GRID3

GEO-REFERENCED INFRASTRUCTURE AND DEMOGRAPHIC DATA FOR DEVELOPMENT

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

Part 1: GRID3 data products, and their applications

BILL & MELINDA GATES foundation

UKaid from the British people

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

UNFPA

WorldPop

FLOWMINDER.ORG

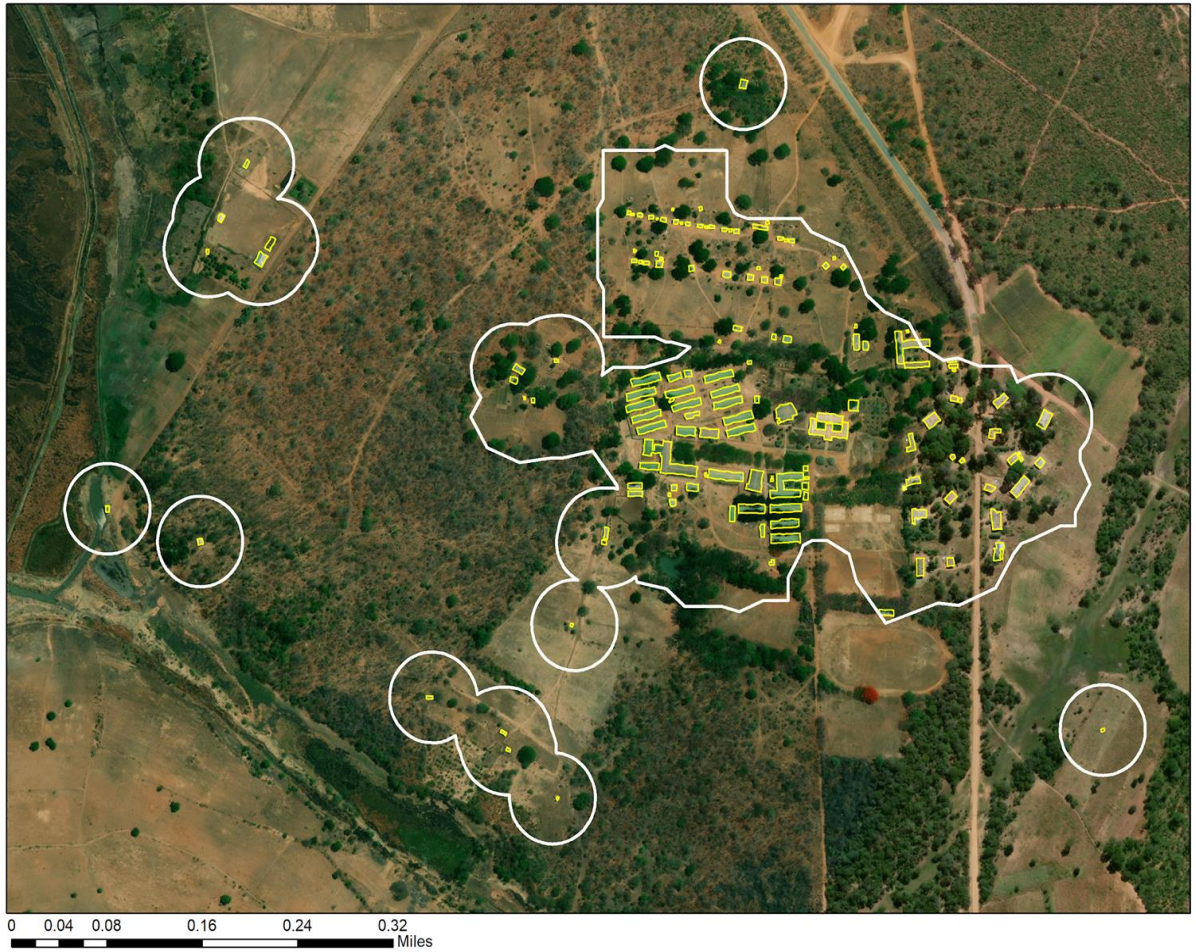
Mapping Settlements, Boundaries & Points of Interest

Settlement Extents

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

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

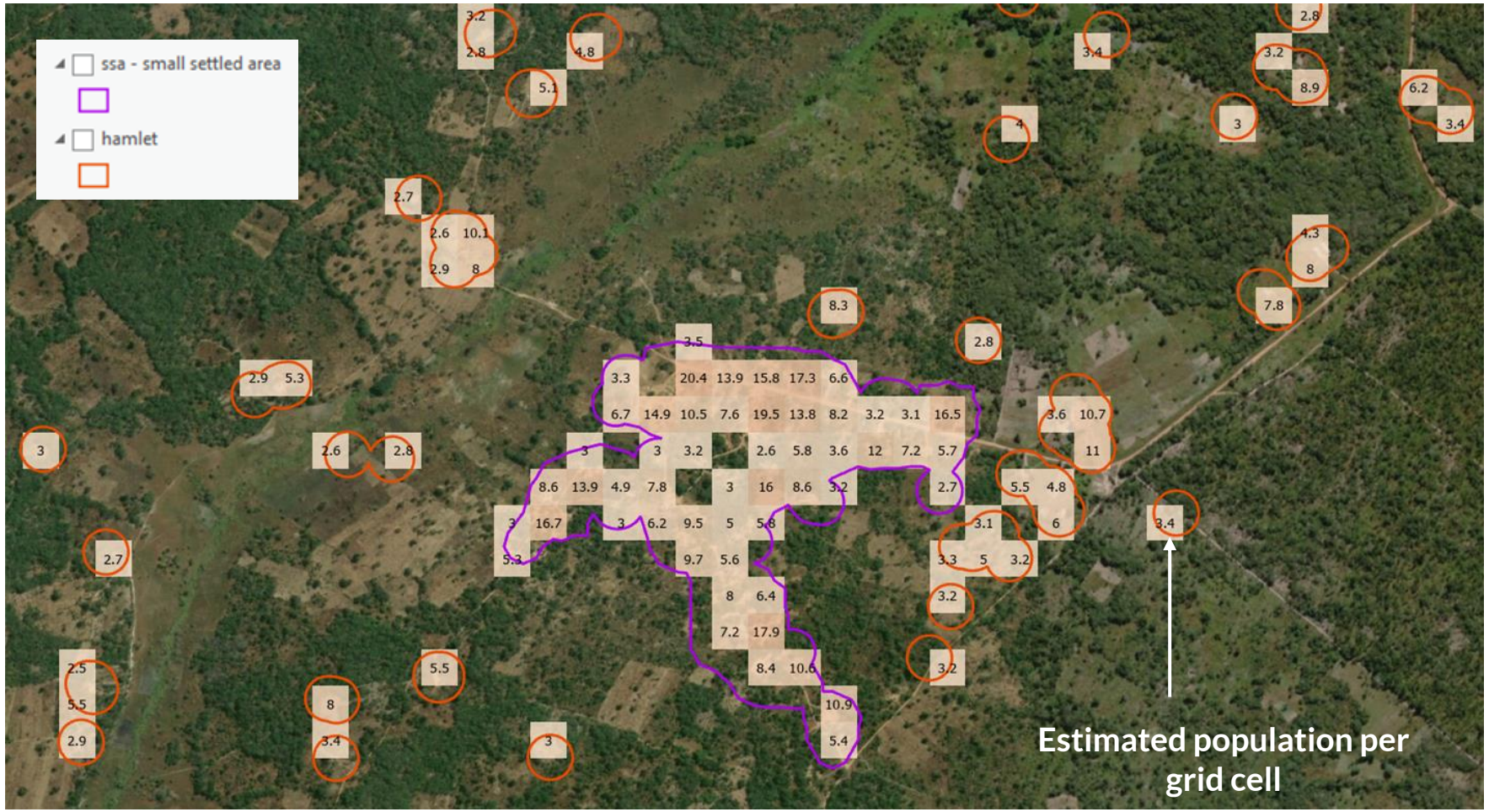
- built-up areas,
- small-settlement areas
- hamlets



Feature Extraction of Building Footprints by Ecopia AI and Maxar

Application of Settlement Extent Dataset

Identify and estimate populations in different areas

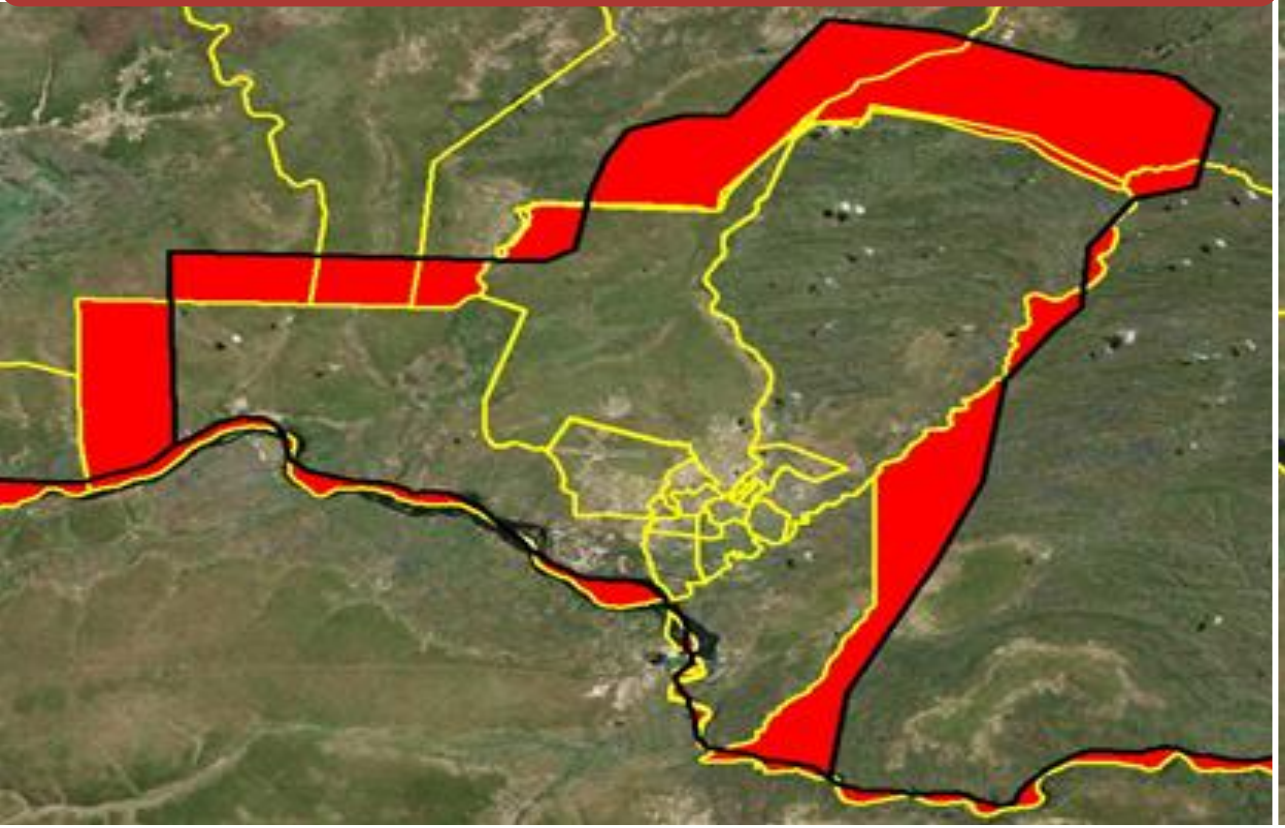


- For the rural area in the image, the estimated population within hamlets (orange polygons): 230
- The estimated population within the “small settled area” (purple polygon): 430

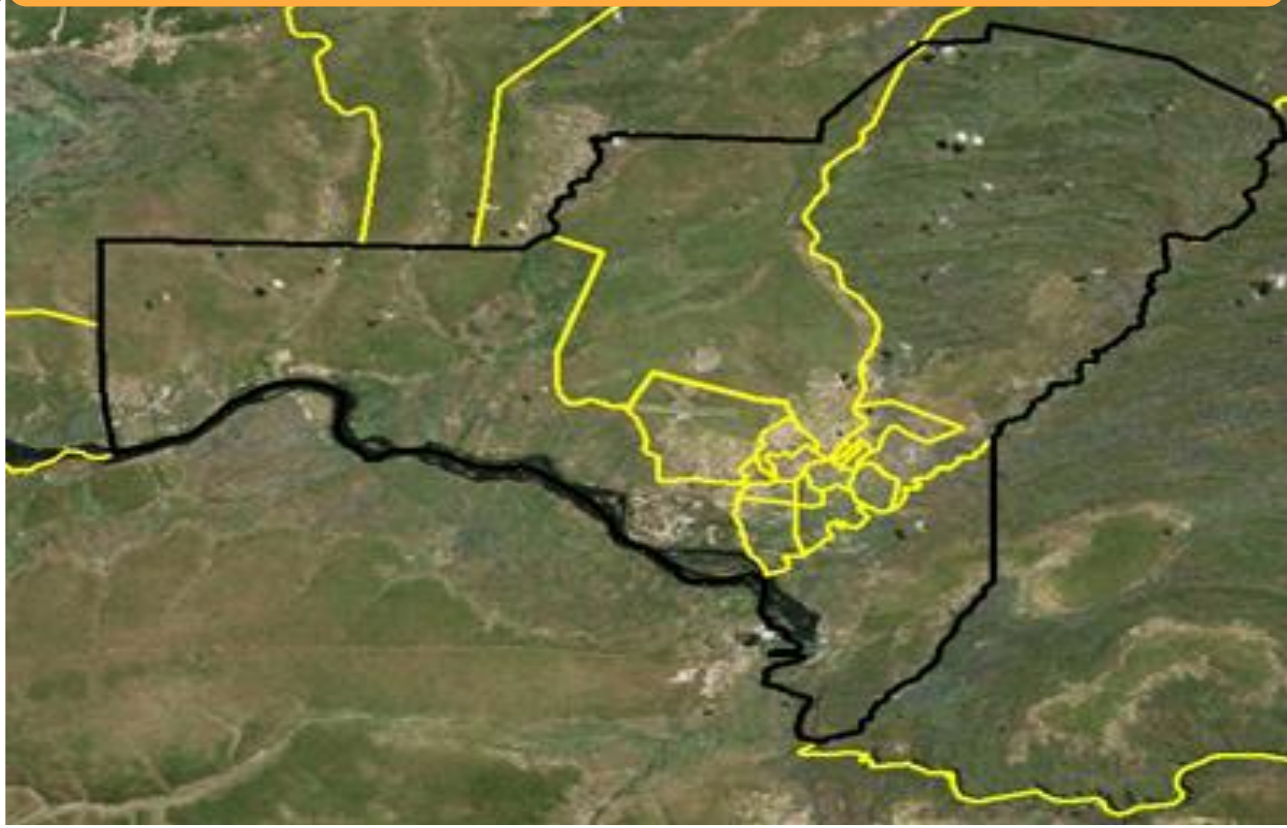
Boundary Harmonisation

District de Livingston, Zambie.

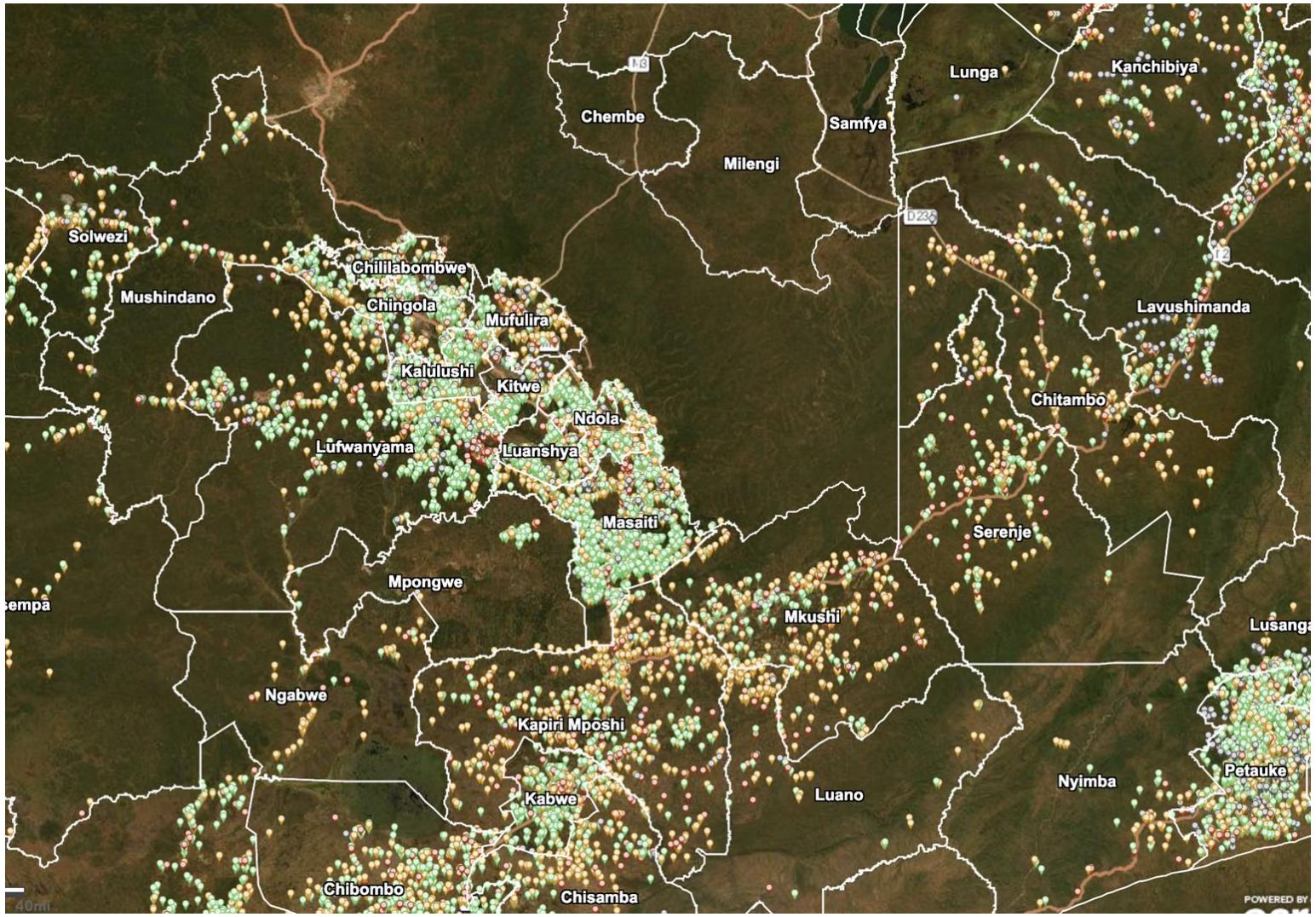
Before Boundary Harmonization



After Boundary Harmonization



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



Theme	Count
Administration	1,435
Agriculture	13,521
Beacon	65
Buildings	35
Commercial	7,853
Compound/Block/Camp	3,102
Mill	2,176
Mining	205
Natural Feature	3,538
Neighborhood	80
Other	443
Police	215
Prison	17
Recreation	625
Religion	14,191
Section	545
Storage Facility	500
Transportation	1,851
Utilities	9,689

Compilation of ‘Points of Interest’ Dataset

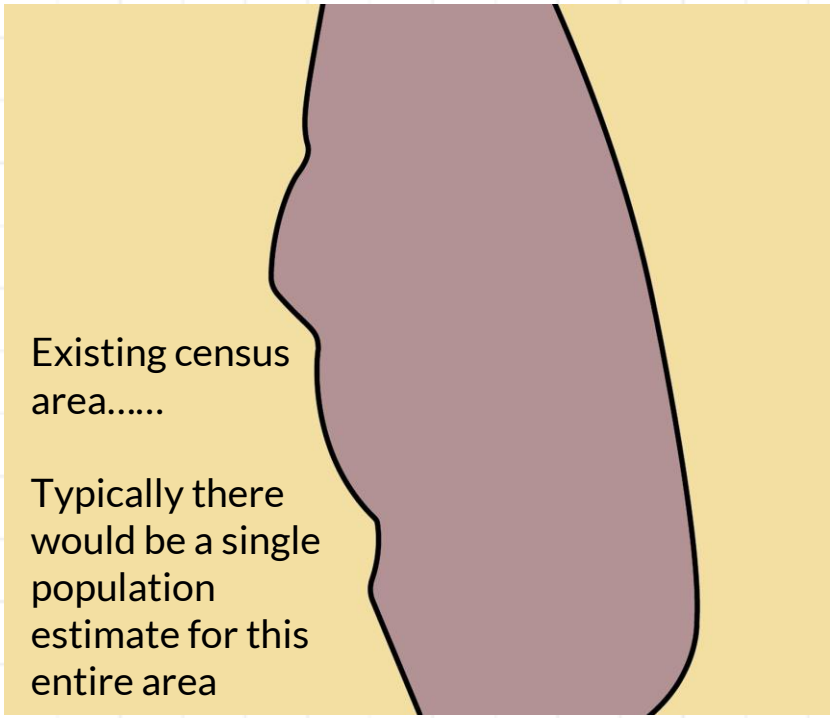

Using
Gridded
Population
Estimates

A residential settlement in Nigeria….

Bing aerial imagery
Accessed 31-05-2019

Applying Gridded population estimates….

Providing fine grained population variation



Existing census area……

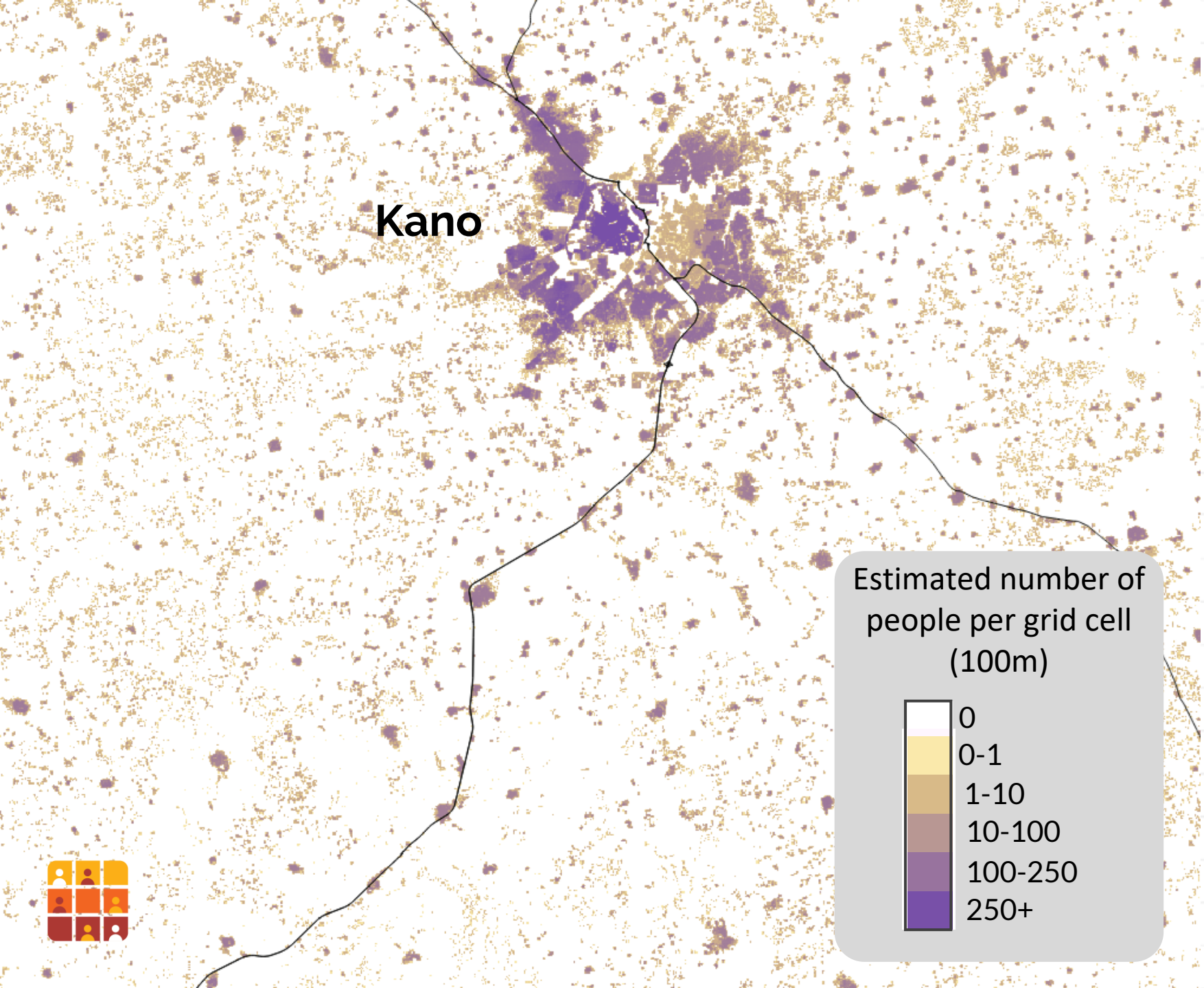
Typically there would be a single population estimate for this entire area

Estimated number of people per grid cell (100m)

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

GRID3 Nigeria Population Estimates v1.1, WorldPop and Flowminder, 22-02-2019.

Gridded population estimates



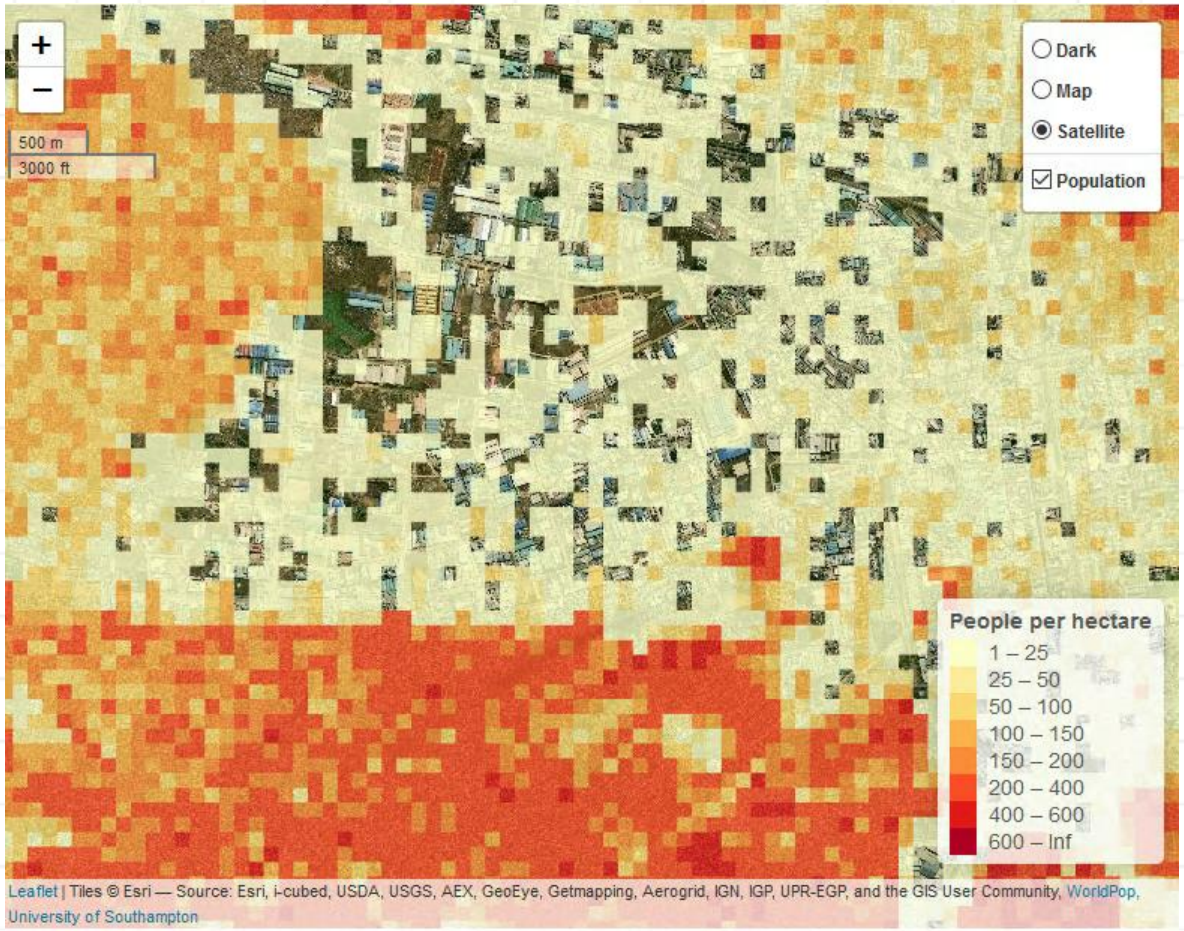
Benefits of gridded population estimates:

- Great aggregation flexibility
- A consistent grid enables easy comparison between areas and with other data themes
- Fine-grained understanding of population variation

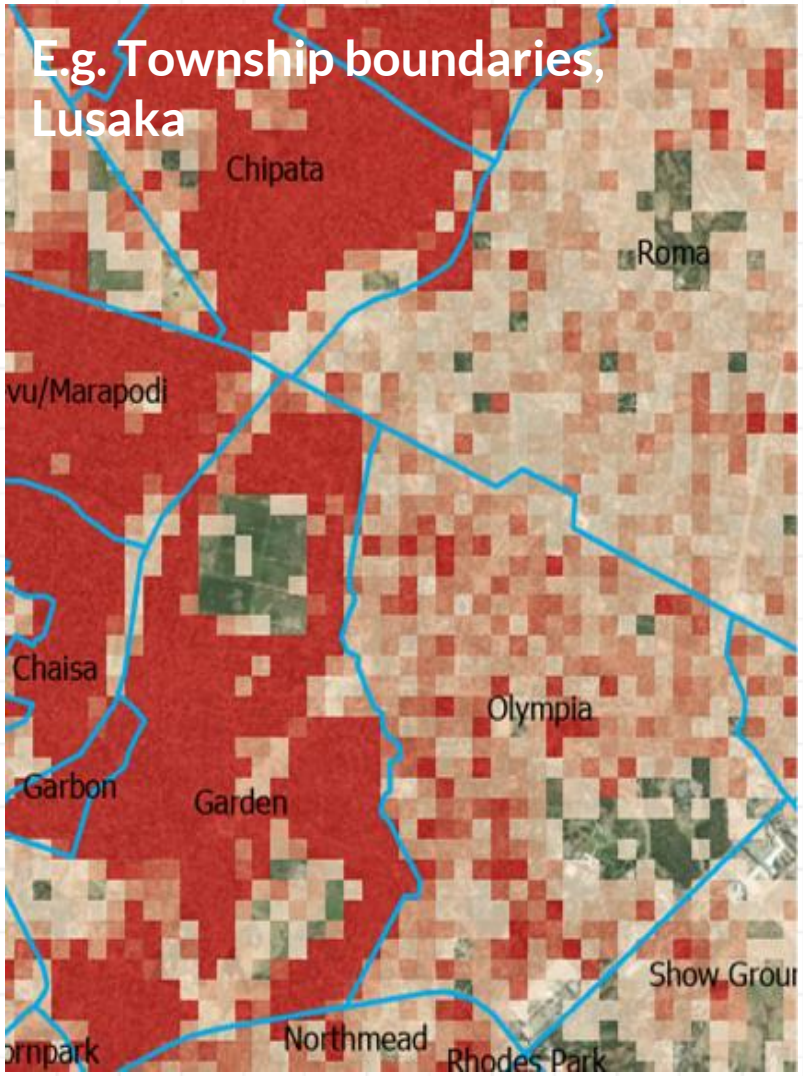
GRID3 Nigeria Population Estimates v1.1, WorldPop and Flowminder, 22-02-2019.

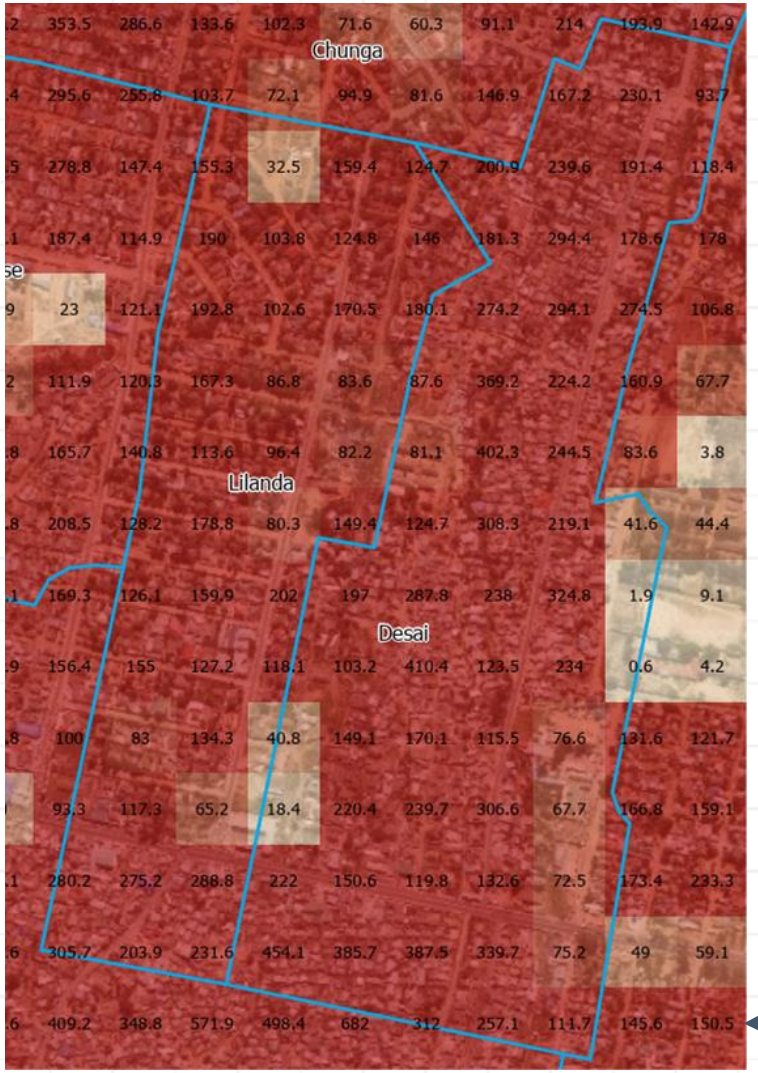
comparison of population estimation and imagery

Good contrast in predicted population counts between areas of dense residential buildings & industrial areas



Application of Gridded Population Estimates





Supporting Census Operations

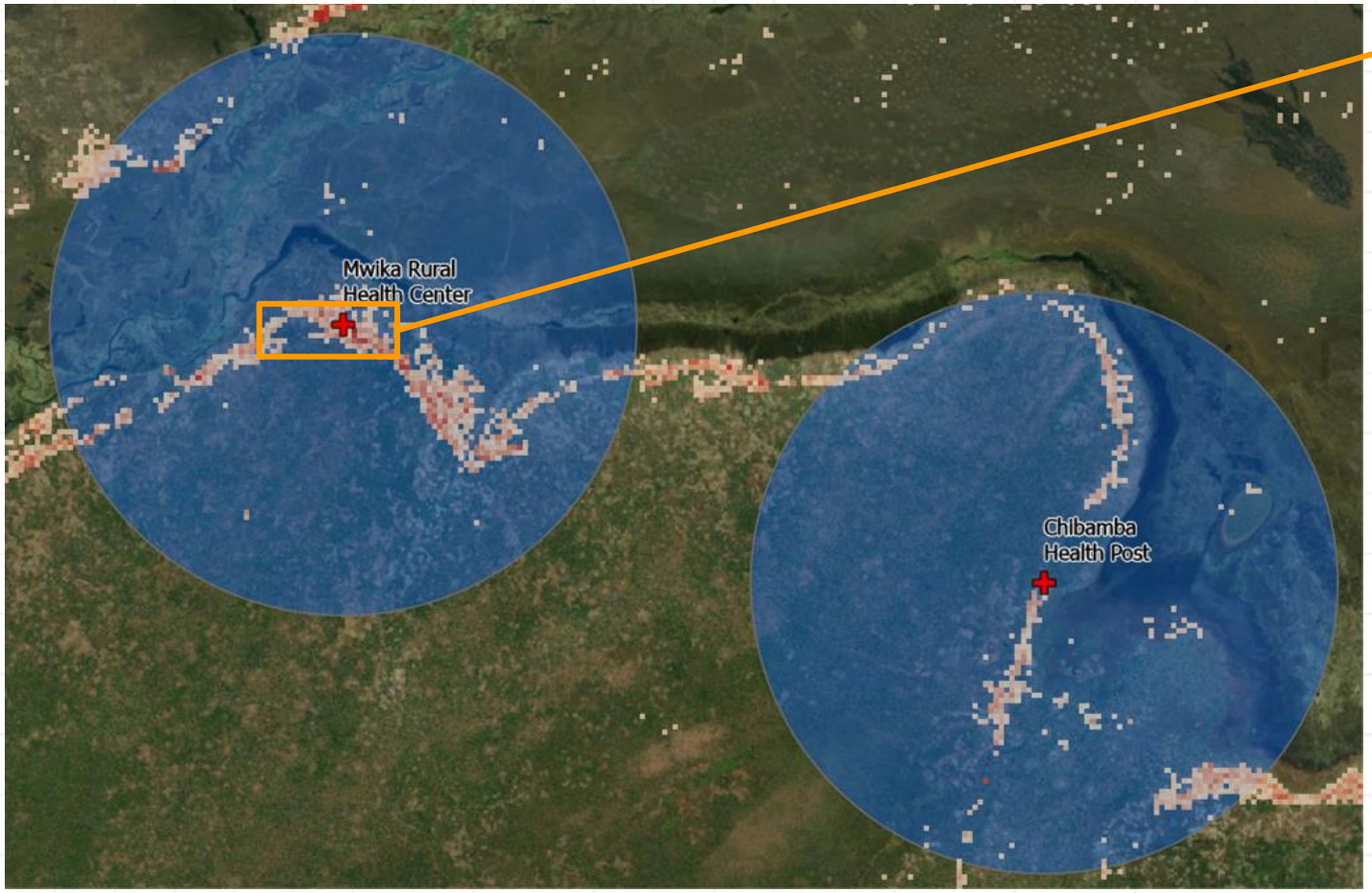
- Population within existing boundaries e.g. townships, can be over / under estimated
- How many enumerators to send?

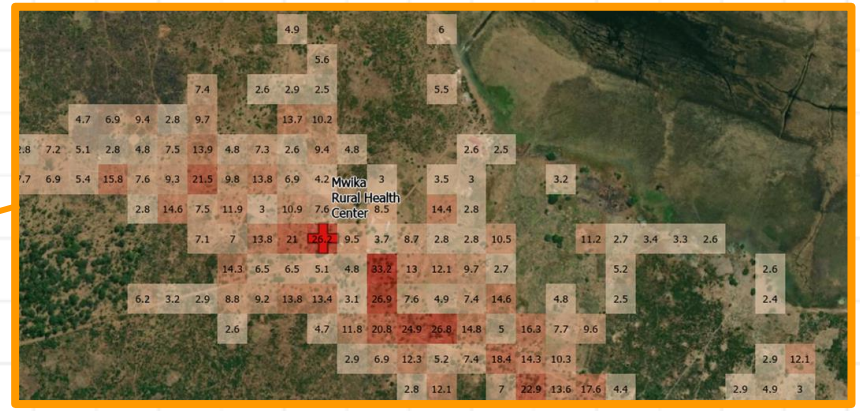
NAME	Estimated population (mean)
Chazanga	72,111
Chunga	77,677
Desai	11,068
Emmasdale/ Villa Ellizabetha	23,487
Lilanda	5,723

Estimated population per grid cell

Applications of Gridded Population Estimates

Access to health & vaccination services





Population within 5km of a health post

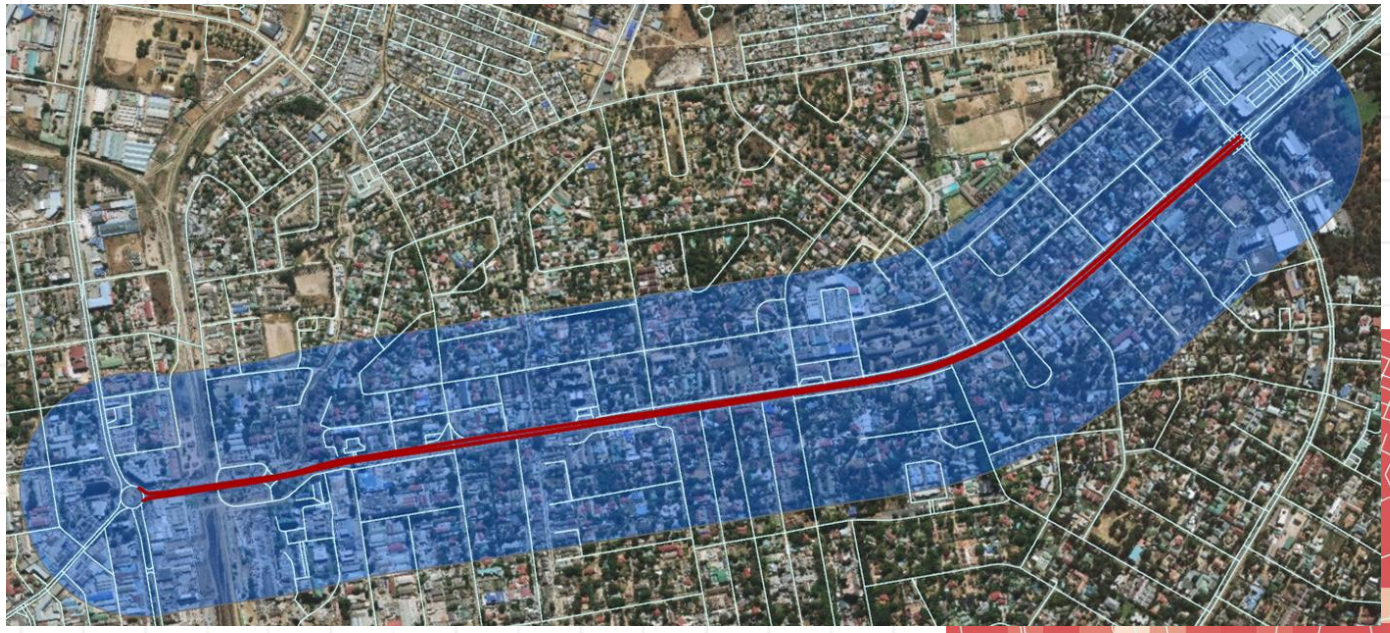
5km buffer around two health facilities in Muchinga, Zambia:

- Chibamba Health Post
- Mwika Rural Health Centre

Estimated 5km catchment populations:

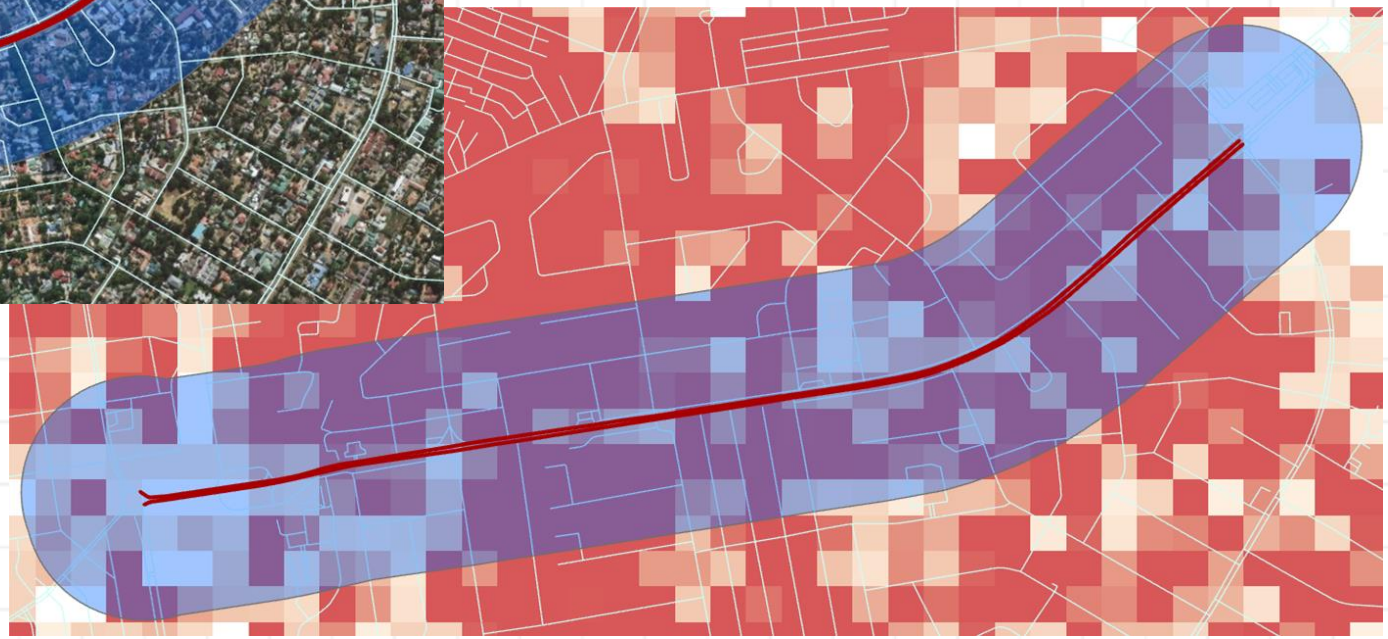
- Chibamba: 2,360
- Mwika: 4,862

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.

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Settlement Data

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

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Other Geospatial Data

Examples:
- Elevation
- Slope
- Vegetation types
- Accessibility to major cities

Data Inputs

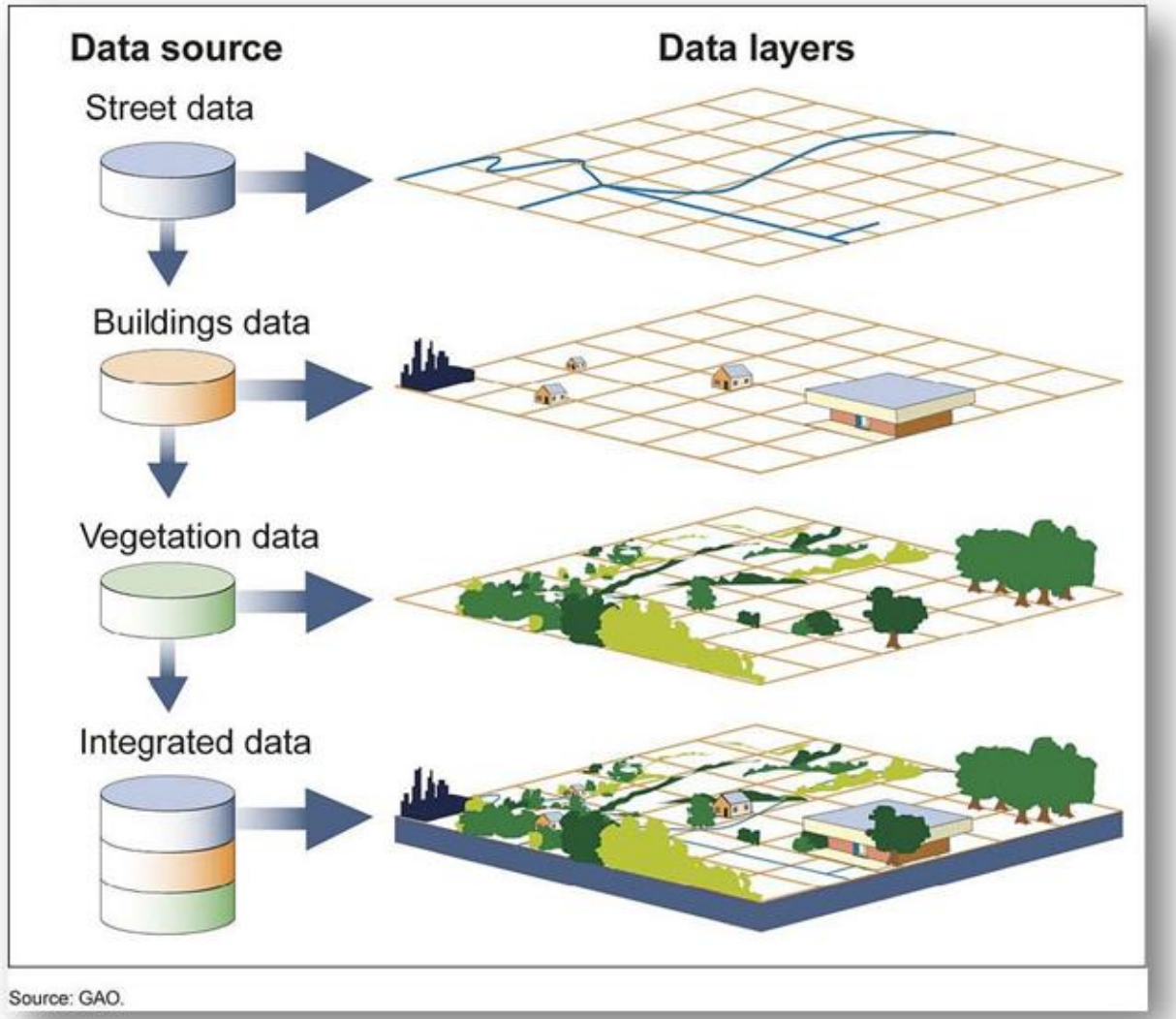
Statistical model

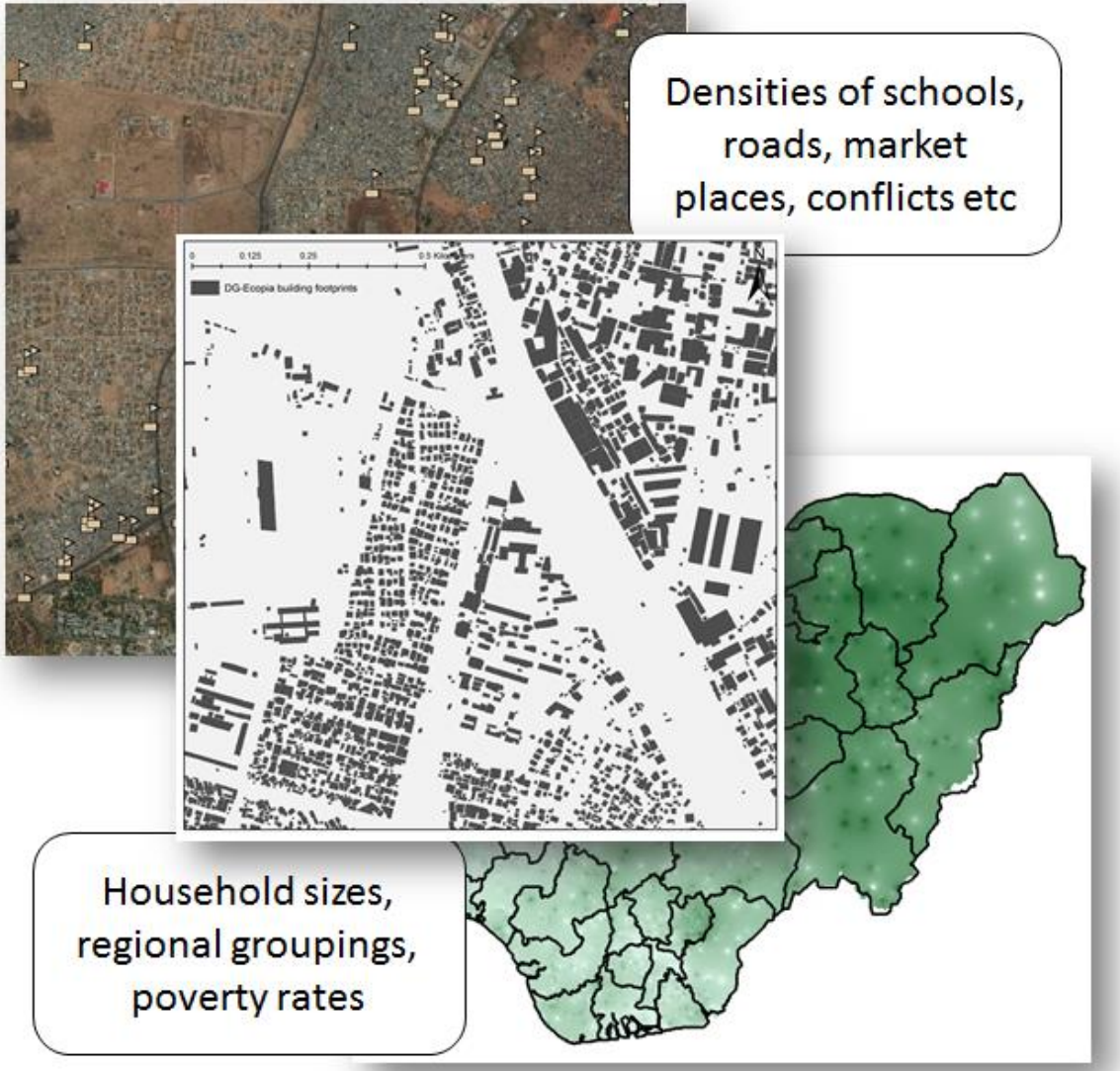
Data Outputs

GRID3 Gridded Population Estimates

Bottom-up population model

Input Data for Population Estimation





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Questions?

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