to reach the furthest behind first.

48. Indicators are being developed to assist this work. Quality, accessible, timely and reliable disaggregated data will be needed to help with the measurement of progress and to ensure that no one is left behind. Such data is key to decision-making.

17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts (emphasis added).

Recognition of the Role of the Data Revolution in Sustainable Development

- The data revolution is already happening:
  - New technologies leading to exponential increase in volume and types of data available
  - Much greater demand for data from all sides
  - Governments, companies, researchers and citizen groups are in a ferment of experimentation, innovation and adaptation

- A huge opportunity to enable and accelerate sustainable development

Recognition of the Role of Geospatial Population and Infrastructure Data for All of the SDGs

“Population distribution” and “Cities and Infrastructure Mapping” are important to indicators and decision making related to all 17 goals.

Alignments of the Goals with specific types of Earth observations and geospatial information
The First Global Gridded Population Dataset, GPWv1

- 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)
- Produced by Waldo Tobler, Uwe Deichmann, Jon Gottsegen, and Kelly Maloy at UC-Santa Barbara
GPWv4.10 now includes new dataset on Basic Demographic with gridded estimates of population by age groups and gender for 2010.

## Diversity of Products with Different Characteristics

<table>
<thead>
<tr>
<th>Project</th>
<th>Prop. Allocation</th>
<th>Dasymetric</th>
<th>Statistical / machine learning</th>
<th>Multiple Time Points</th>
<th>Imagery / spectral data</th>
<th>Radar</th>
<th>Nominal Spatial Resolution</th>
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<tr>
<td>GPW</td>
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<td></td>
<td>1km</td>
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<tr>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>1km</td>
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<tr>
<td>WorldPop</td>
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<td>✓</td>
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<td>100m</td>
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<tr>
<td>GHSL</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>30m, 250m, 1km</td>
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<tr>
<td>GUF</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>~12m for scientific research ~84m public</td>
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<tr>
<td>Esri</td>
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<td>✓</td>
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<td>250m</td>
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<tr>
<td>HRSL</td>
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<td>✓</td>
<td>✓</td>
<td></td>
<td>30m</td>
</tr>
<tr>
<td>GMIS/HBASE</td>
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<td>✓</td>
<td>✓</td>
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<td>30 m</td>
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</tbody>
</table>

* Exists for some countries, planned for WorldPop Global
High Resolution Settlement Layer (HRSL): **Focus on rural population to optimize Internet access**

- Collaboration with Internet.org/Facebook to produce open access 30–m resolution population density estimates: based on high res remote sensing imagery (IKONOS)
- Data for 23 countries plus Puerto Rico released; others to be released soon.

A: Haiti; B: Sri Lanka

http://ciesin.columbia.edu/data/hrsl/
Human settlements and infrastructure are a dynamic, integrated system, dependent on environmental conditions and ecological services, and managed by people!

- People live and work in infrastructure
- Households, communities invest in, expand, and maintain infrastructure
- Vulnerability to disaster, climate change, pollution, etc. depends on infrastructure
- Sustainability of infrastructure (physical, economic, social) depends on environmental conditions and ecological services, and their variability
- Key subsystems related to energy, water, transportation, sanitation, communications, etc. need to work together
- Infrastructure is a critical economic asset, essential to future income generation and sustainable development
POPGRID: A “Data Collaborative” for Settlement, Infrastructure, and Population Data

- Public-private data partnership involving intergovernmental organizations, national & academic research institutions, large and small companies, NGOs, foundations, universities, data stewards, etc.

- Goal: Accelerate the development and use of high quality, highly usable georeferenced data on population, human settlements, and infrastructure.
Participation Welcome!

- POPGRID Web Site
  http://www.popgrid.org

- POPGRID Google Group
  https://groups.google.com/forum/#!forum/popgrid

- GEO Human Planet Initiative
  https://www.earthobservations.org/activity.php?id=119

- GEO Symposium 2018, June 11-12, 2018, Geneva, Switzerland

- UN World Data Forum, October 22-24, 2018, Dubai, UAE

- GEO XVI Plenary, October 29-November 1, 2018, Kyoto, Japan

- International Data Week, November 5-8, 2018, Gaborone, Botswana

- American Geophysical Union, December 10-14, 2018, Washington DC