Case Studies on the use of geospatial technology in the development sector

Part 1: GRID3 data products, and their applications
Mapping
Settlements, Boundaries & Points of Interest
Settlement Extents

(polygon delimiting the built-up area of a locality)

Automated method to use building footprints data to separate settlement into:

- built-up areas,
- small-settlement areas
- hamlets
Application of Settlement Extent Dataset

Identify and estimate populations in different areas

- For the rural area in the image, the estimated population within hamlets (orange polygons): 230
- The estimated population within the “small settled area” (purple polygon): 430
Boundary Harmonisation

Before Boundary Harmonization

- Yellow boundaries represent wards; black boundaries represent districts
- Red areas represent gaps and overlaps between two levels of administrative divisions

After Boundary Harmonization

District de Livingston, Zambie.
Compilation of ‘Points of Interest’ Dataset
Using Gridded Population Estimates
A residential settlement in Nigeria....
Existing census area......

Typically there would be a single population estimate for this entire area.

Estimated number of people per grid cell (100m):
- 0
- 0-1
- 1-10
- 10-100
- 100-250
- 250+

Gridded population estimates

Applying Gridded population estimates....

Providing fine grained population variation
Benefits of gridded population estimates:

▪ Great aggregation flexibility

▪ A consistent grid enables easy comparison between areas and with other data themes

▪ Fine-grained understanding of population variation

Kano

Estimated number of people per grid cell (100m)

- 0
- 0-1
- 1-10
- 10-100
- 100-250
- 250+

comparison of population estimation and imagery

Good contrast in predicted population counts between areas of dense residential buildings & industrial areas
Application of Gridded Population Estimates

- Population within existing boundaries e.g. townships, can be over/under estimated
- How many enumerators to send?

<table>
<thead>
<tr>
<th>NAME</th>
<th>Estimated population (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chazanga</td>
<td>72,111</td>
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<tr>
<td>Chunga</td>
<td>77,677</td>
</tr>
<tr>
<td>Desai</td>
<td>11,068</td>
</tr>
<tr>
<td>Emmasdale/Villa Ellizabetha</td>
<td>23,487</td>
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<tr>
<td>Lilanda</td>
<td>5,723</td>
</tr>
</tbody>
</table>

Estimated population per grid cell
Population within 5km of a health post

5km buffer around two health facilities in Muchinga, Zambia:

- Chibamba Health Post
- Mwika Rural Health Centre

Estimated 5km catchment populations:

- Chibamba: 2,360
- Mwika: 4,862
Application of Gridded Population Estimates

Urban connectivity and mobility

Estimate population (or other variables) within 300m of a main road

- Create 300m buffer around main road
- Calculate population for buffered area = 8,238
How are the gridded estimates created?

Population Data
Sourced from:
Population Census Surveys with demographic, health, and household income data; 'Microcensus' conducted for the purpose of modelling.

Settlement Data
Examples:
- Settlement types
- Individual building shapes
- Point locations
- Associated characteristics

Other Geospatial Data
Examples:
- Elevation
- Slope
- Vegetation types
- Accessibility to major cities

Bottom-up population model
Input Data for Population Estimation

Data source
- Street data
- Buildings data
- Vegetation data
- Integrated data

Data layers
- Densities of schools, roads, market places, conflicts etc
- Household sizes, regional groupings, poverty rates

Source: GAO.
Questions?

Please post any questions or comments in the course forum below!