
WorldPop

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The Power of Population Data: Introducing WorldPop Global 2 (2015–2030)

4 September 2025

					
Professor Andy Tatem Founder and Director of **WorldPop** and Professor of Spatial Demography and Epidemiology at University of Southampton	**Dr Jessica Espey** Associate Professor in the School of Geography and Environmental Sciences at University of Southampton, Deputy Director Research at **WorldPop**	**Mr Andrew Bob Johnny** Statistician General Statistics Sierra Leone	**Dr Mollie Van Gordon** Senior Program Officer leading the Geospatial Insights portfolio at the Gates Foundation	**Dr Sabrina Juran** Regional Advisor, Data and Population Dynamics, Latin America and the Caribbean at the United Nations Population Fund (UNFPA)	**Dr Maksym Bondarenko** Head of **WorldPop's** Spatial Data Infrastructure Team

Agenda

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British Summer Time

15:00 – 15:20	**Part 1: Unveiling the Future: WorldPop's newest innovative global dataset** **Breaking new ground: introducing WorldPop Global2** *Professor Andy Tatem, Director of WorldPop*
15:20 – 15:50 moderated panel discussion	**From research to real-world impact: Global development applications** *Mollie van Gordon - Gates Foundation* *Andrew Bob Johnny - Sierra Leone* *Sabrina Juran - UNFPA* *Moderator: Jess Espey, WorldPop*
15:50 – 16:10	**Part 2: Hands-on discovery – input data, tools and technical deep-dive** *Dr Maksym Bondarenko, Head of WorldPop's Spatial Data Infrastructure*
16:10 – 16:30	**Interactive Q&A with WorldPop's team** *Questions on technical requirements, platforms, tools, access, integration and much more.*

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Part 1 – Unveiling the Future

WorldPop Global2

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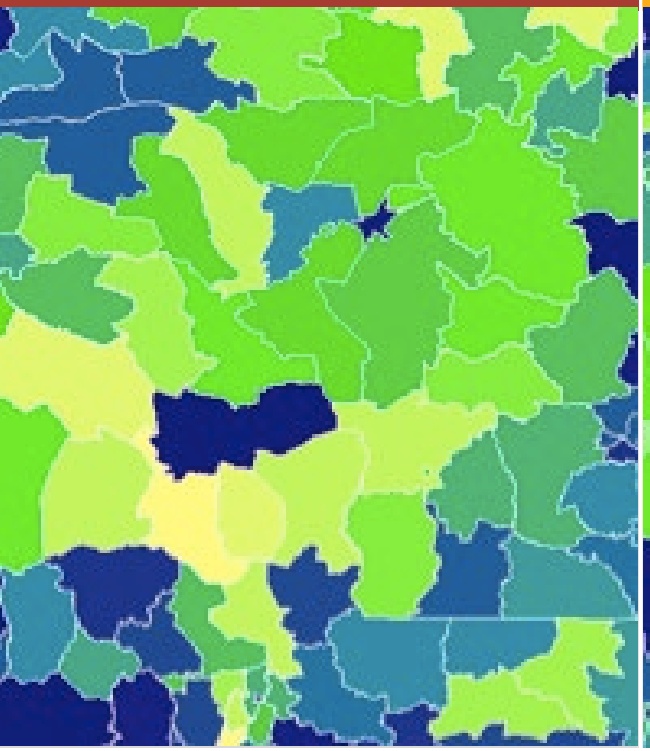
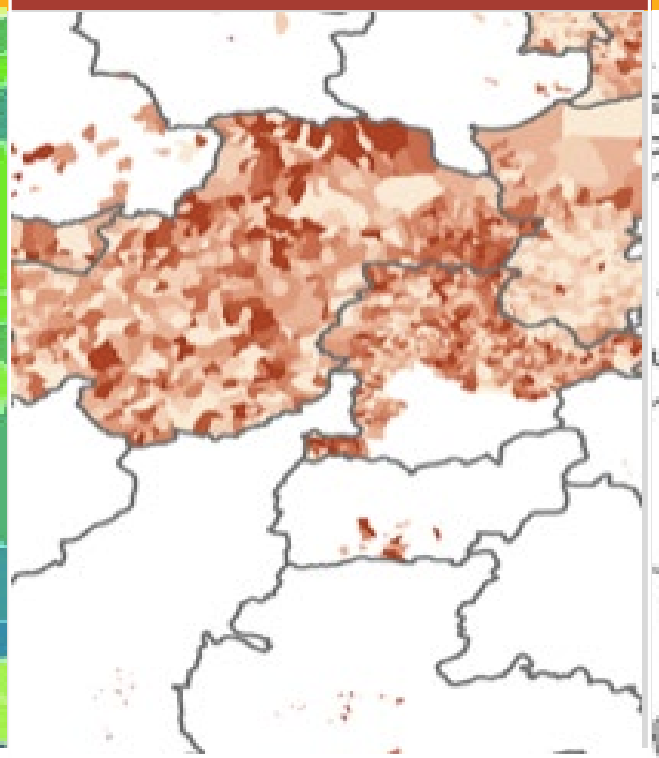
Value of small area population data

- Planning elections
- Calculating GDP
- Local governance
- Traffic planning
- Financial services
- Delivering utilities
- Agricultural subsidies
- Taxation
- Land use management
- Energy strategies
- Health system planning
- Supply chain management
- Health metrics
- Meeting SDGs
- Controlling infectious diseases
- Measuring climate change impacts
- Education planning
- Disaster preparedness

Coarse resolution	Outdated	Incomplete	Inaccuracies, missing populations
			

Demographic data challenges

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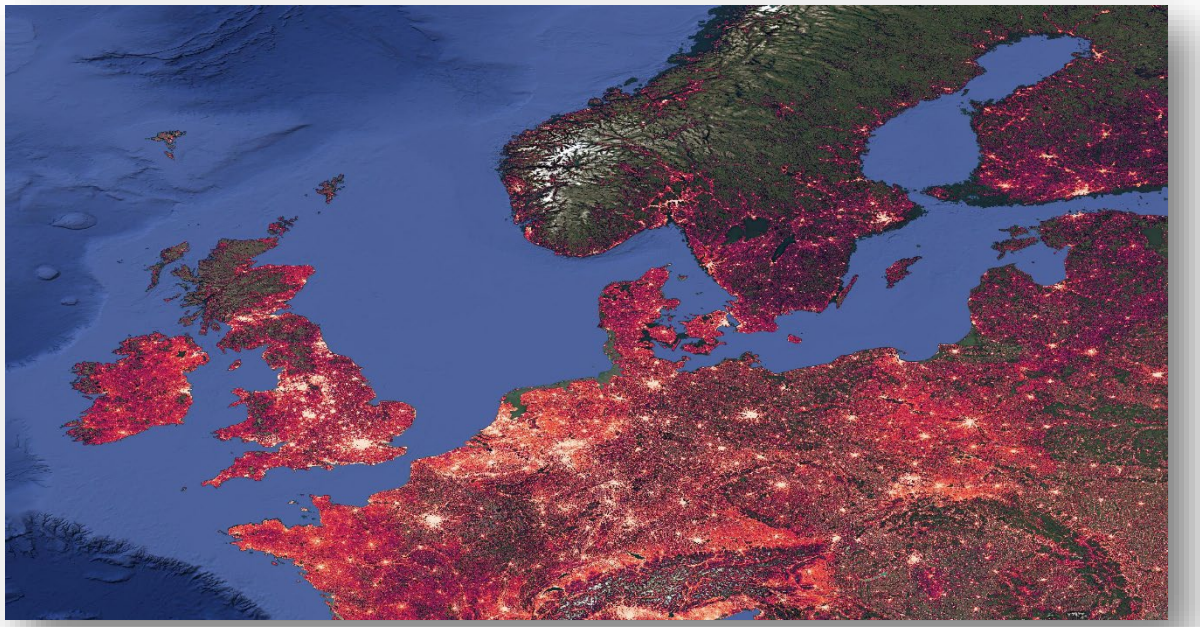
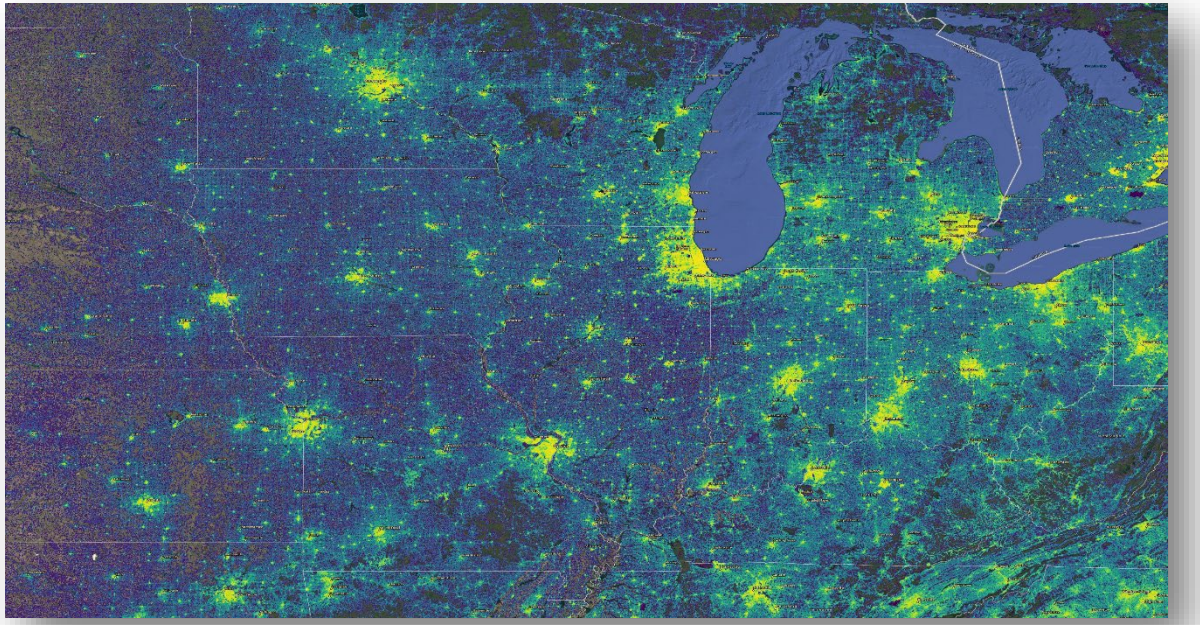
-Applied research group of 40 staff

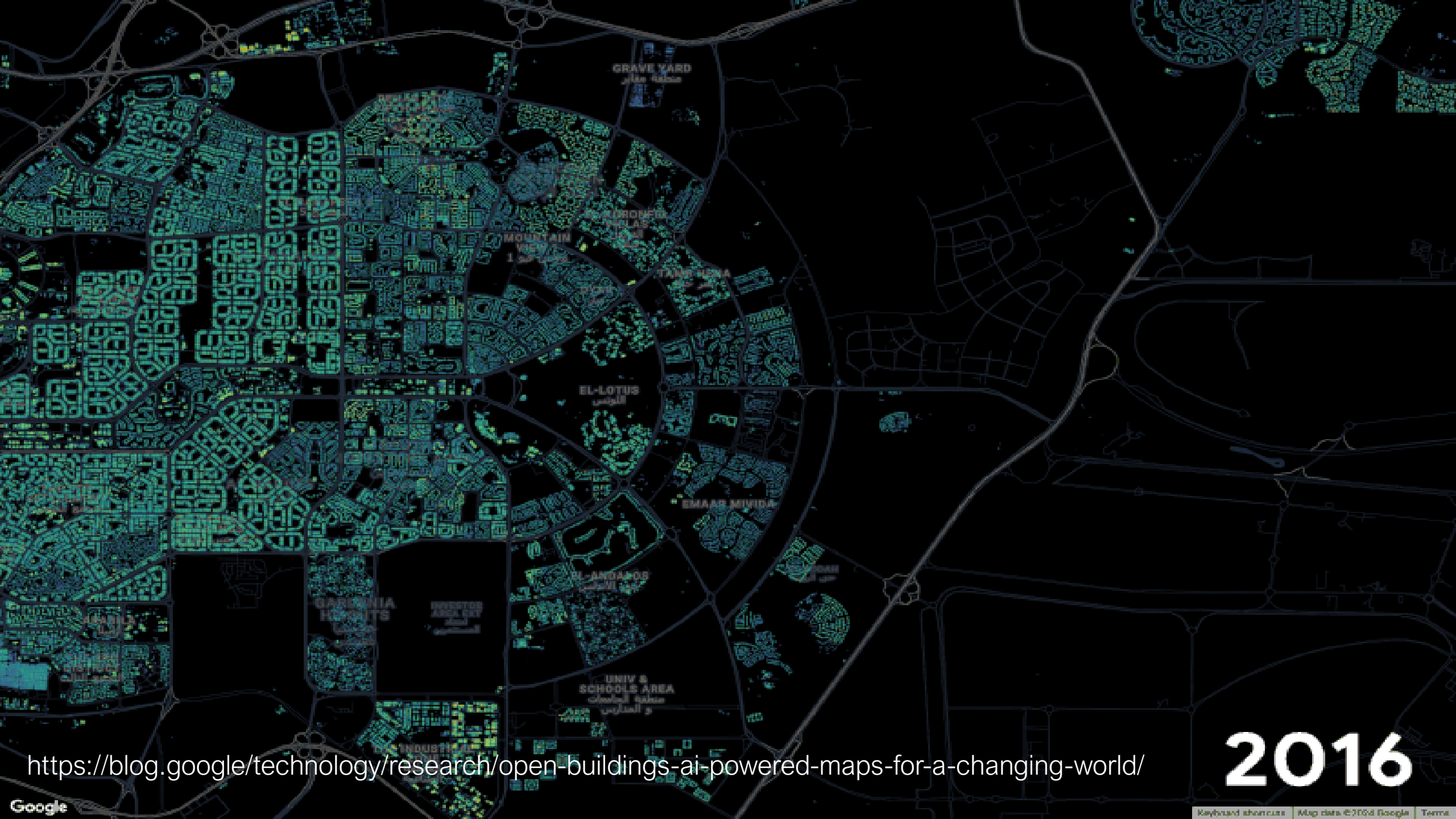
-Geospatial integration methods for addressing demographic data gaps

Mission: Innovative research to empower decision-makers to harness the power of reliable, inclusive and accurate spatial demographic data

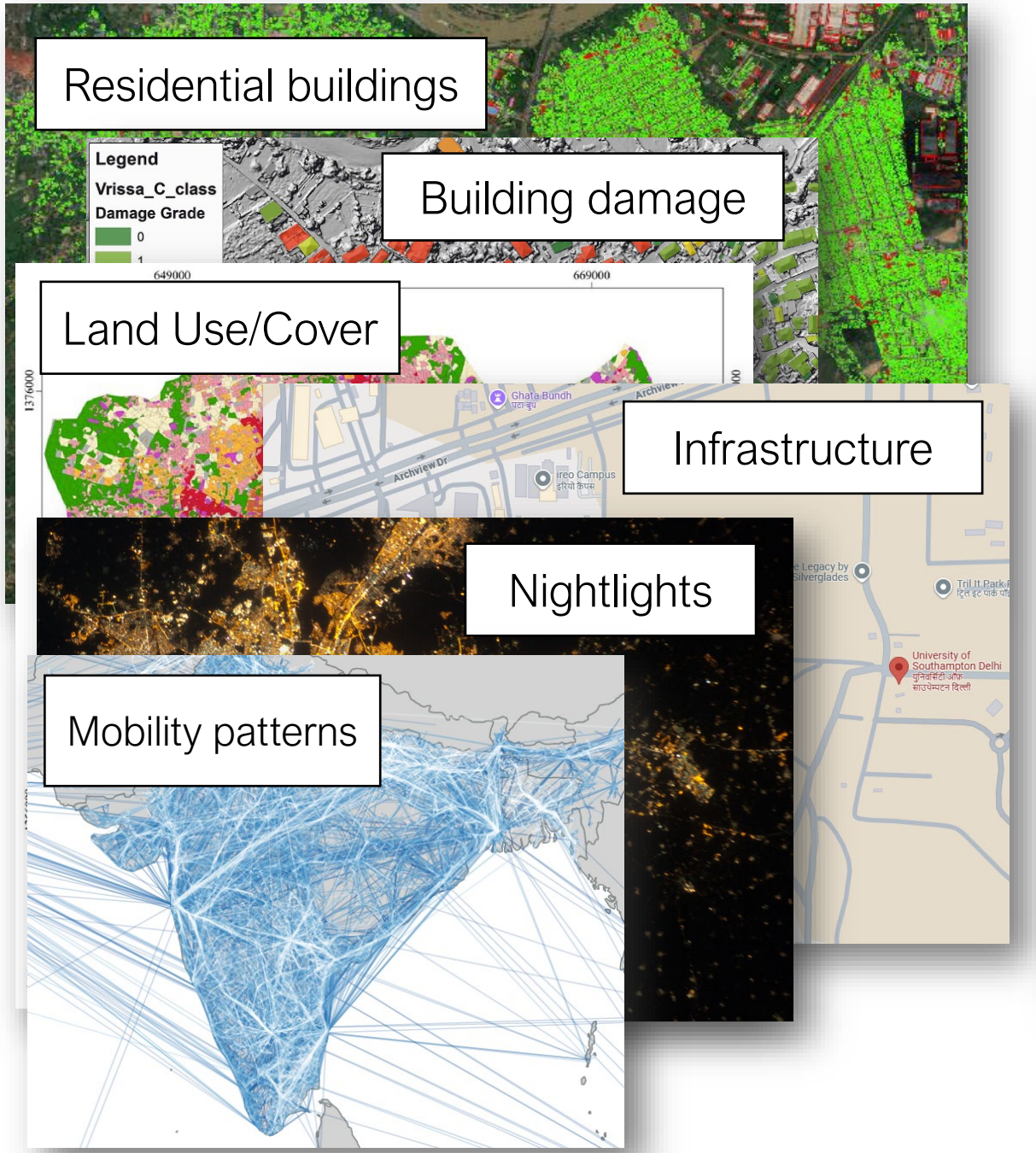
Vision: A world where everyone, everywhere is counted in decision-making

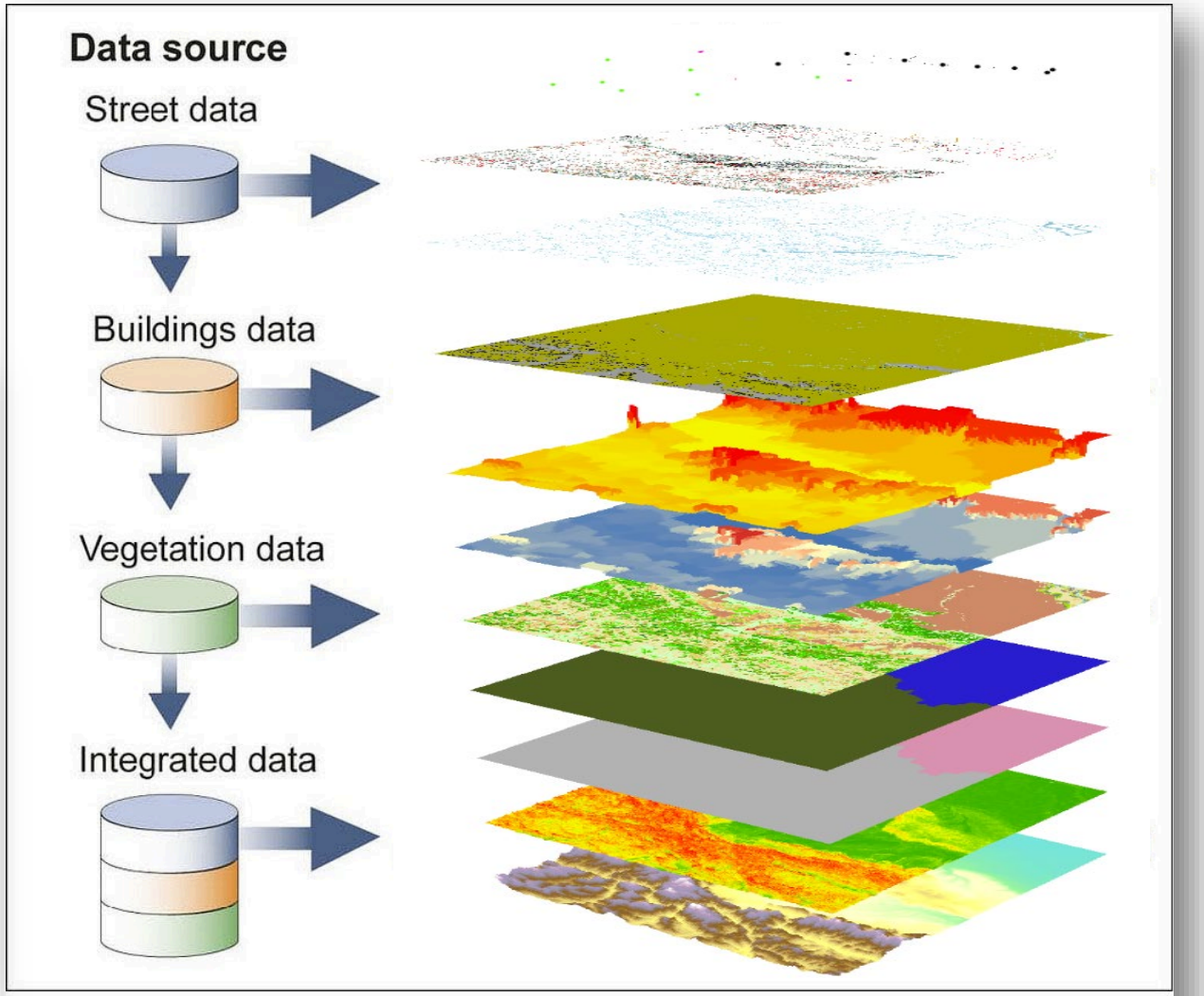






https://blog.google/technology/research/open-buildings-ai-powered-maps-for-a-changing-world/





Source: GAO.

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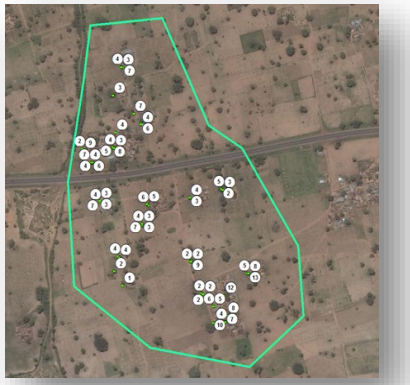
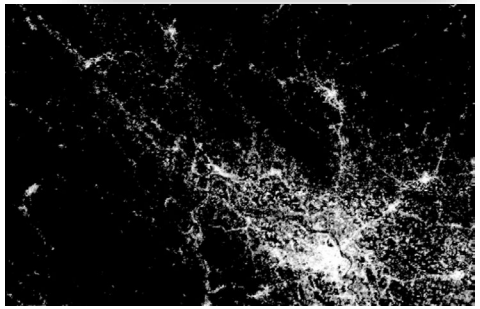
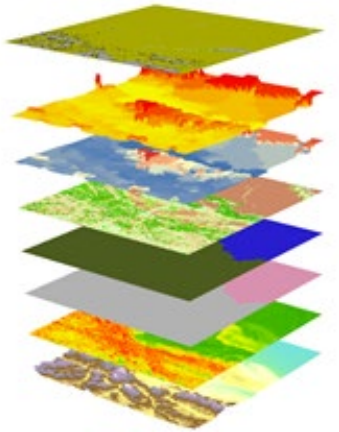
Small area population estimation







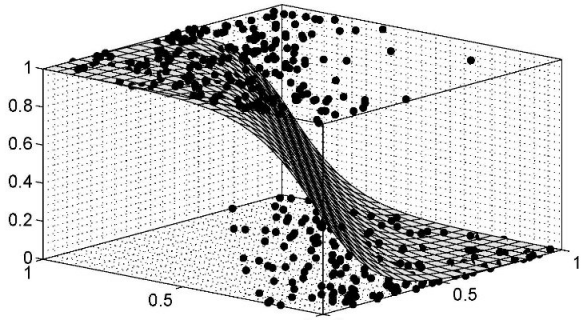
Population Data

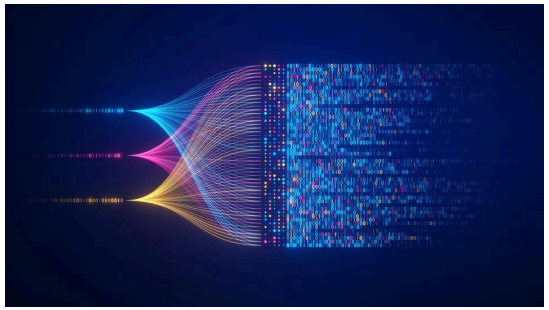
Settlement

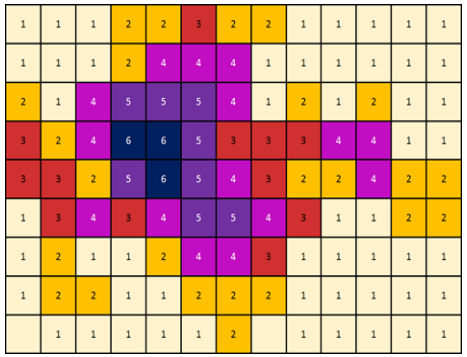
Geospatial covariates

Spatial statistical/ machine learning model

Population estimates



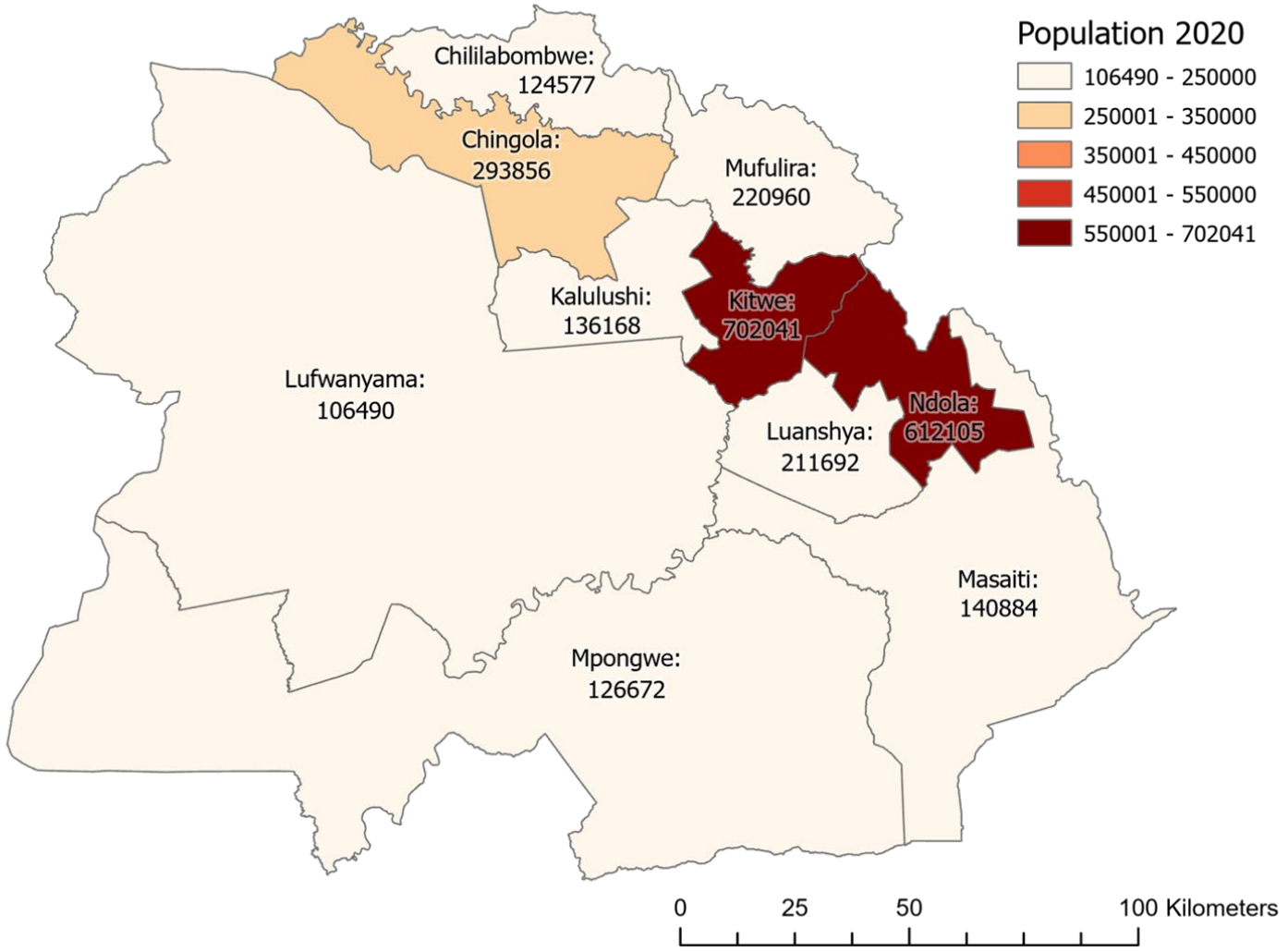




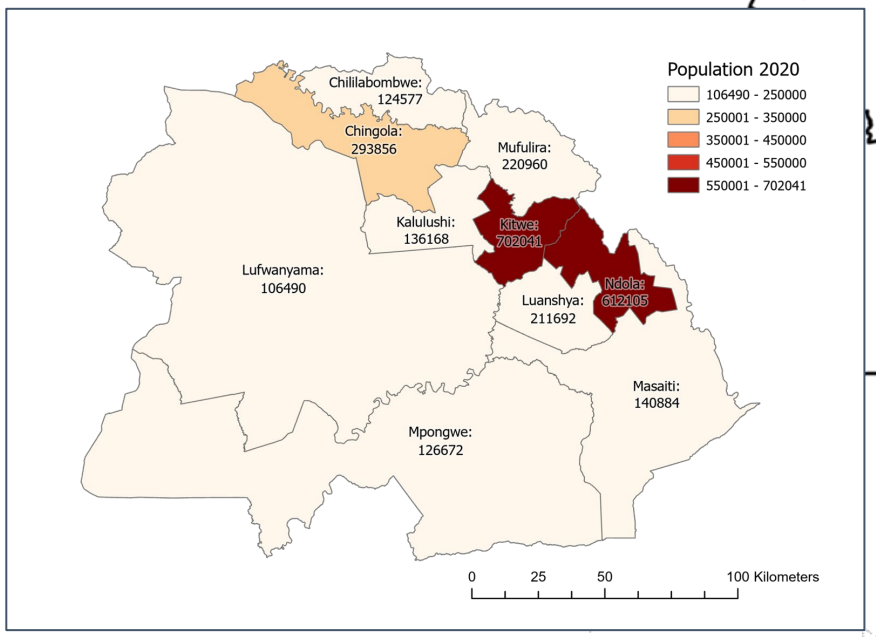
Wardrop et al (2018) PNAS

Population estimates: typical data

District	Province	Total
Chililabombwe	Copperbelt	124577
Chingola	Copperbelt	293856
Kalulushi	Copperbelt	136168
Kitwe	Copperbelt	702041
Luanshya	Copperbelt	211692
Lufwanyama	Copperbelt	106490
Masaiti	Copperbelt	140884
Mpongwe	Copperbelt	126672
Mufulira	Copperbelt	220960
Ndola	Copperbelt	612105



Gridded population estimates

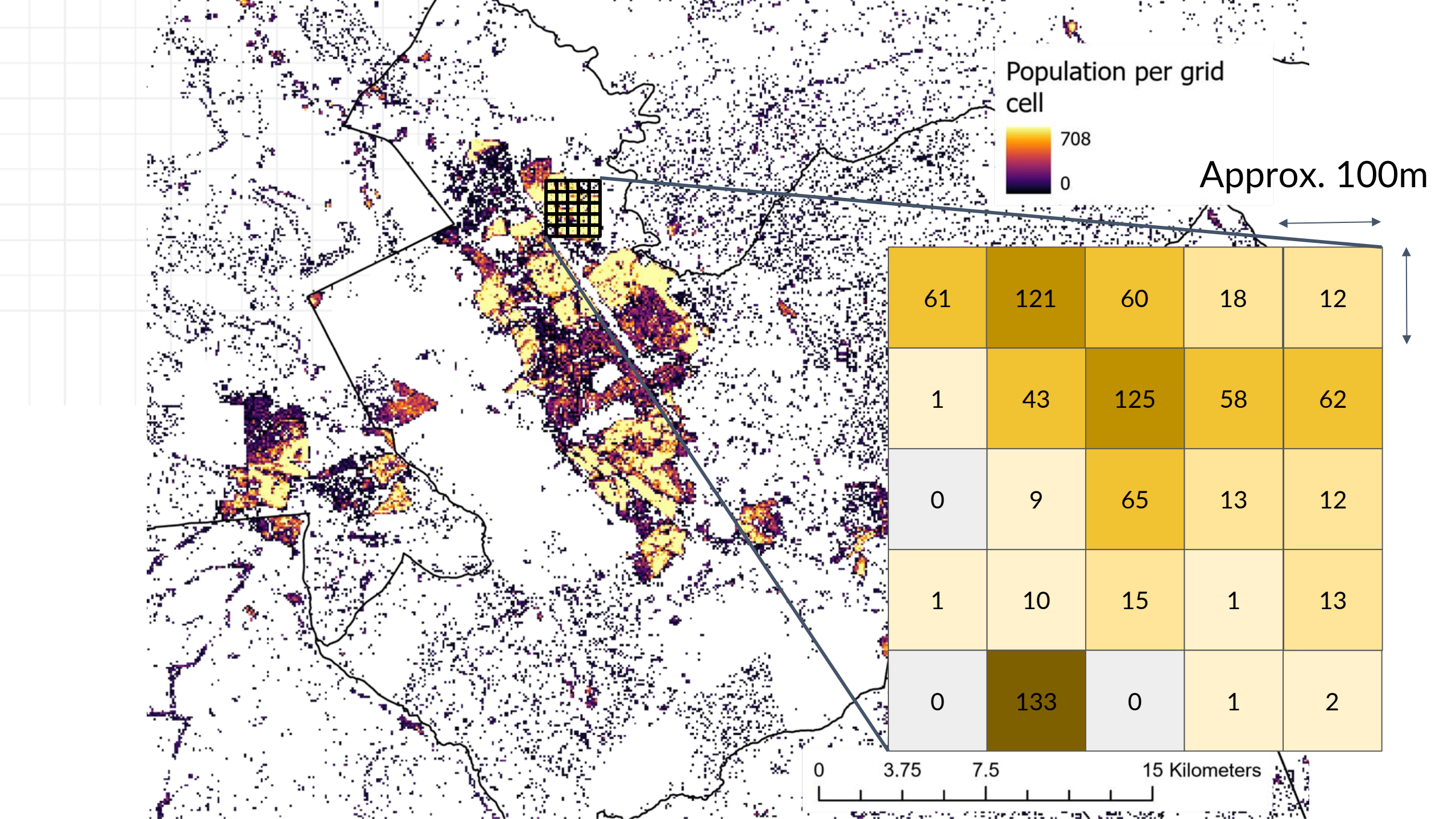


Population per grid cell

708

0

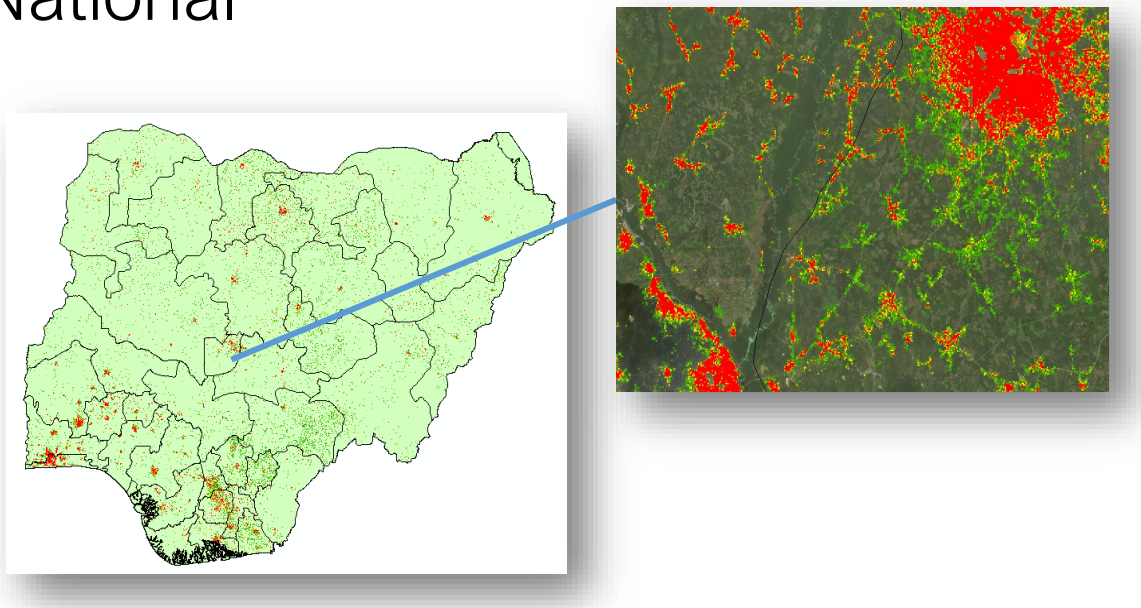
0 25 50 100 Kilometers


Population per grid cell
708
0
Approx. 100m
61 121 60 18 12
1 43 125 58 62
0 9 65 13 12
1 10 15 1 13
0 133 0 1 2
0 3.75 7.5 15 Kilometers

WorldPop produces two broad types of demographic datasets

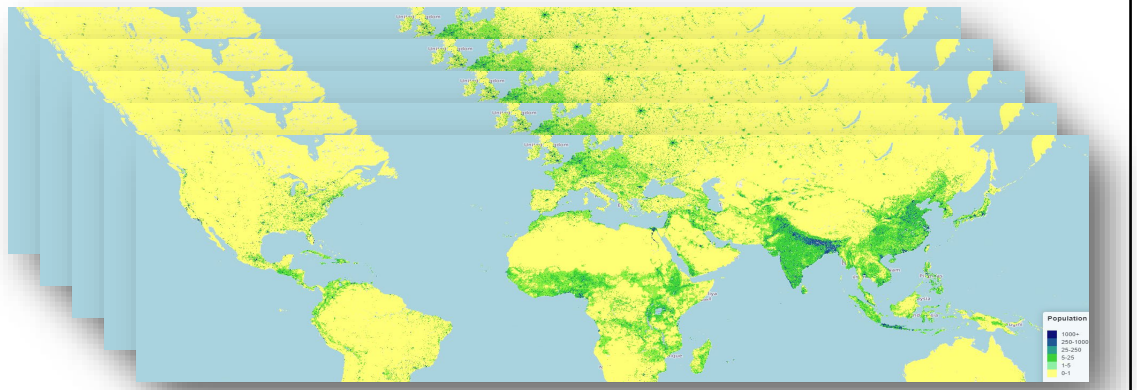
WorldPop

National



- Bespoke model design and data
- Single recent time point
- Co-developed with decision-makers for specific applications
- **Most accurate estimates for individual countries and recent timepoints**

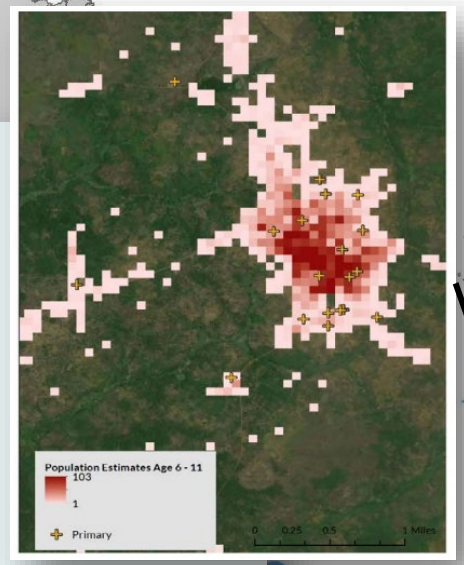
Global

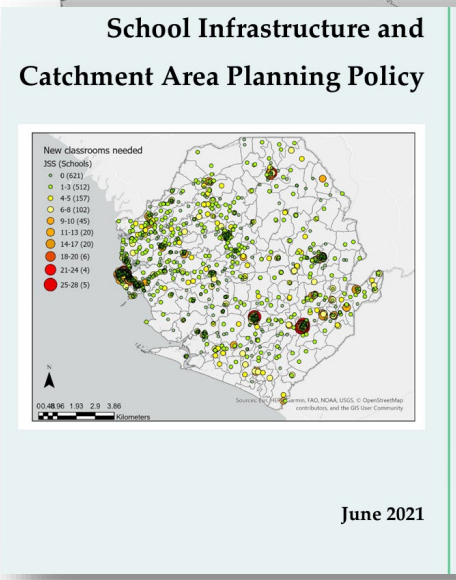


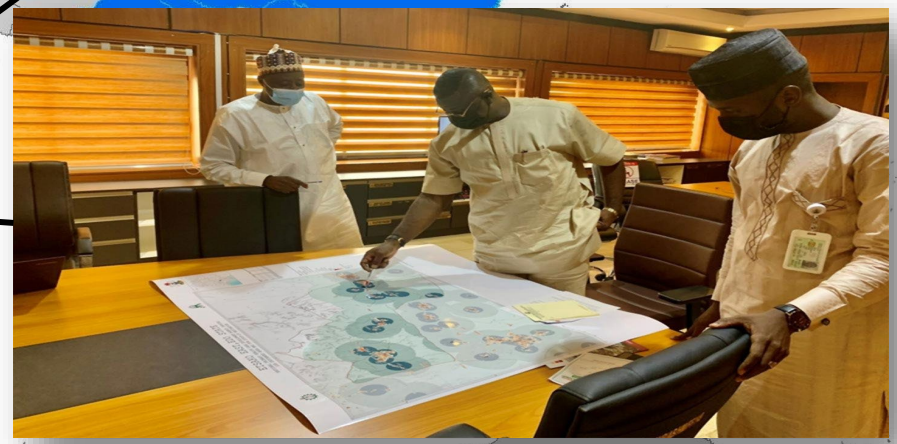
- Consistent data, methods, outputs for all countries
- Multi-temporal
- Co-developed with global demographic and geospatial data providers
- **Best for multi-country, multi-year analyses**

Government co-development, support

WorldPop







www.worldpop.org/global-engagement

Gates Foundation

Gavi The Vaccine Alliance

Foreign, Commonwealth & Development Office

wellcome

unicef

UNFPA

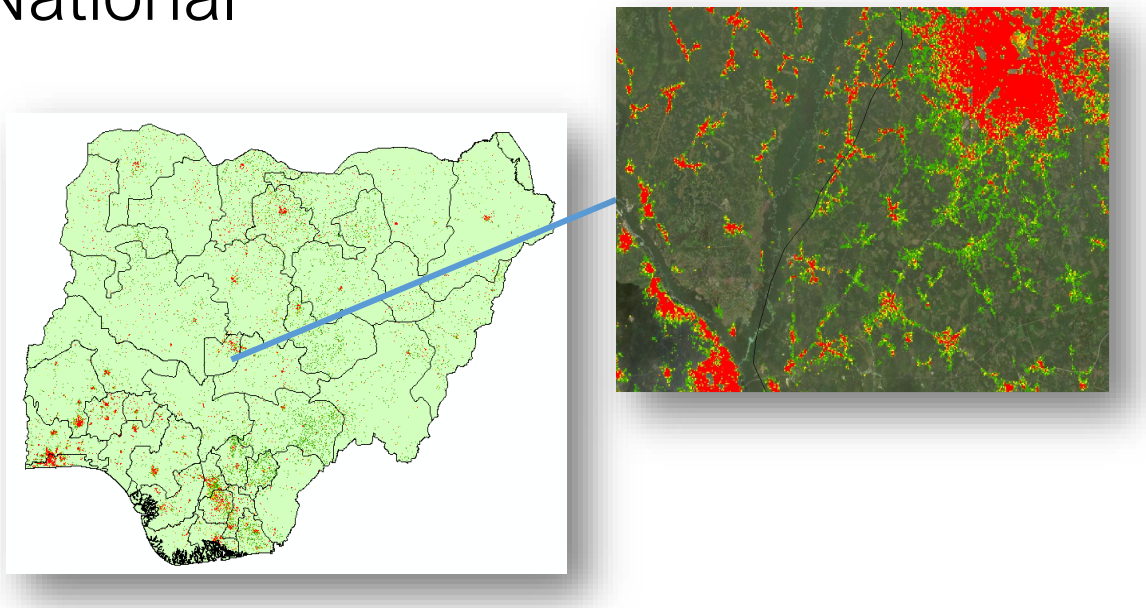
THE WORLD BANK

GRID3 GEO-REFERENCED INFRASTRUCTURE AND DEMOGRAPHIC DATA FOR DEVELOPMENT

WorldPop produces two broad types of demographic datasets

WorldPop

National



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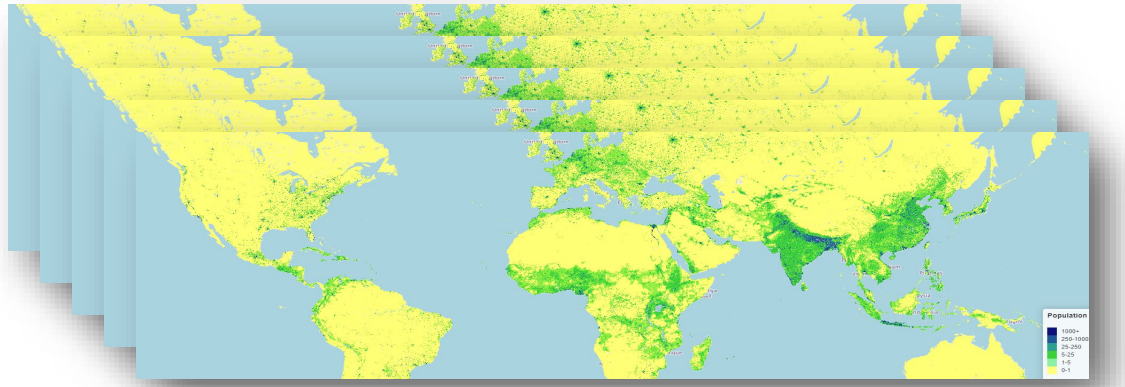
Global



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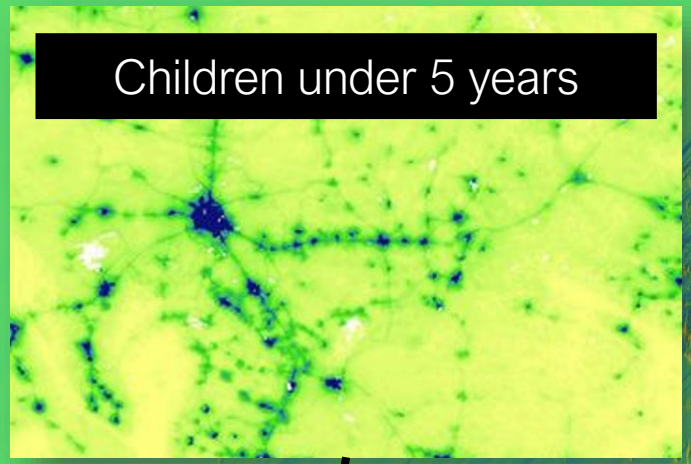
- Multi-temporal
- Co-developed with global demographic and geospatial data providers
- Best for multi-country, multi-year analyses

WorldPop Global1 data: 2000-2020



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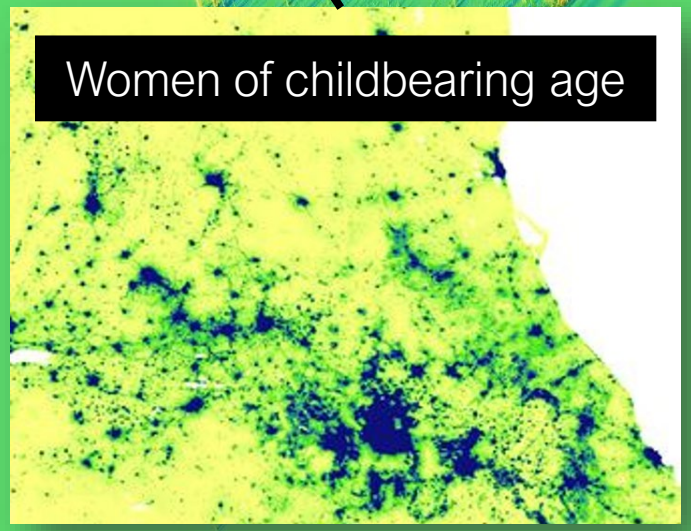
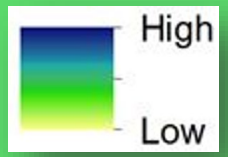
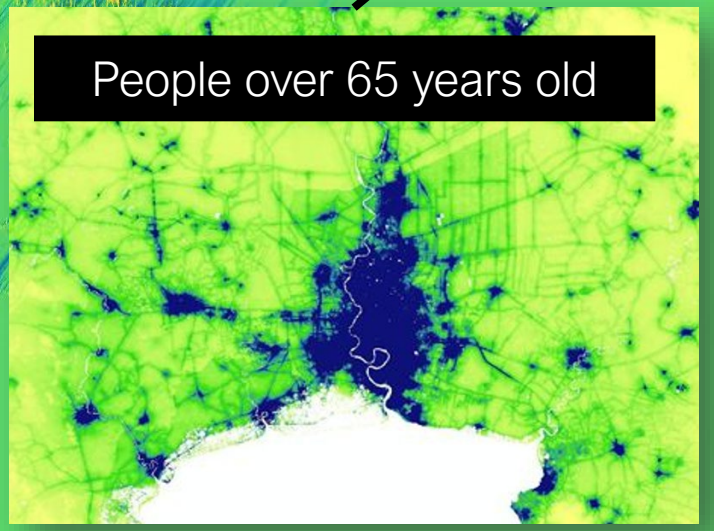
Openly distributed through WorldPop's website and the platforms below







HDX Humanitarian Data Exchange

Google Earth Engine

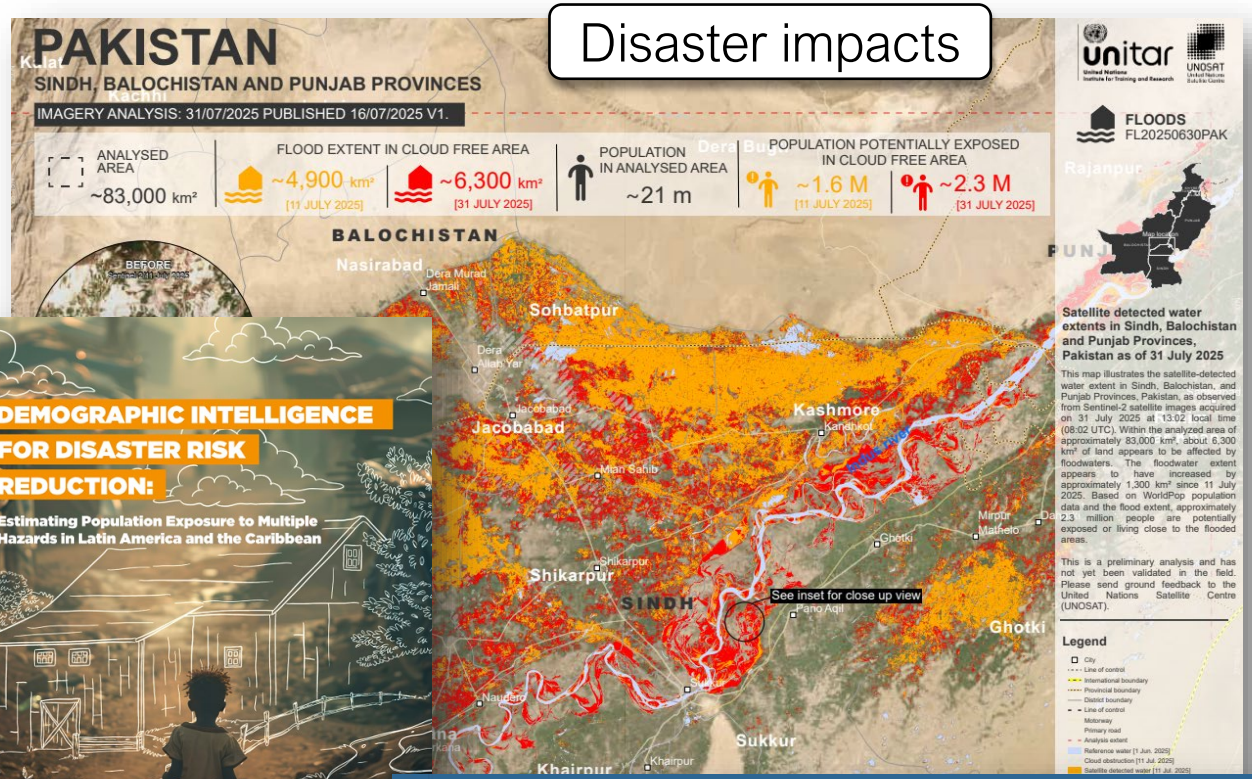
ArcGIS Living Atlas of the World

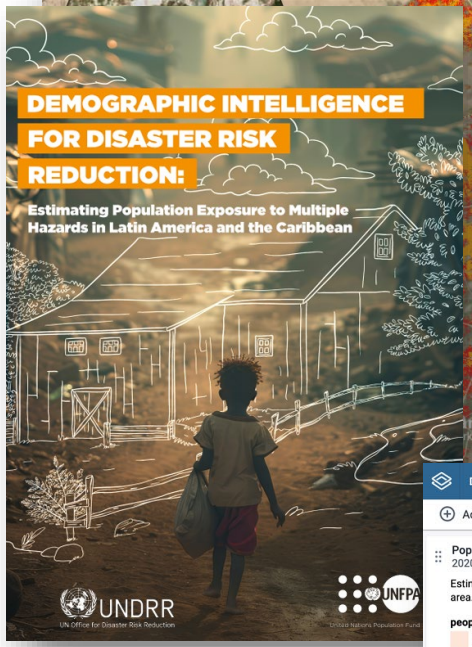
UNFPA Population Data Portal

Food and Agriculture Organization of the United Nations

Hand-in-Hand Initiative

Disaster impacts

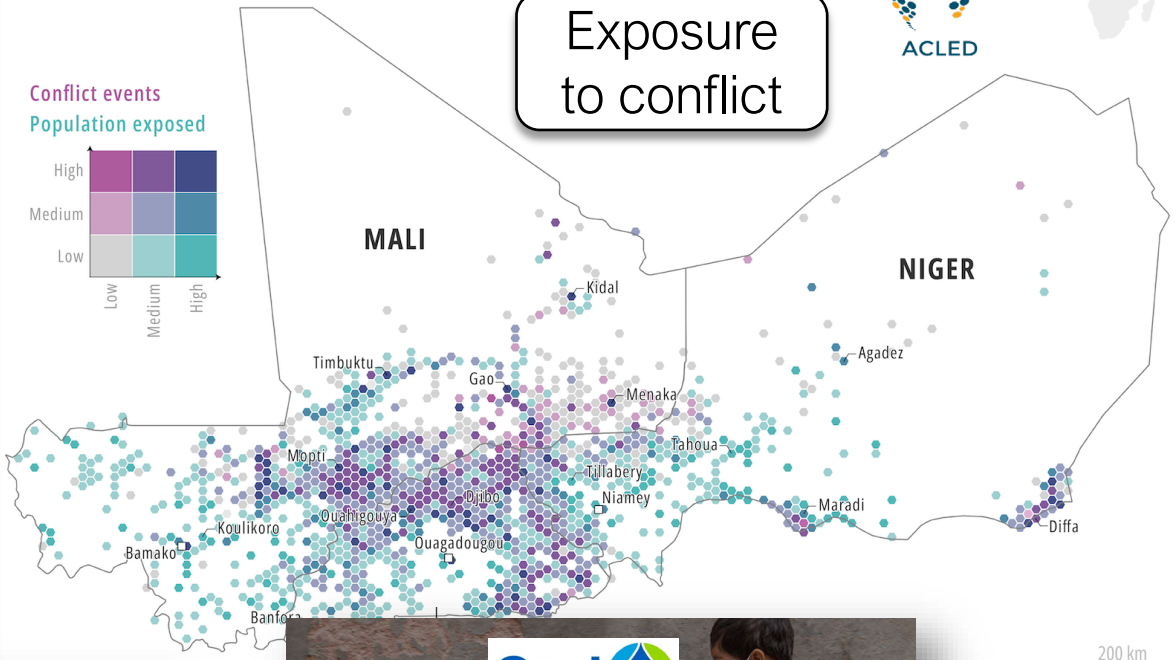


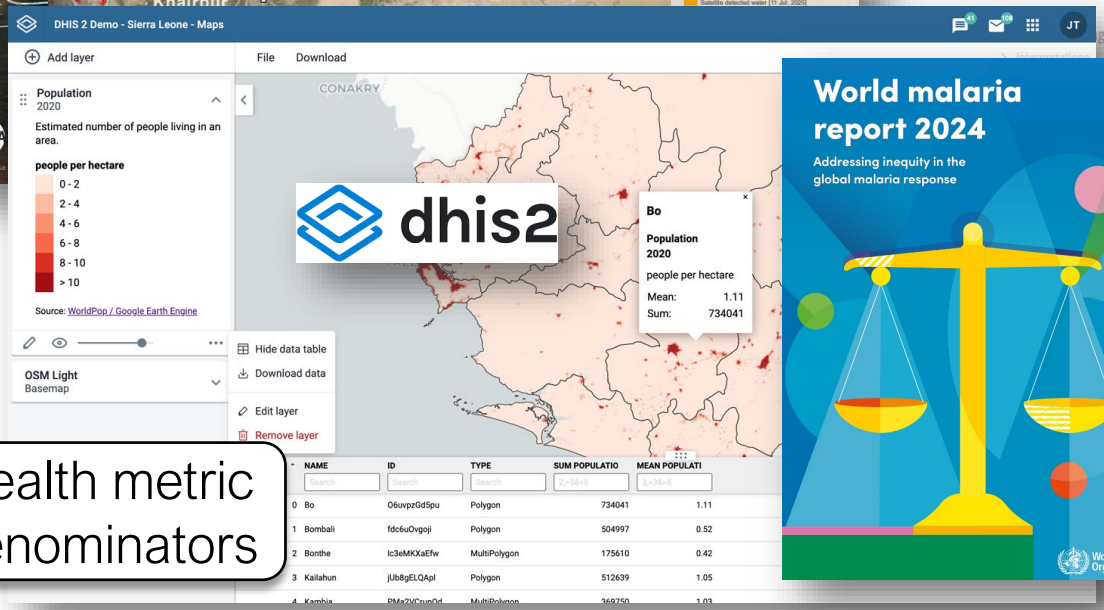


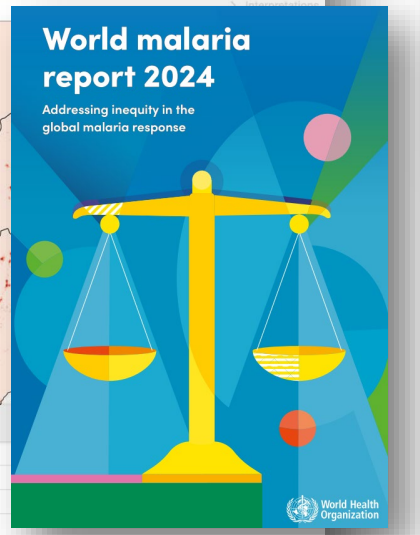
Conflict Exposure in the Sahel
2020 - 2023

ACLED

Exposure to conflict

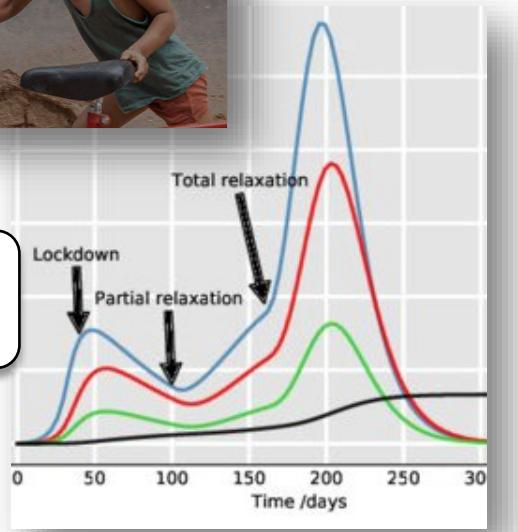






Health metric denominators

Disease control strategies



https://www.worldpop.org/impact/dev-a/

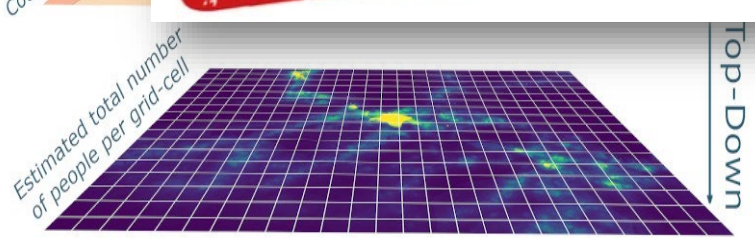
WorldPop ‘Global1’ population estimates

sus-based projections

20 nt maps

00-2020 ospatial variates

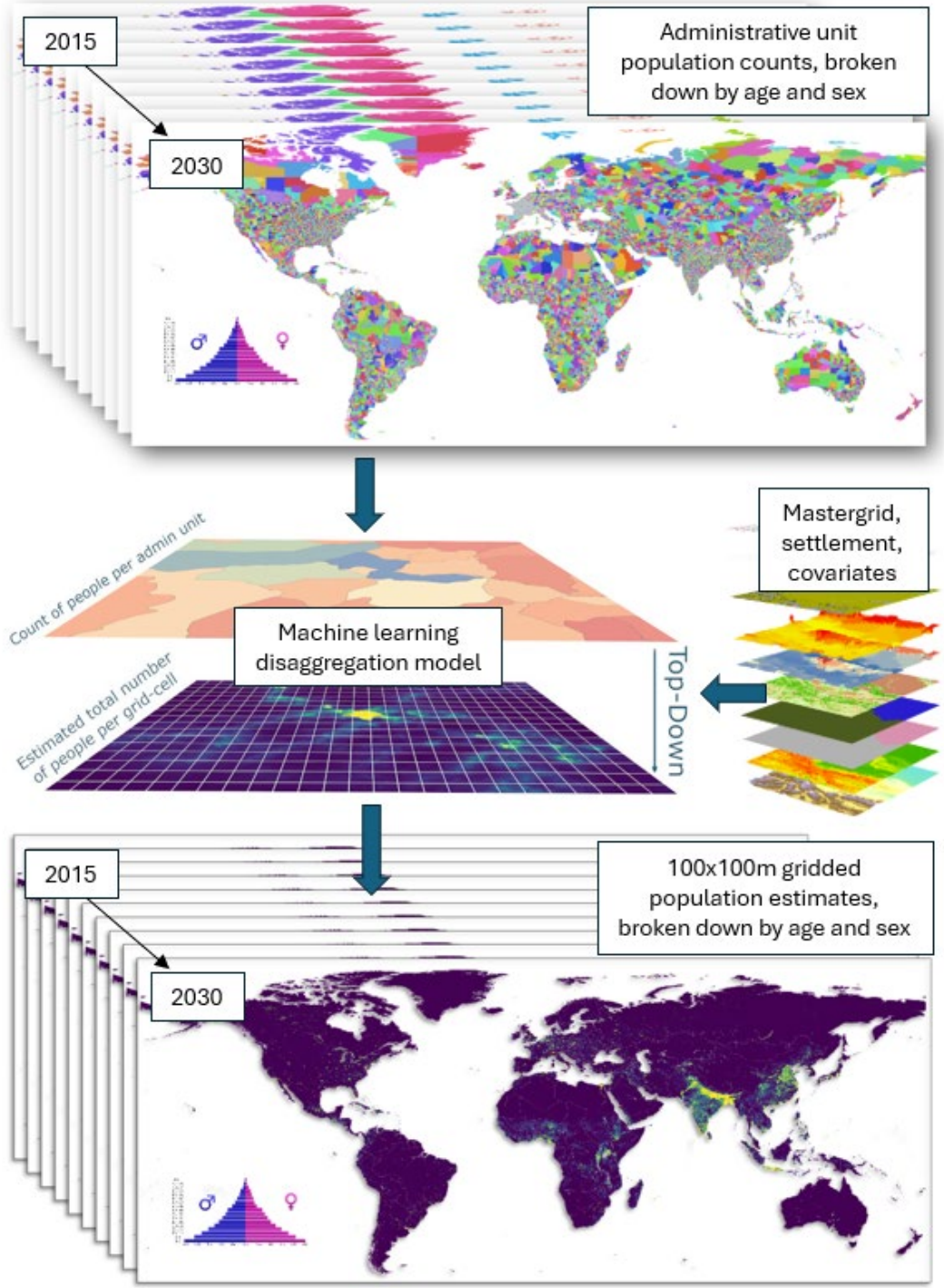
Machine



2000-2020 annual gridded population


GLOBAL2

ALL NEW


2015
2030
Administrative unit population counts, broken down by age and sex
Count of people per admin unit
Machine learning disaggregation model
Estimated total number of people per grid-cell
Top-Down
Mastergrid, settlement, covariates
2015
2030
100x100m gridded population estimates, broken down by age and sex

WorldPop 'Global2': Global high-resolution population estimates for 2015-2030

/ WorldPop News / By Andy Tatem

Tomorrow we're launching WorldPop's new global gridded population datasets – which we're calling 'Global 2'. In this blog I aim to provide an overview of what these new data are, why they matter, how you can use them, and a glimpse of what's coming next.

What was Global 1?

Back in 2018, the WorldPop team finished building the first ever set of multi-annual global 100x100m gridded estimates of residential population, broken down by age and sex classes – 'Global1'. This was the culmination of more than a decade of research on scalable geospatial modelling methods that could leverage satellite imagery and other mapping datasets to spatially disaggregate administrative unit-level population counts. By doing so we could produce high resolution gridded population estimates across national, continental and global scales. The annual datasets covering the 2000-2020 period were made openly available to download and have been in wide use by governments, UN agencies, academics, Non-Governmental Organisations and the private sector ever since.

Why make gridded population data?

A major advantage of gridded population data over the more traditional administrative unit-based counts is their flexibility in being able to

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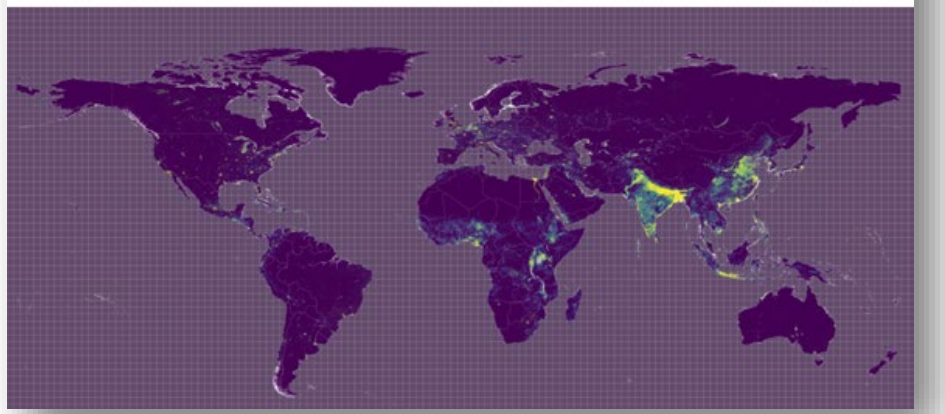
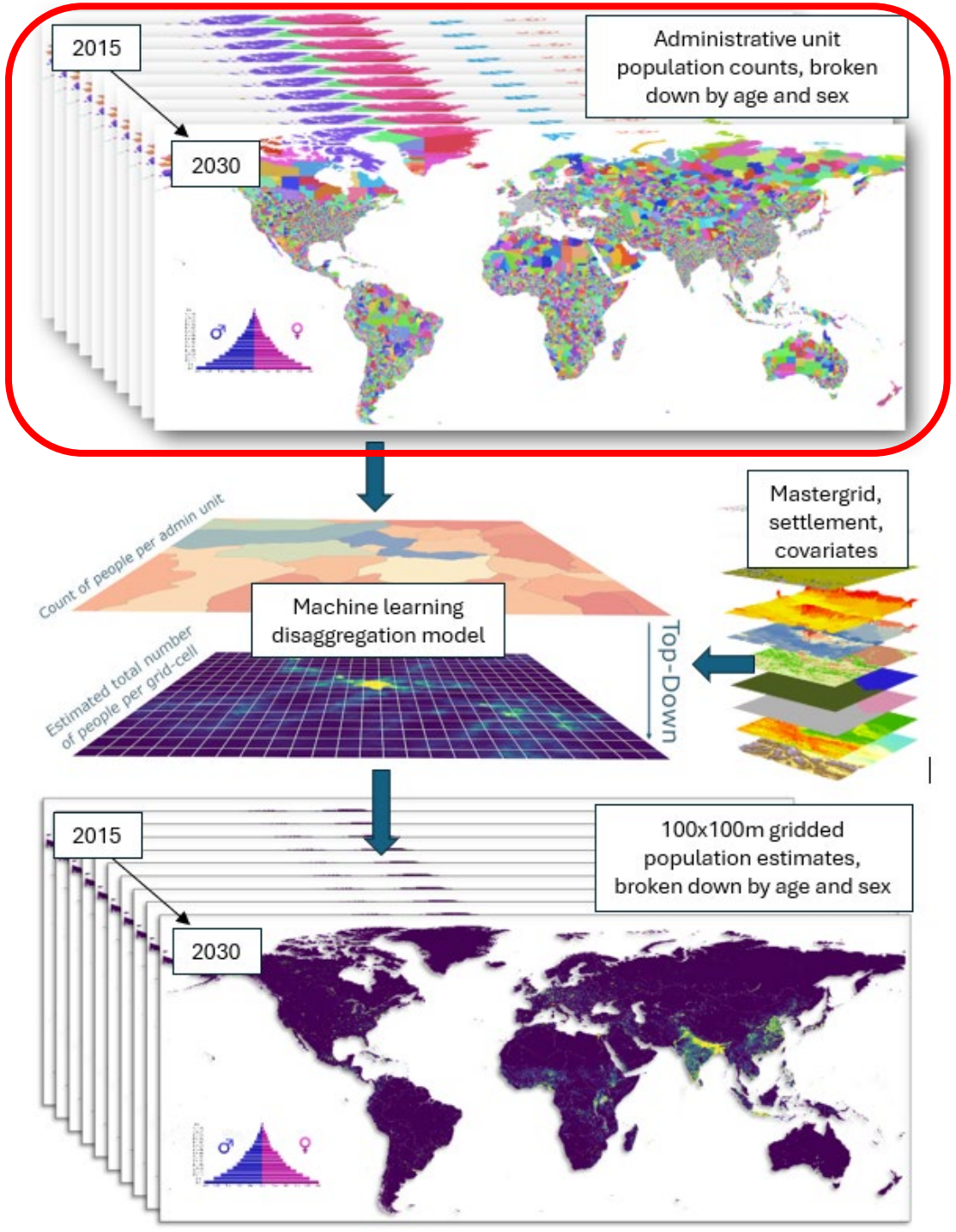
Global Demographic Data

Public release R2025A V1

worldpop.org
September 2025



www.worldpop.org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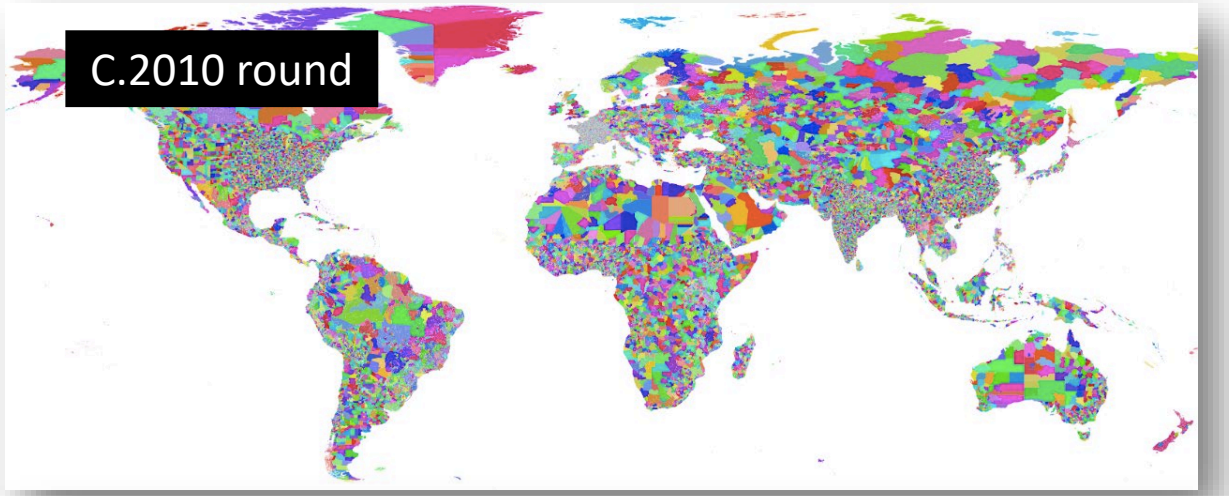
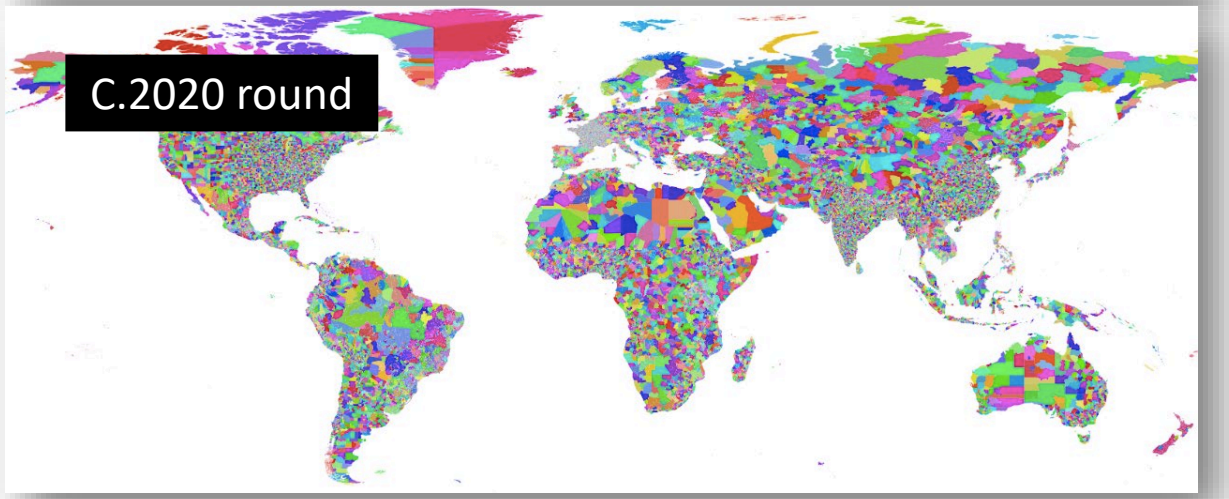
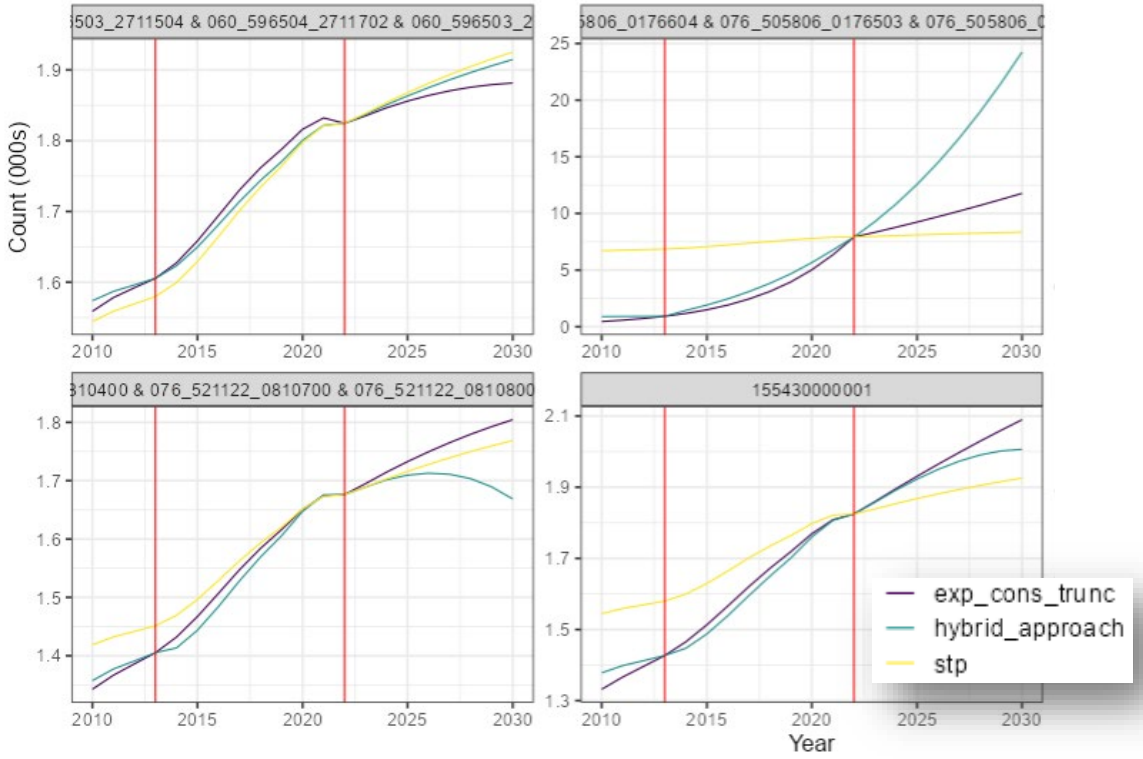
100x100m gridded population estimates, broken down by age and sex
♂
♀

Assembly of 2010-2030 age/sex structured subnational census/projections, including c.2010 and c.2020 census rounds (>1 mill admin unit-based counts)







Department of Social Statistics and Demography

University of Southampton

COMMON OPERATIONAL DATASETS

CITY POPULATION

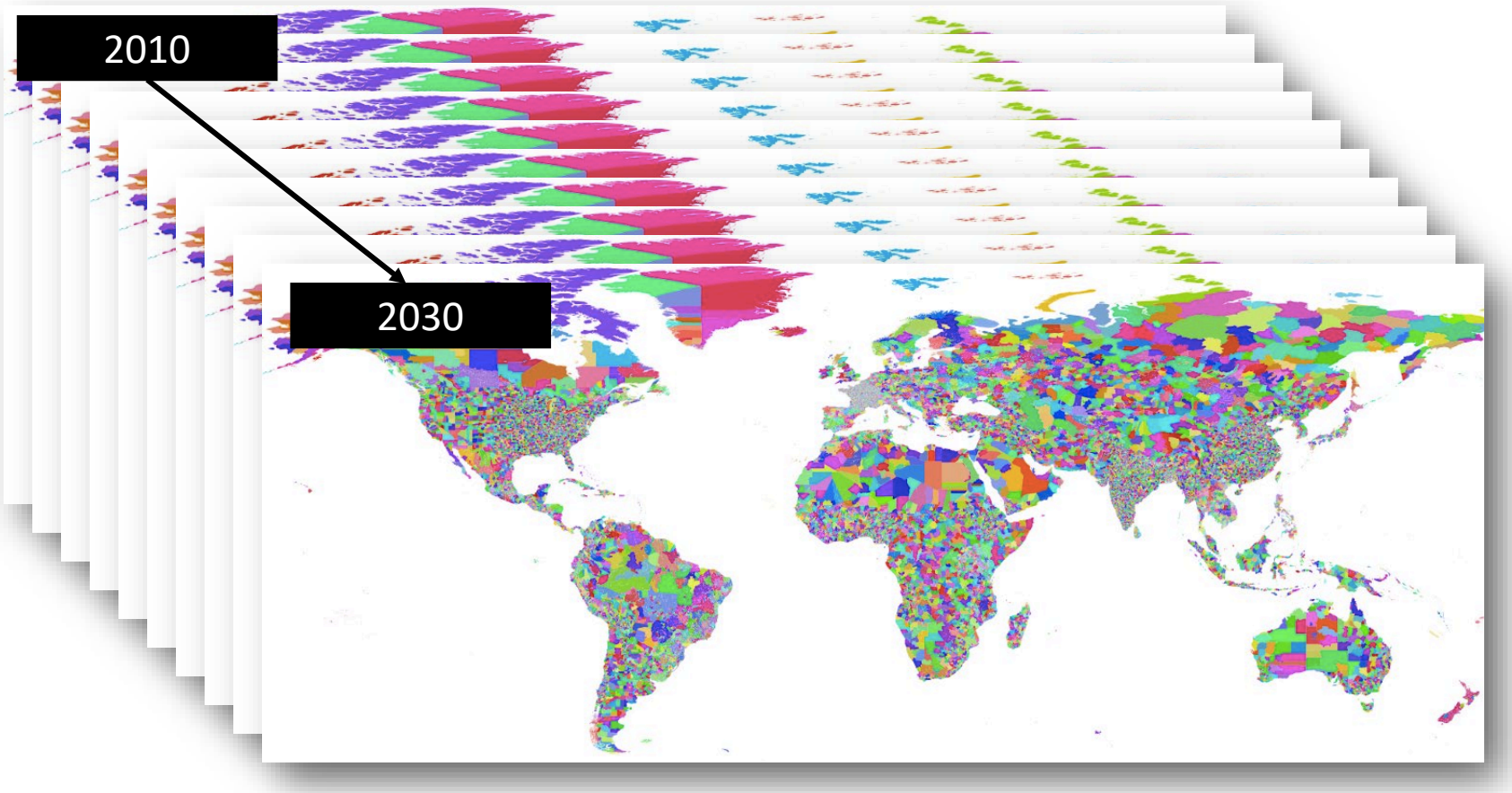
CIESIN

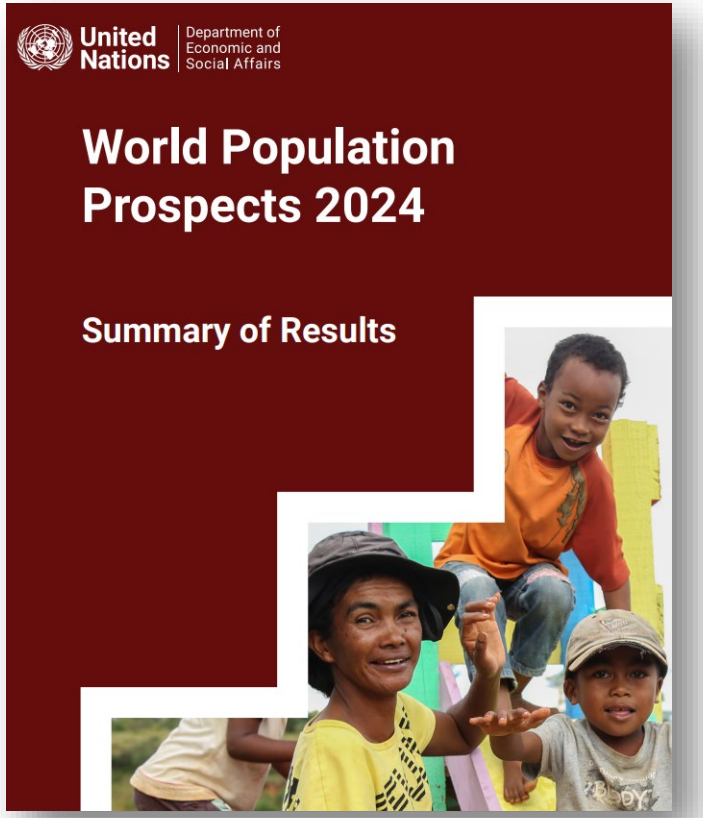
Population Division

United States Census Bureau

Cihan et al (2025) in prep

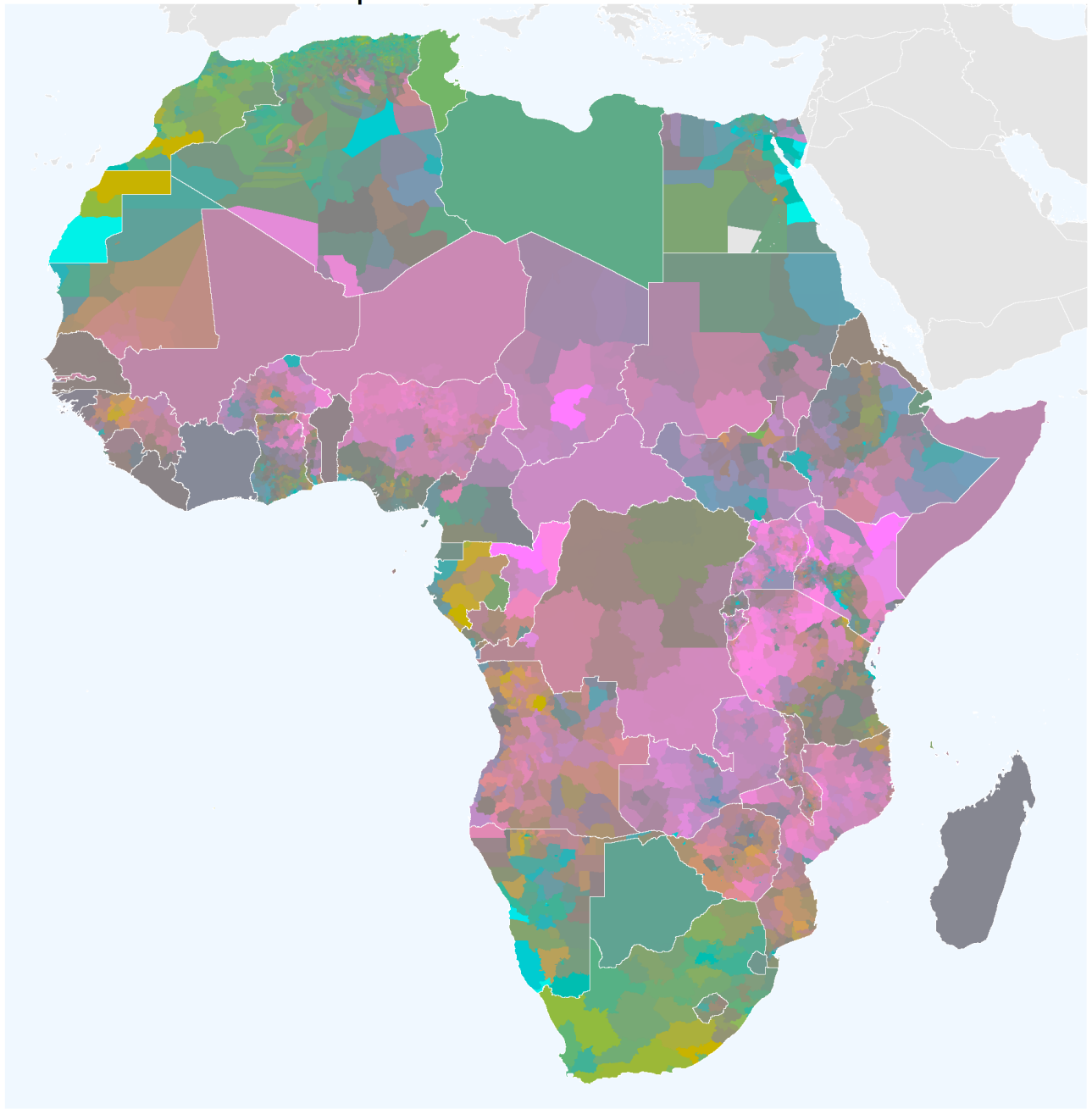
2010-2030 annual time series aligned with UN WPP 2024 national estimates

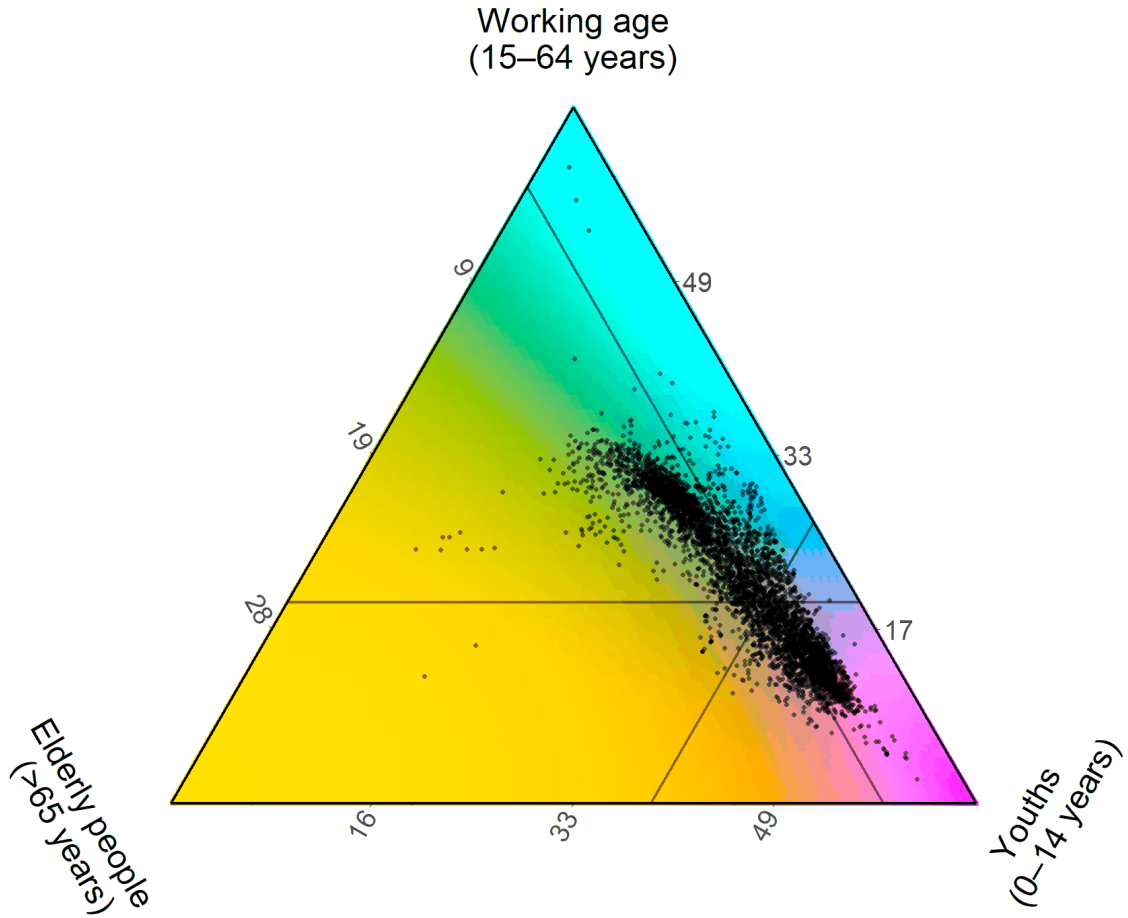




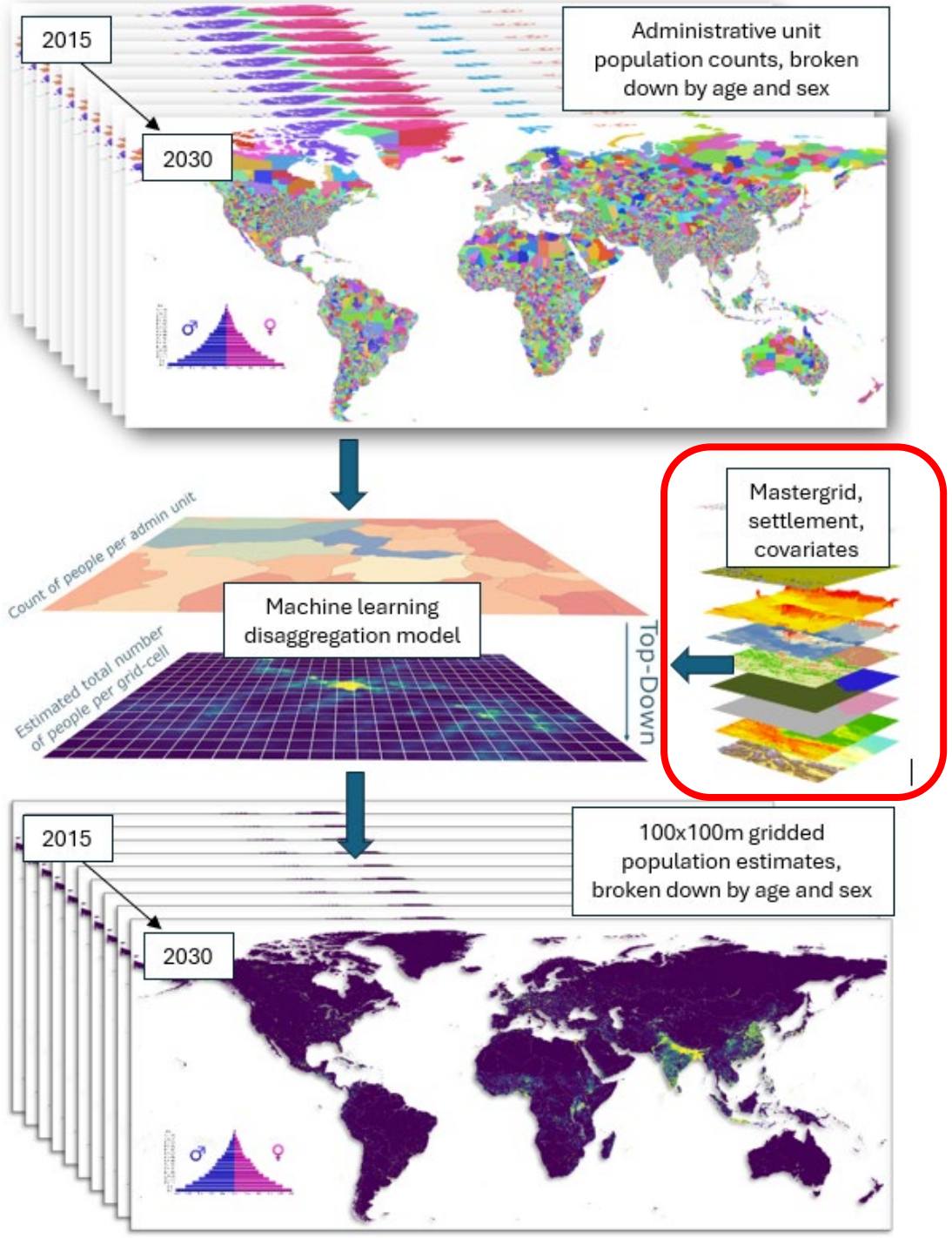
Cihan et al (2025) in prep

Africa Subnational Population Structures in 2015





Source: WorldPop Global 2 Data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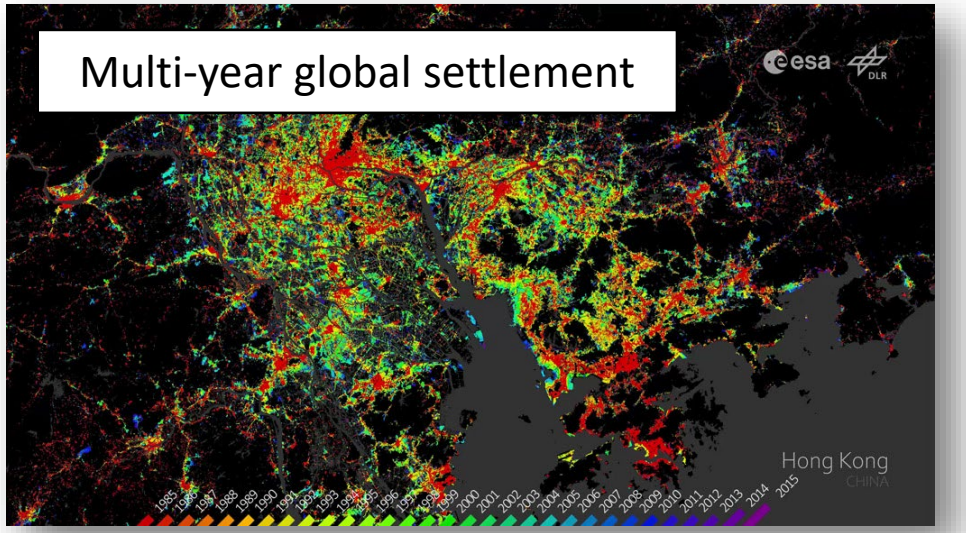
♂
♀

DLR

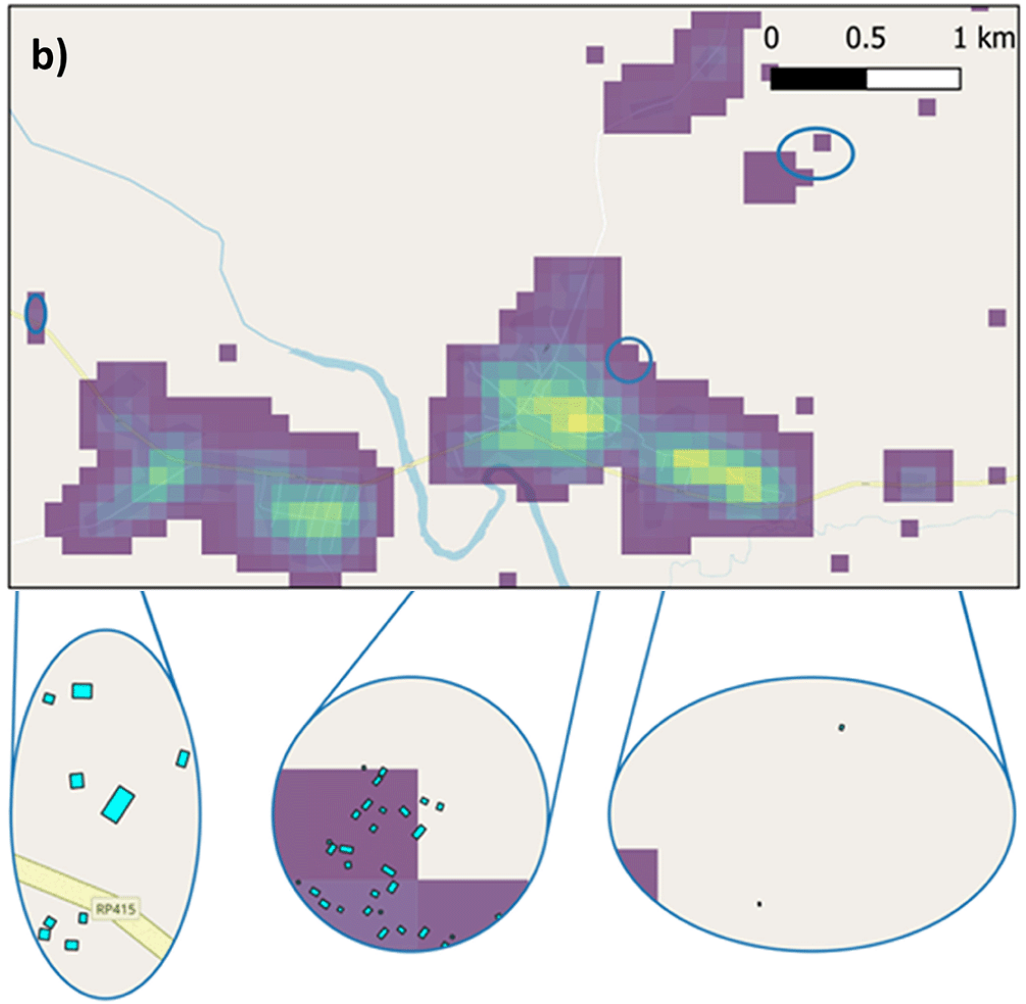
JRC
EUROPEAN COMMISSION



Microsoft

Google
Research

OpenStreetMap

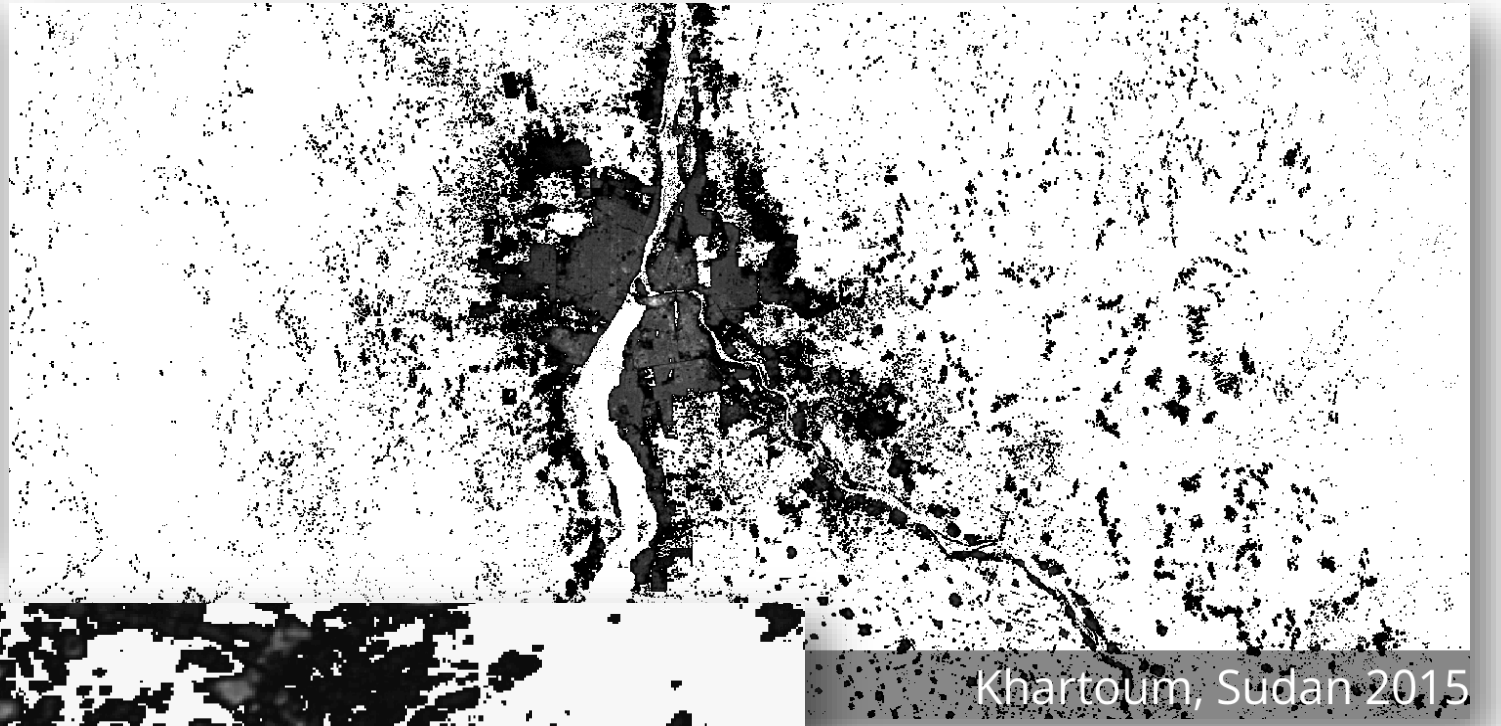


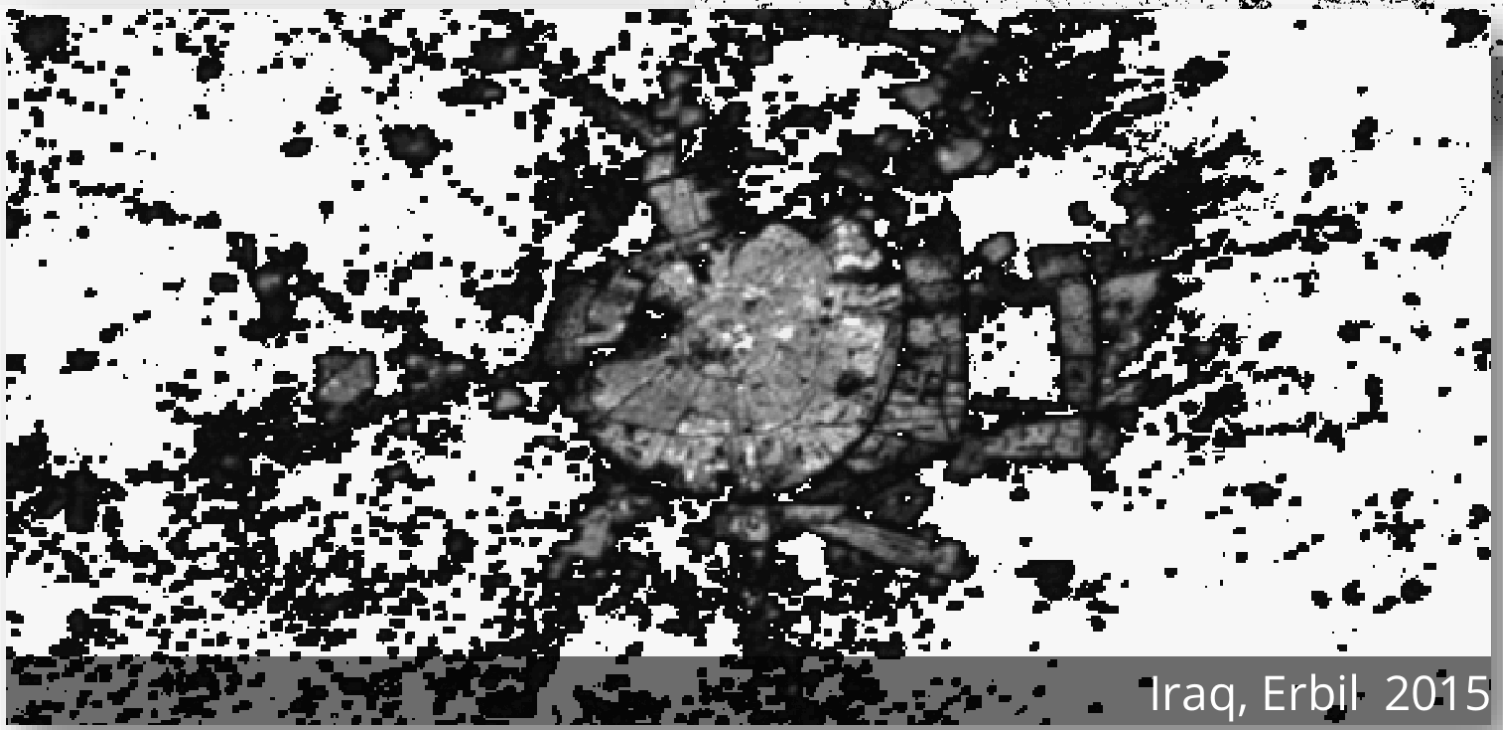
Woods et al (2025) VeriXiv

Computers, Environment and Urban Systems
Volume 80, March 2020, 101444

Annually modelling built-settlements between remotely-sensed observations using relative changes in subnational populations and lights at night

Jeremiah J. Nieves [a b], Alessandro Sorichetta [a b], Catherine Linard [a c], Maksym Bondarenko [a b], Jessica E. Steele [a b], Forrest R. Stevens [a d], Andrea E. Gaughan [a d], Alessandra Carioli [a b], Donna J. Clarke [a b], Thomas Esch [e], Andrew J. Tatem [a b]





Woods et al (2025) VeriXiv

https://hub.worldpop.org/project/categories?id=14

VeriXiv

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Home › Articles › Global gridded multi-temporal datasets to support human population ...

PREPRINT

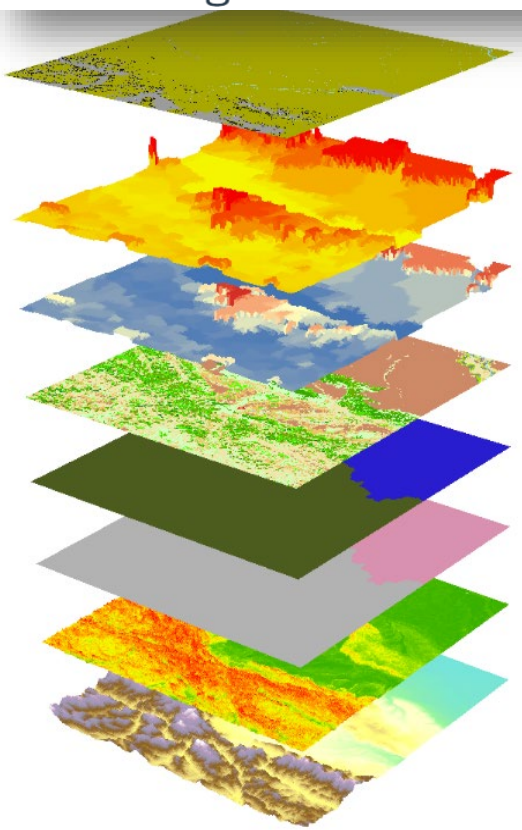
Undergoing Peer Review

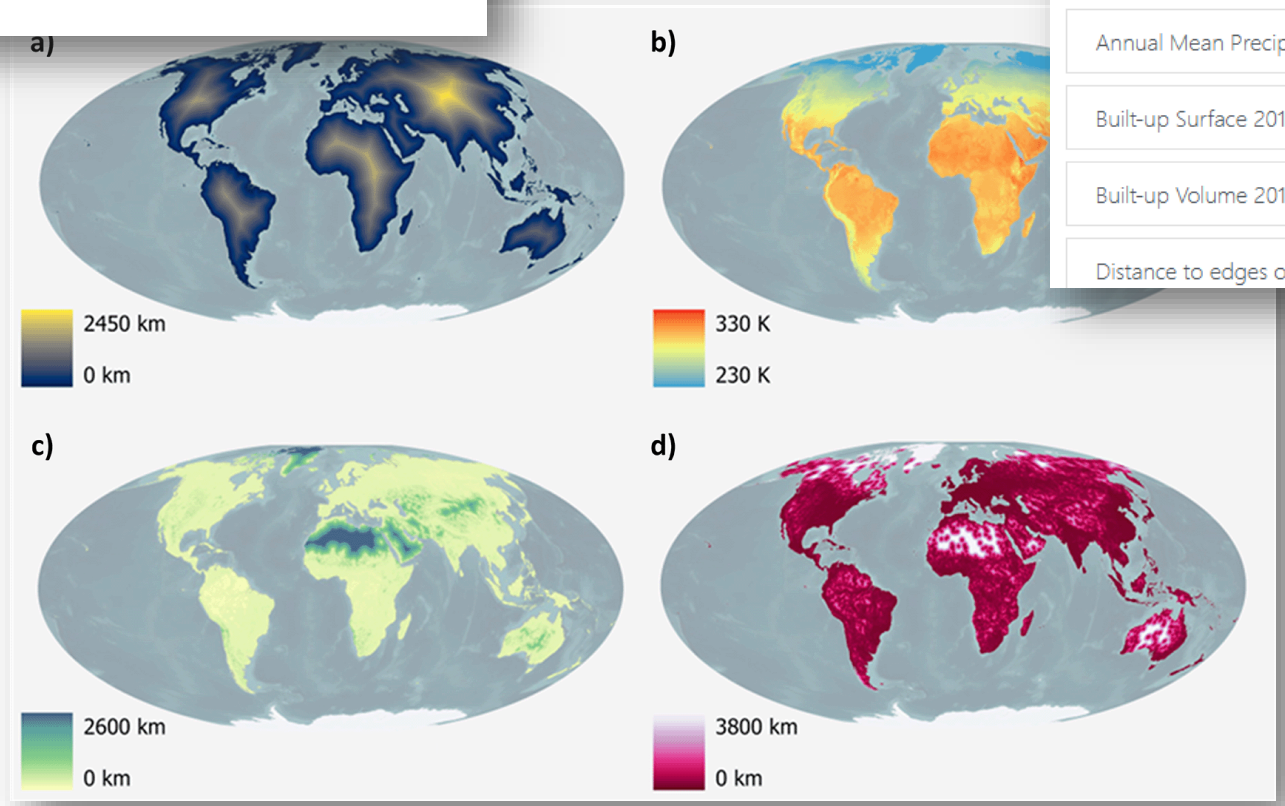
DATA NOTE

Global gridded multi-temporal datasets to support human population distribution modelling

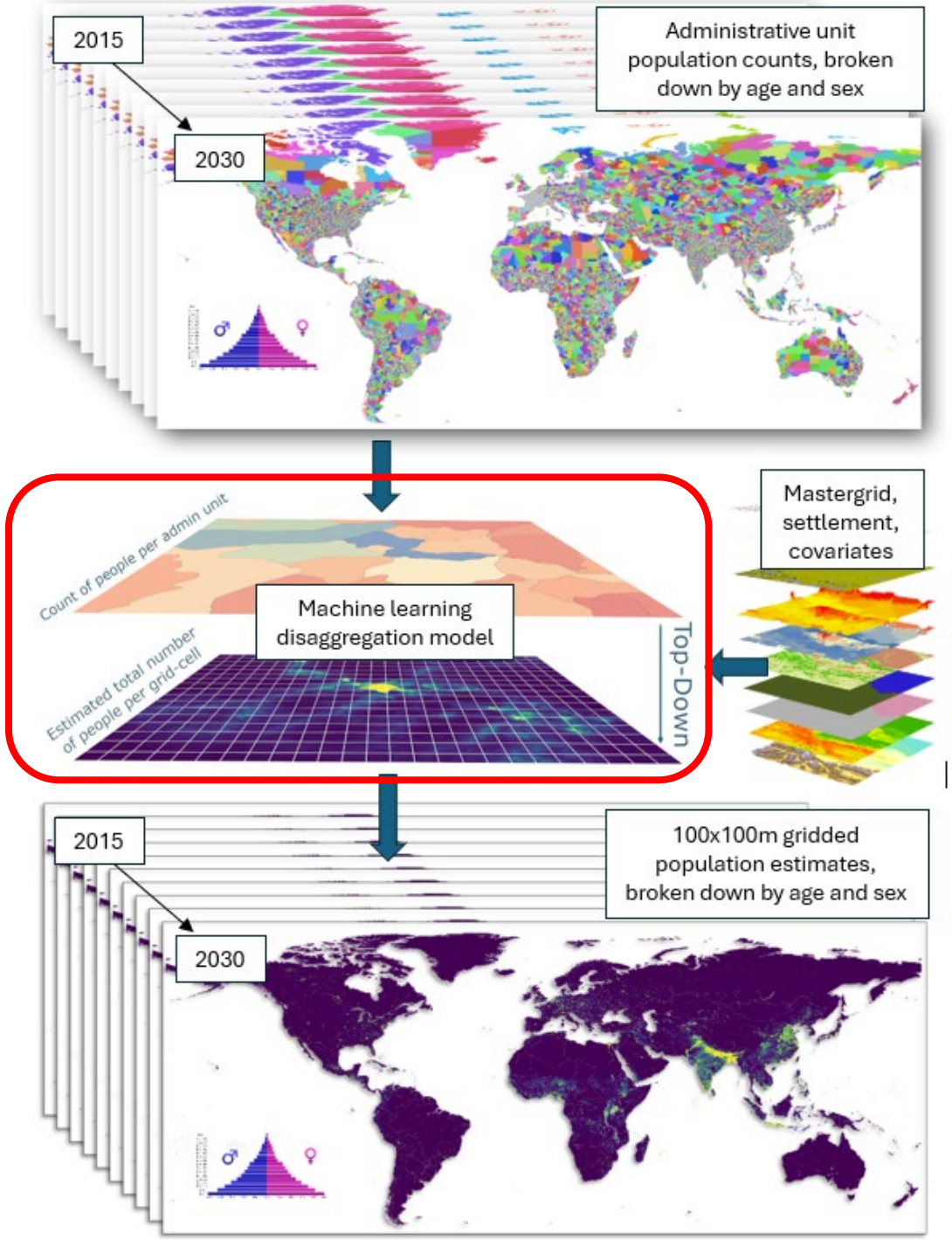
WorldPop Hub

- Annual Mean Surface Temperature 2015-2023
- Distance to Built-up Surface 2015-2030
- Distance to inland water 2021
- Distance to open-water coastline 2021
- Annual Mean Precipitation 2015-2023
- Built-up Surface 2015-2030
- Built-up Volume 2015-2030
- Distance to edges of reclassified ESA-CCI-LC classes 2015 R2004V1

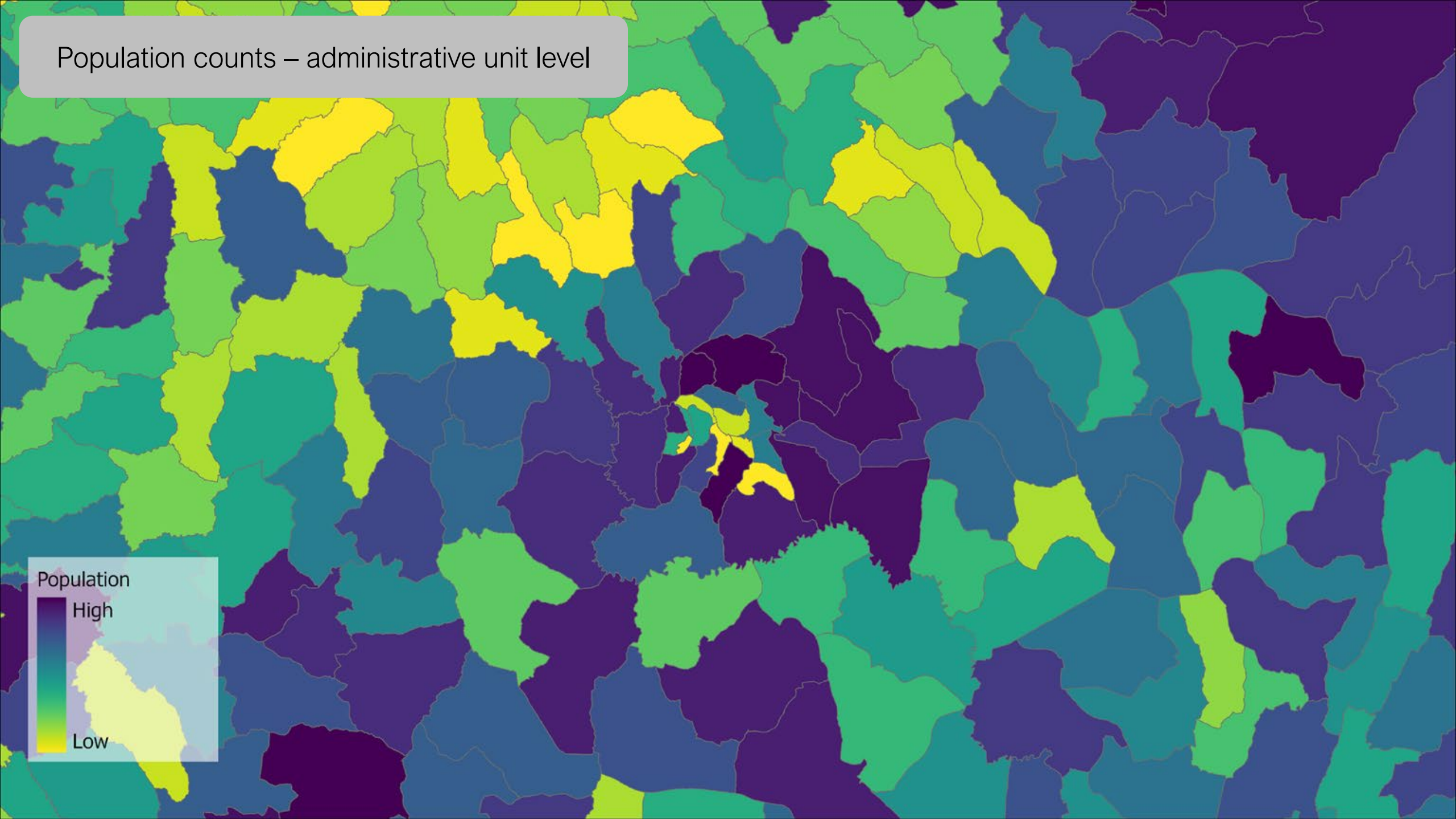




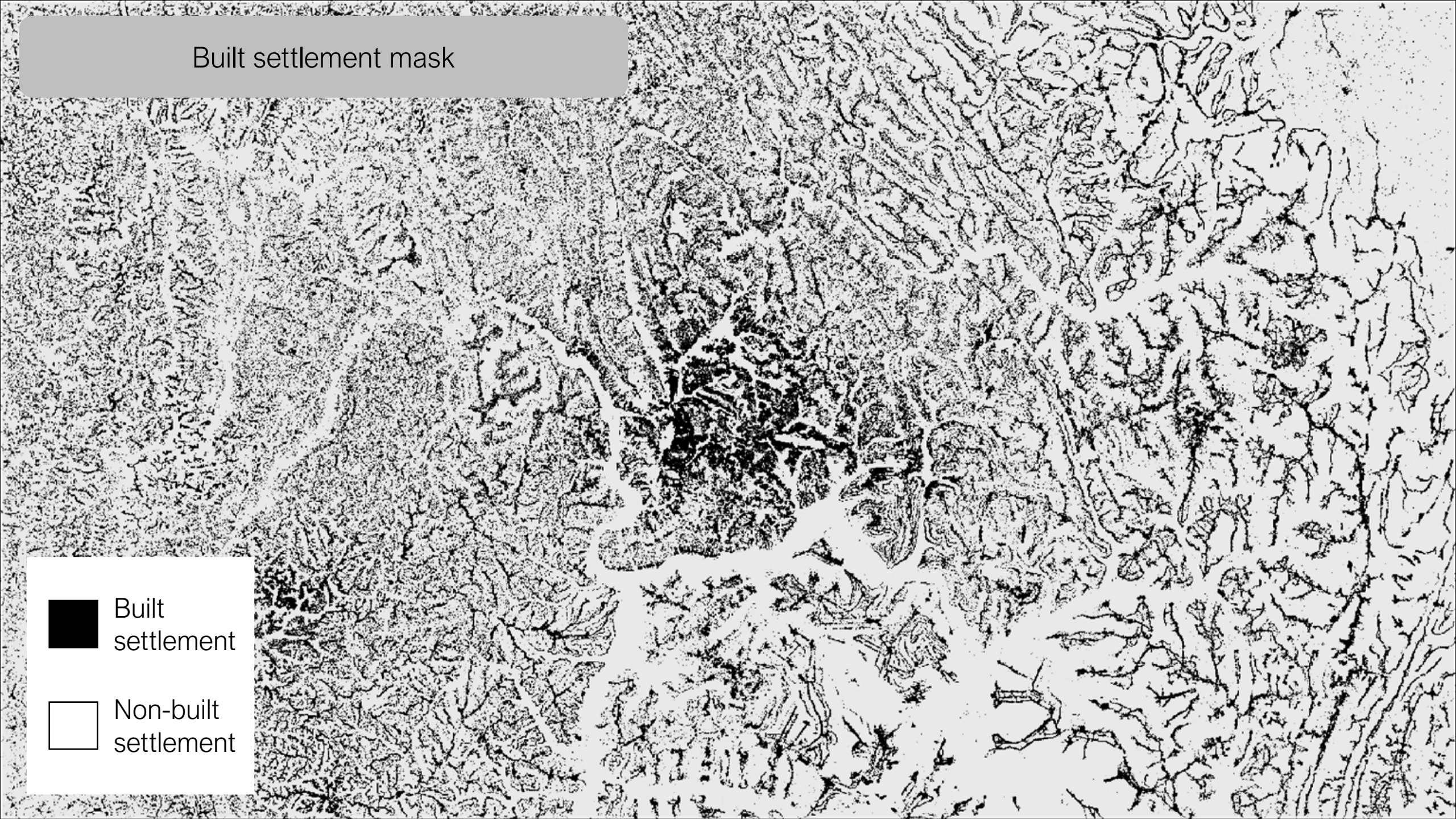
Woods et al (2025) VeriXiv


2015
2030
Administrative unit population counts, broken down by age and sex
♂
♀
Count of people per admin unit
Machine learning disaggregation model
Estimated total number of people per grid-cell
Top-Down
Mastergrid, settlement, covariates
2015
2030
100x100m gridded population estimates, broken down by age and sex
♂
♀

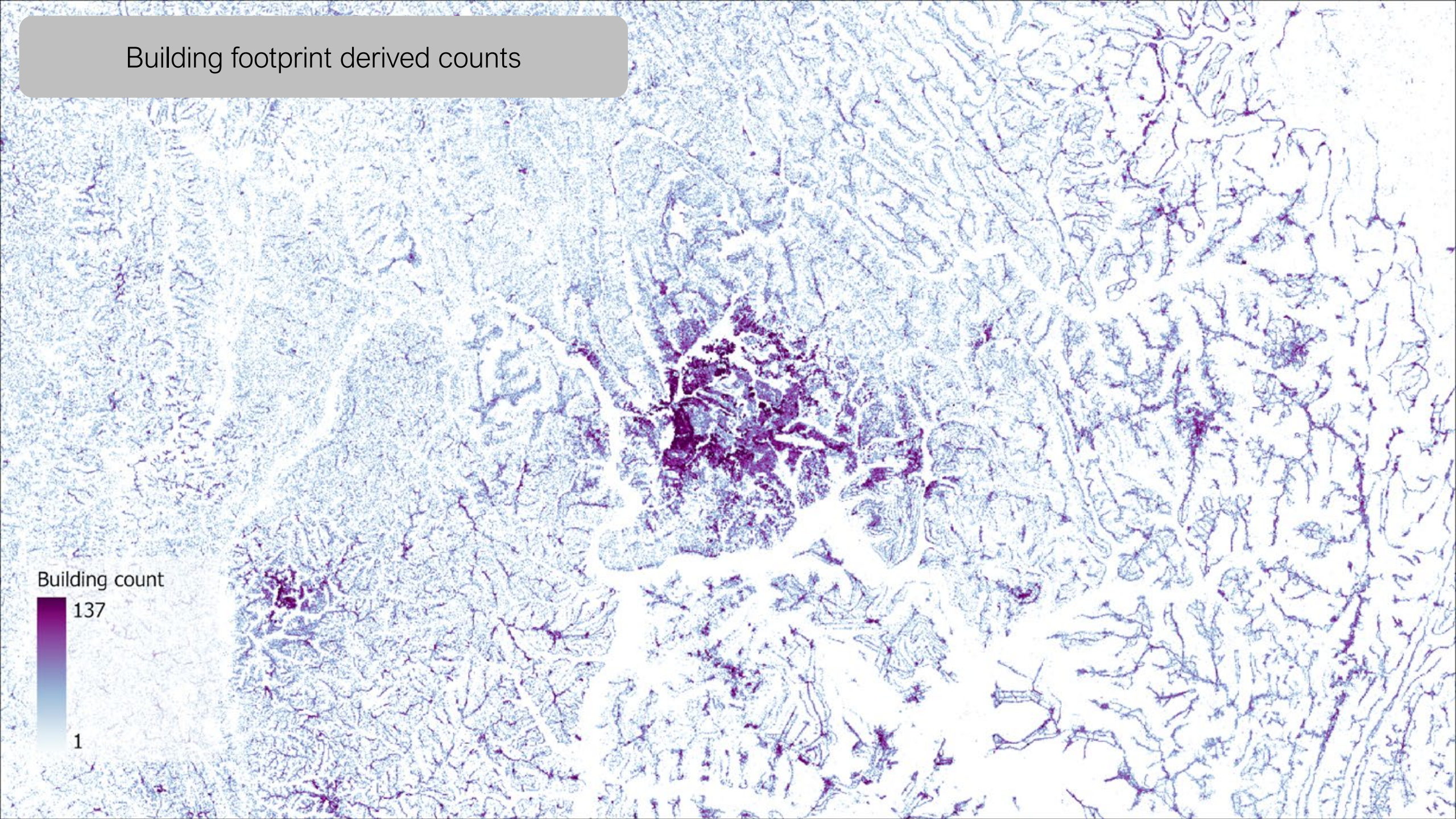
Population counts – administrative unit level



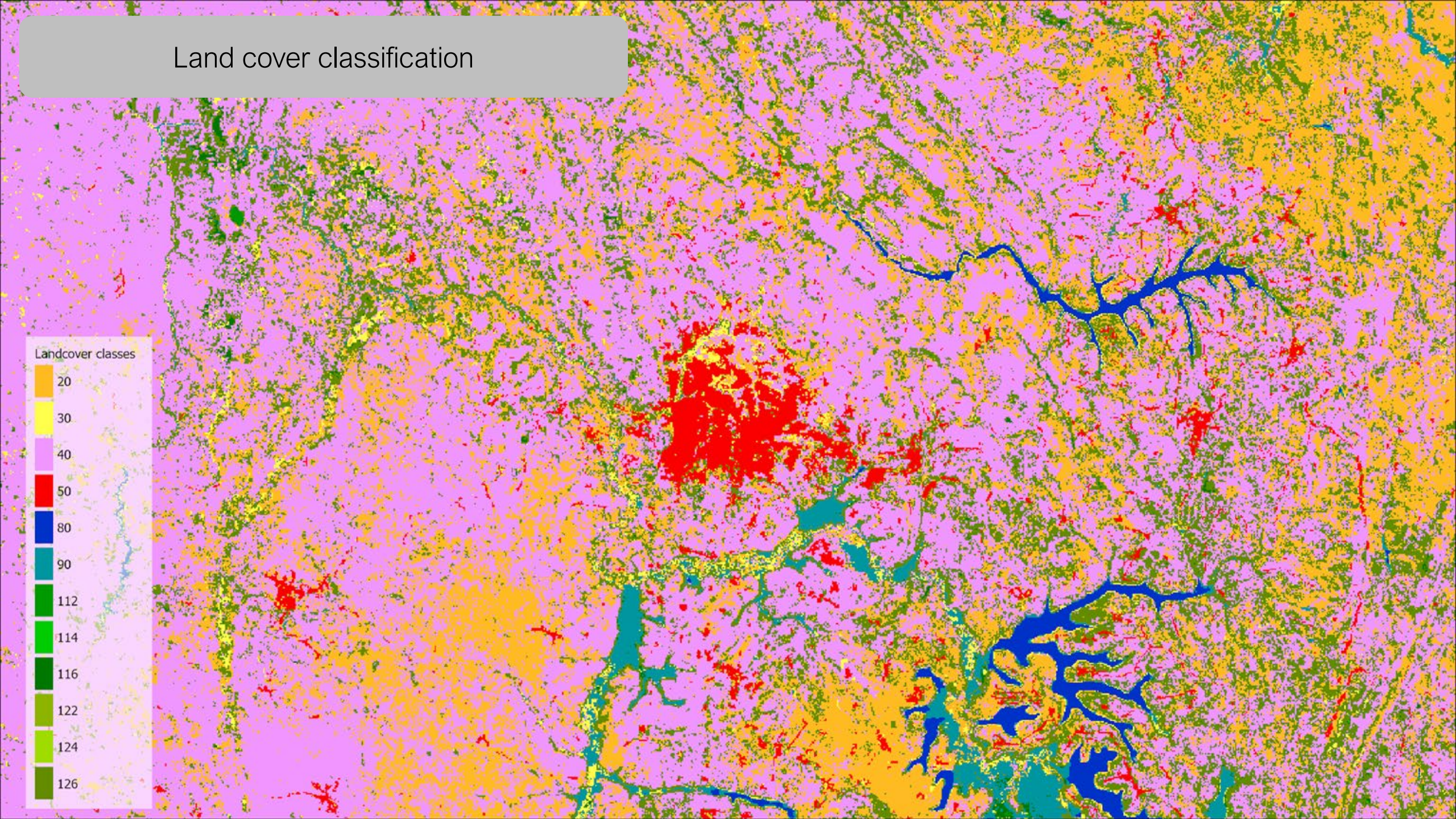
Built settlement mask



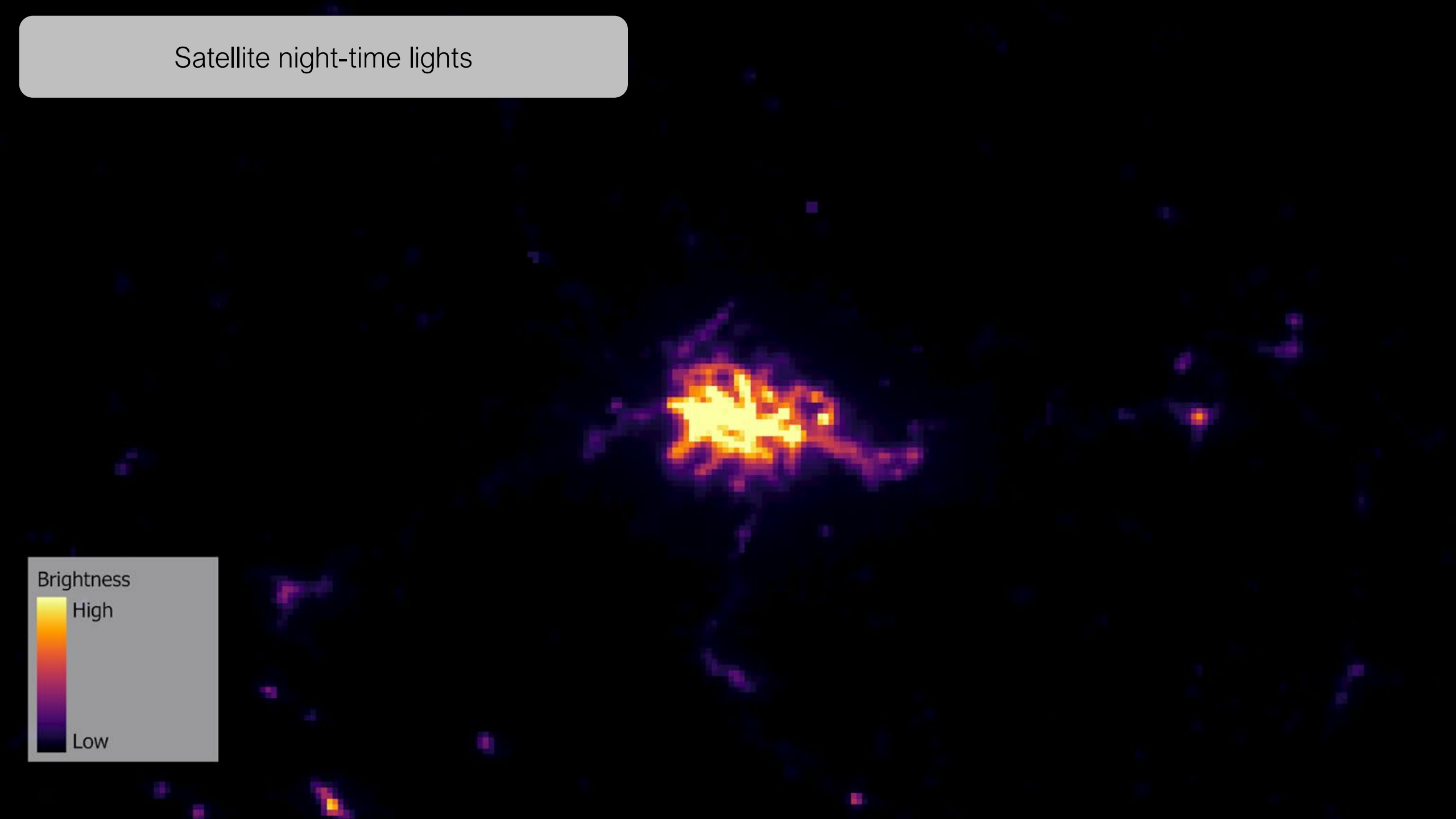
Building footprint derived counts



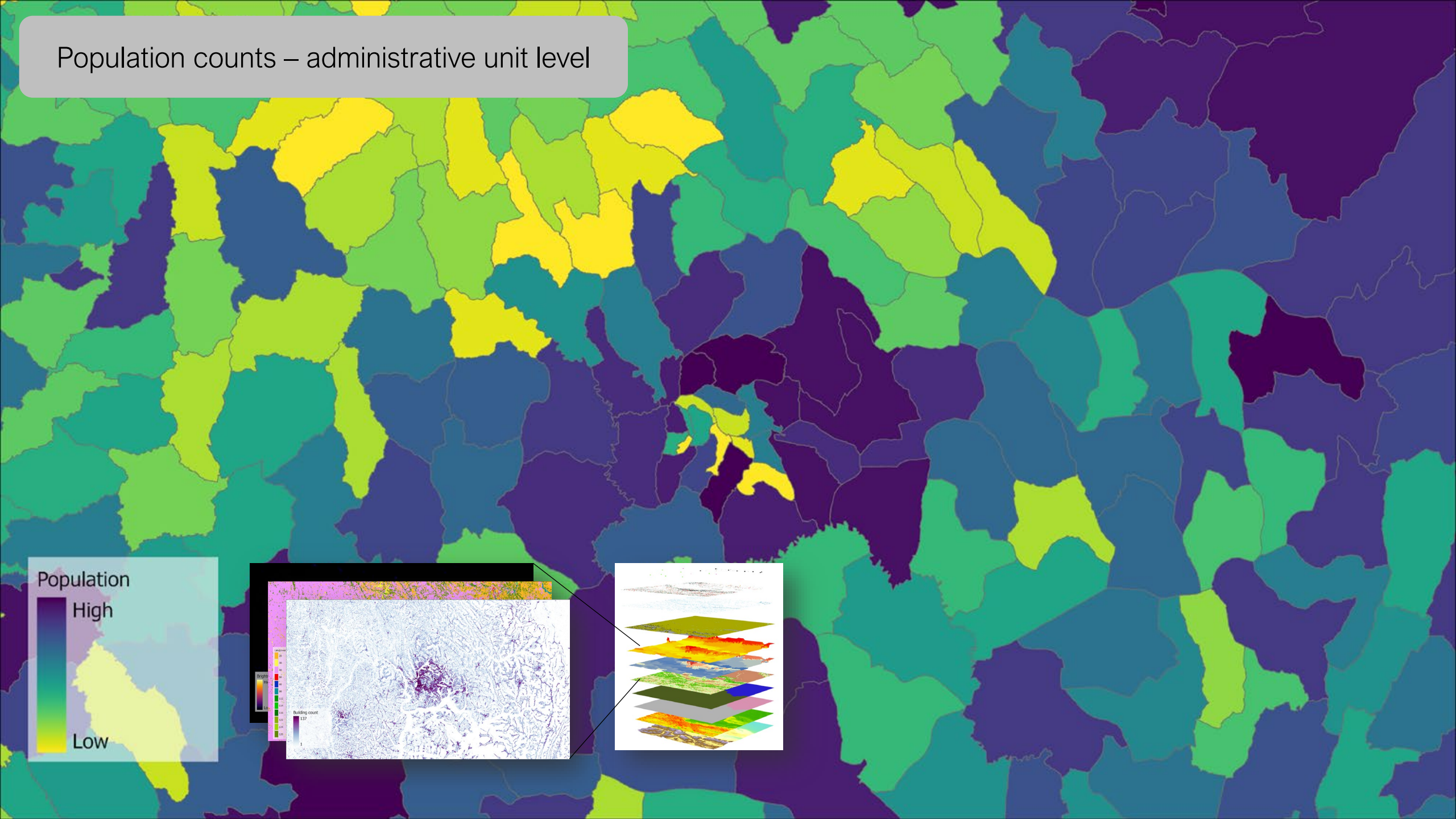
Land cover classification



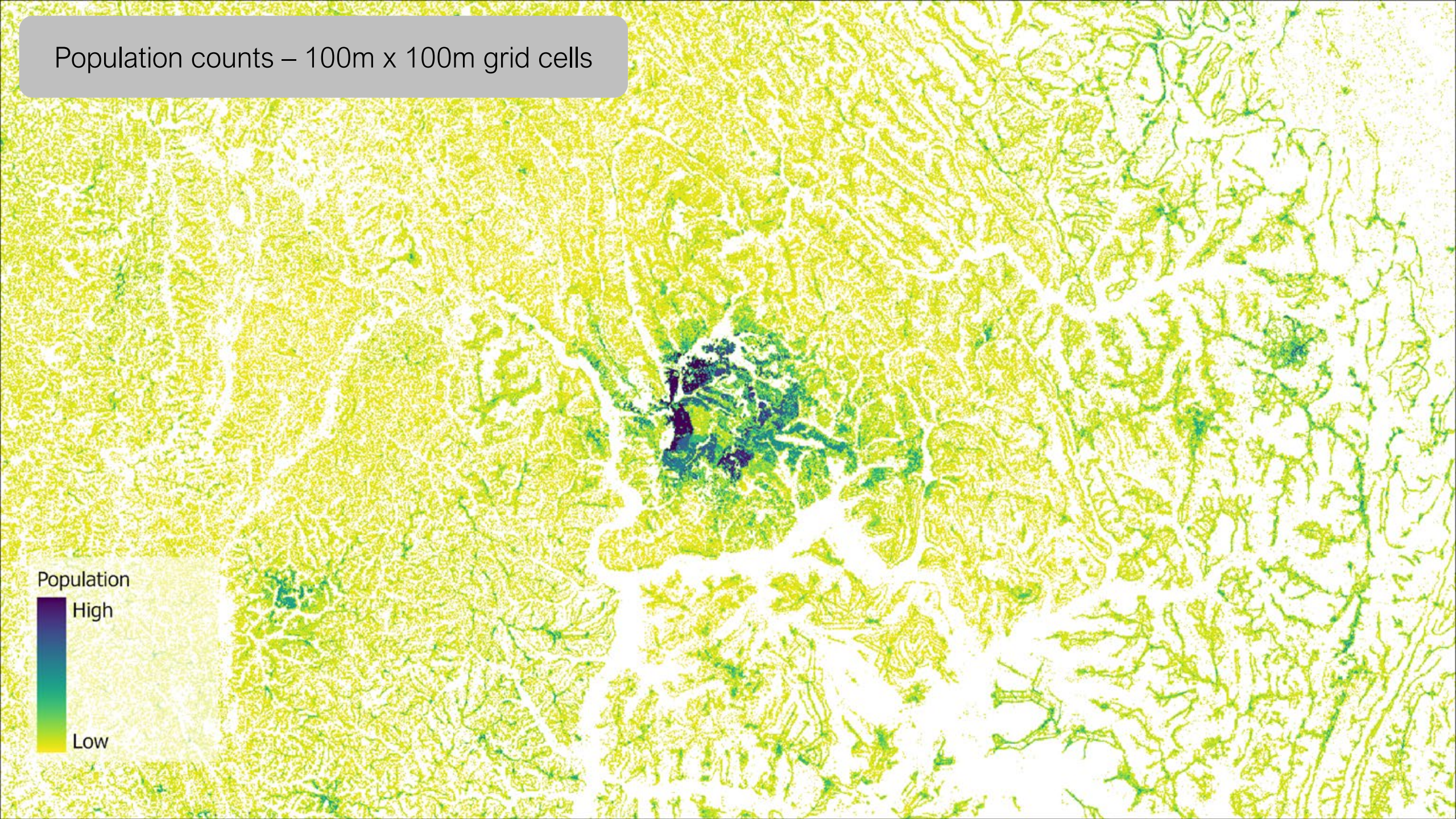
Satellite night-time lights

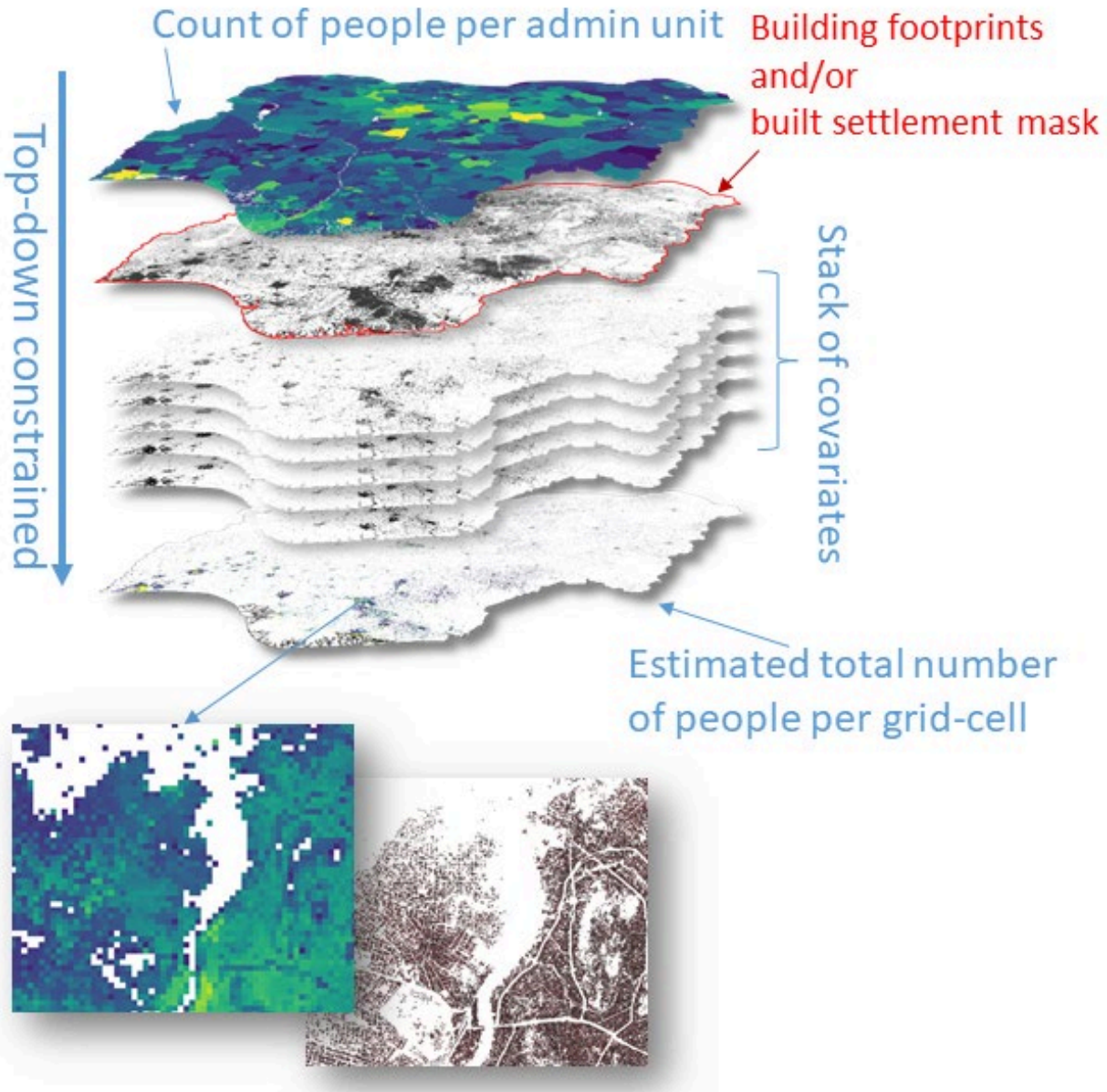


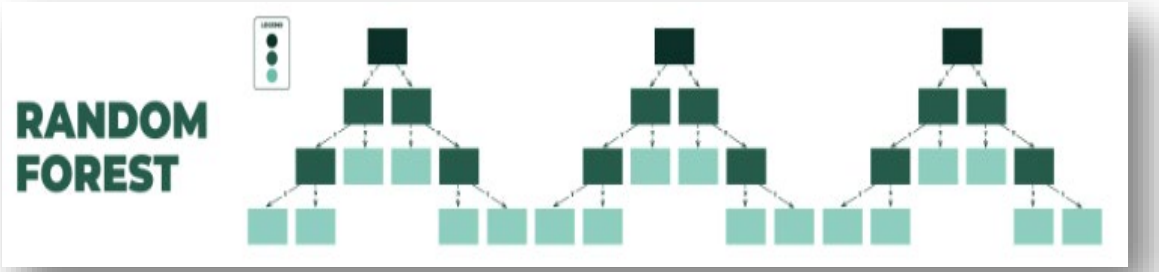
Population counts – administrative unit level



Population counts – 100m x 100m grid cells







README

popRF: Random Forest-informed Population Disaggregation R package

High resolution, recent data on human population distributions are important for measuring impacts of population growth, monitoring human-environment interactions and for planning and policy development. Many methods are used to disaggregate census data and predict population densities for finer scale, gridded population data sets. `popRF` is a population modelling R package utilizing Random Forests to inform a dasymetric redistribution of census-based population count data. A description of using Random Forests machine learning method in `popRF` is described in Stevens et al.

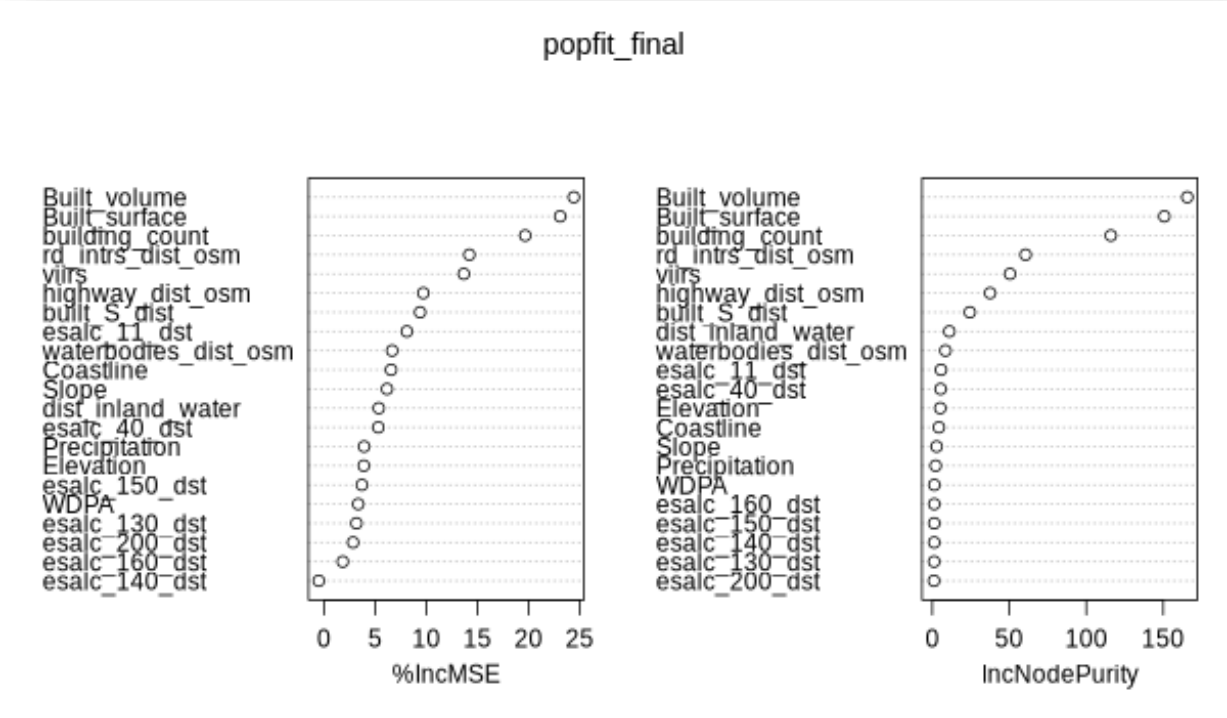
Installation

The `popRF` package can be installed directly from Github.

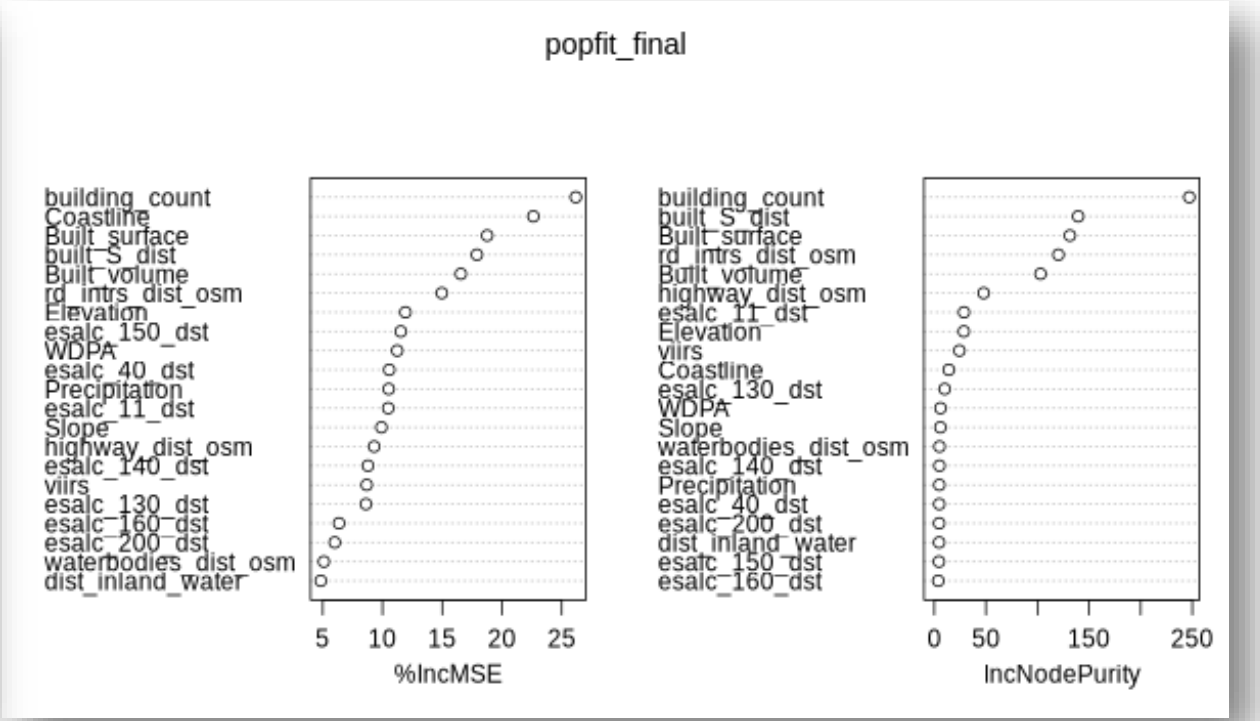
```
install.packages("devtools")
devtools::install_github("wpgp/popRF")
```

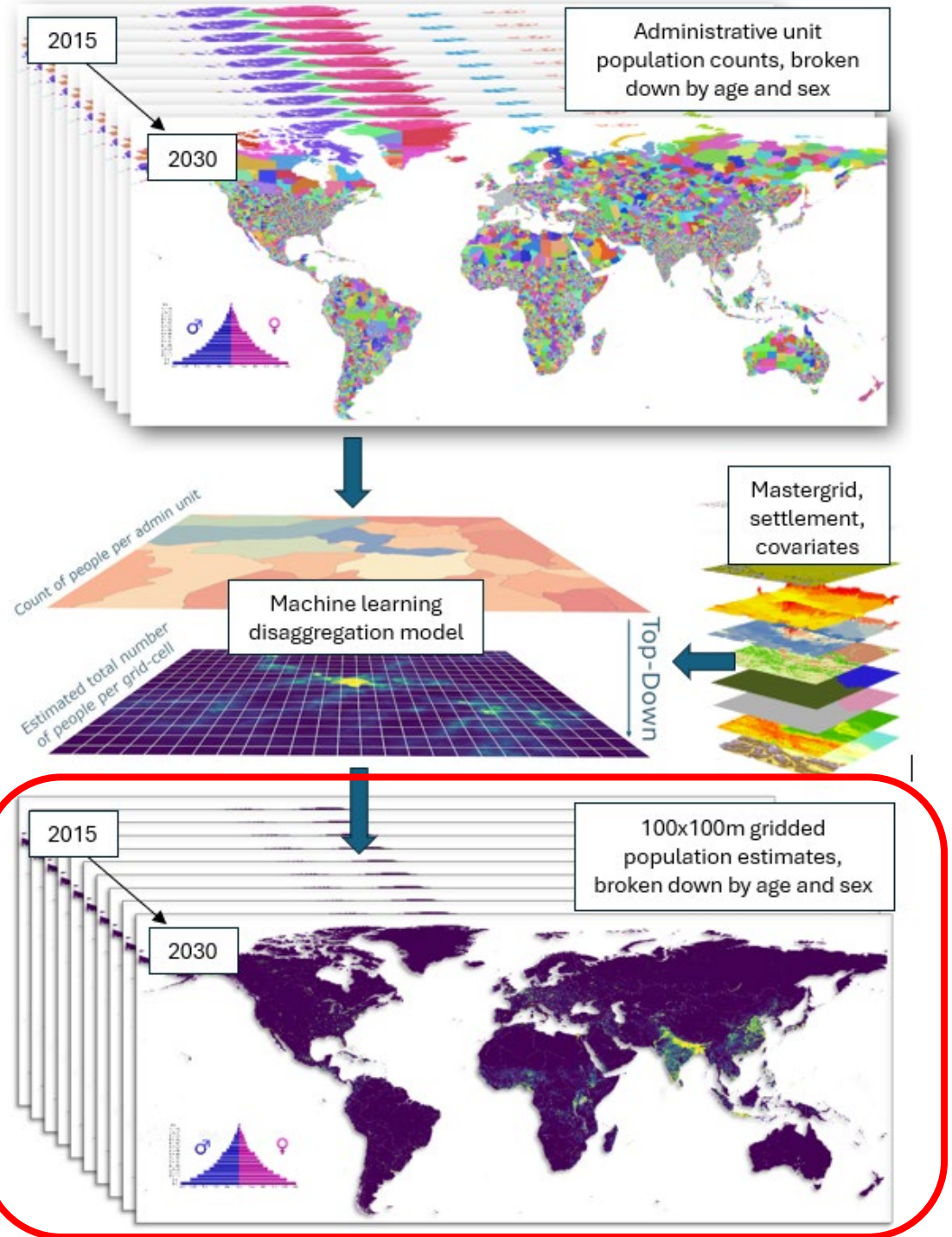
https://github.com/wpgp/popRF

Namibia 2025 gridded estimates
Variance explained **96.4%**
(last census: 2023)



Ethiopia 2025 gridded estimates
Variance explained **90.5%**
(last census: 2007)




2015
2030
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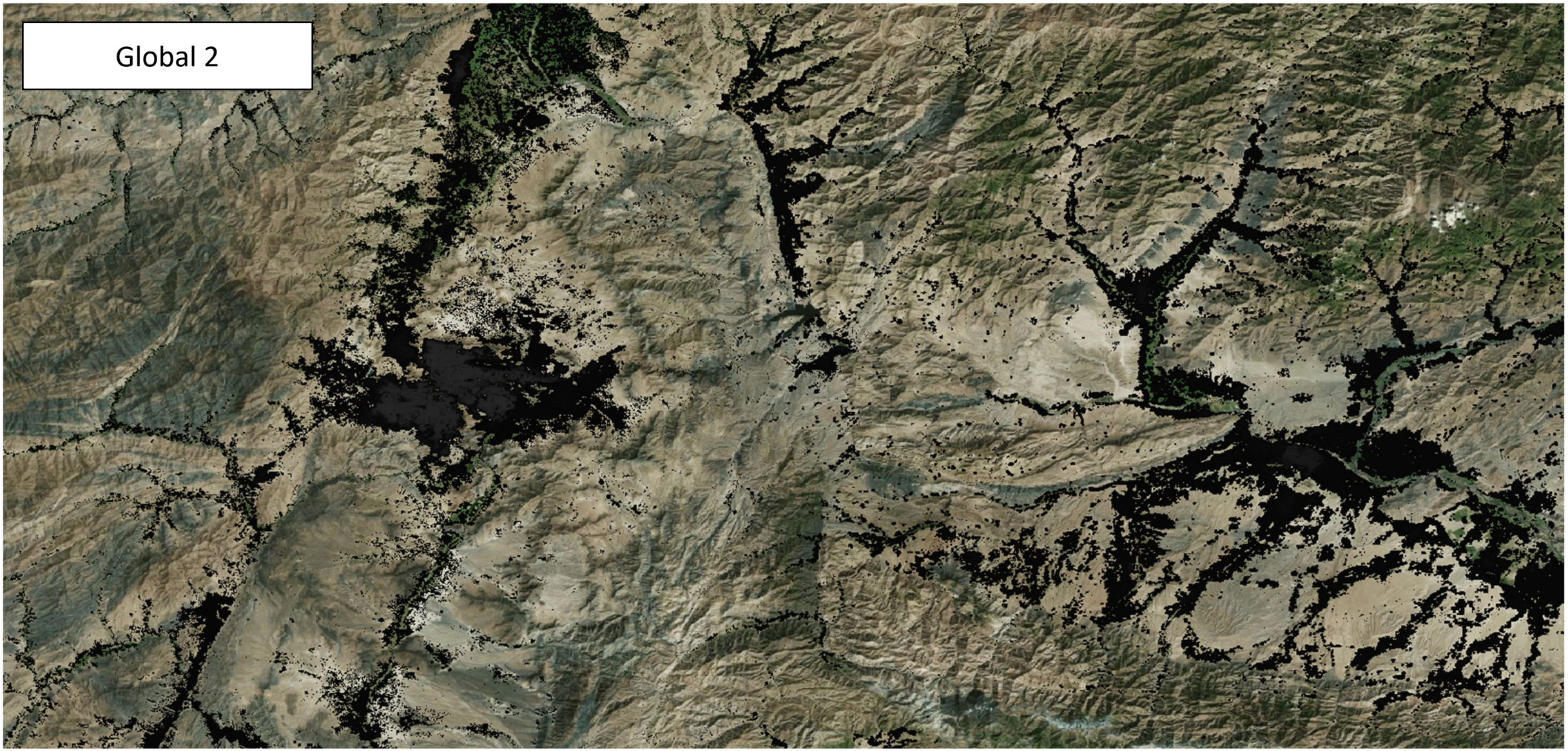
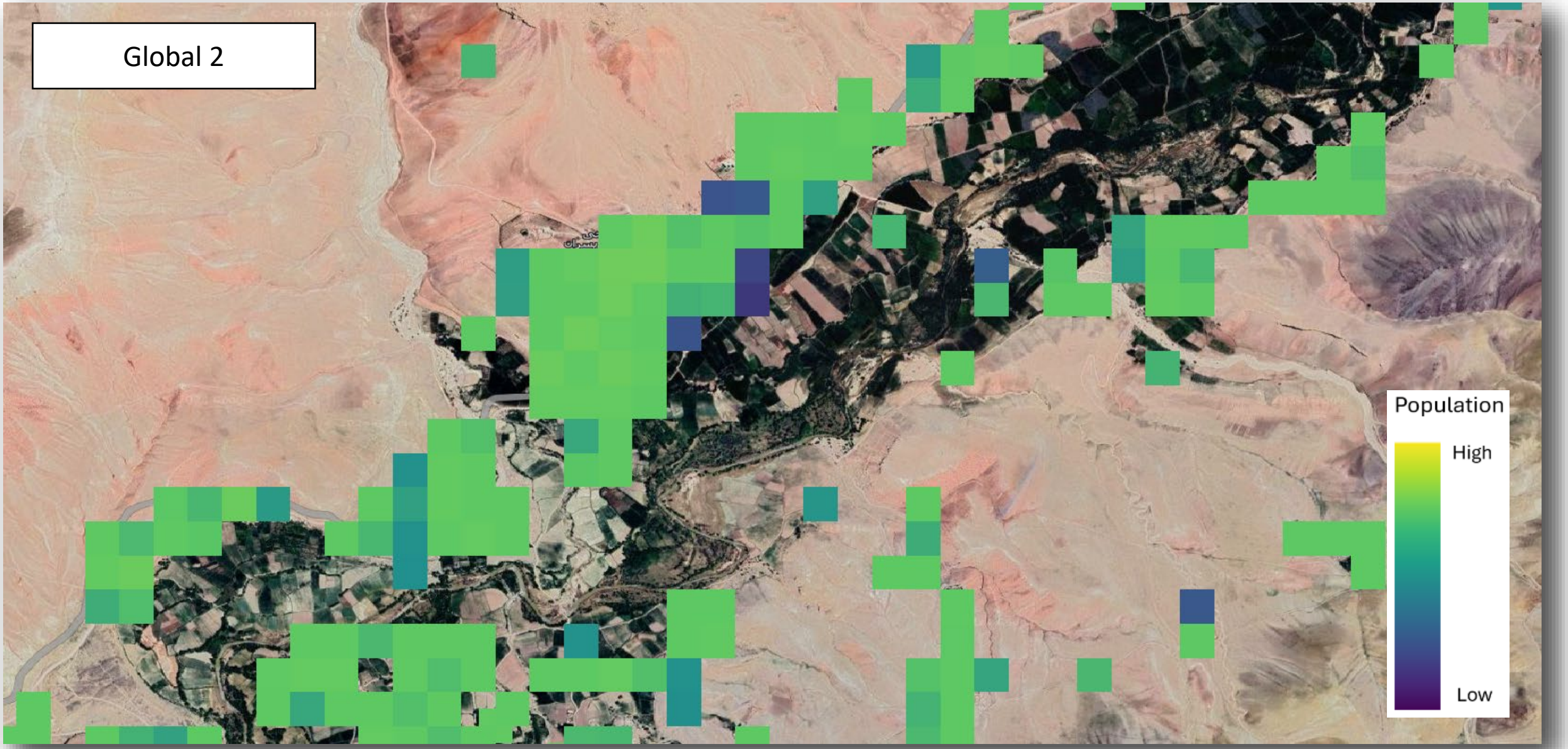
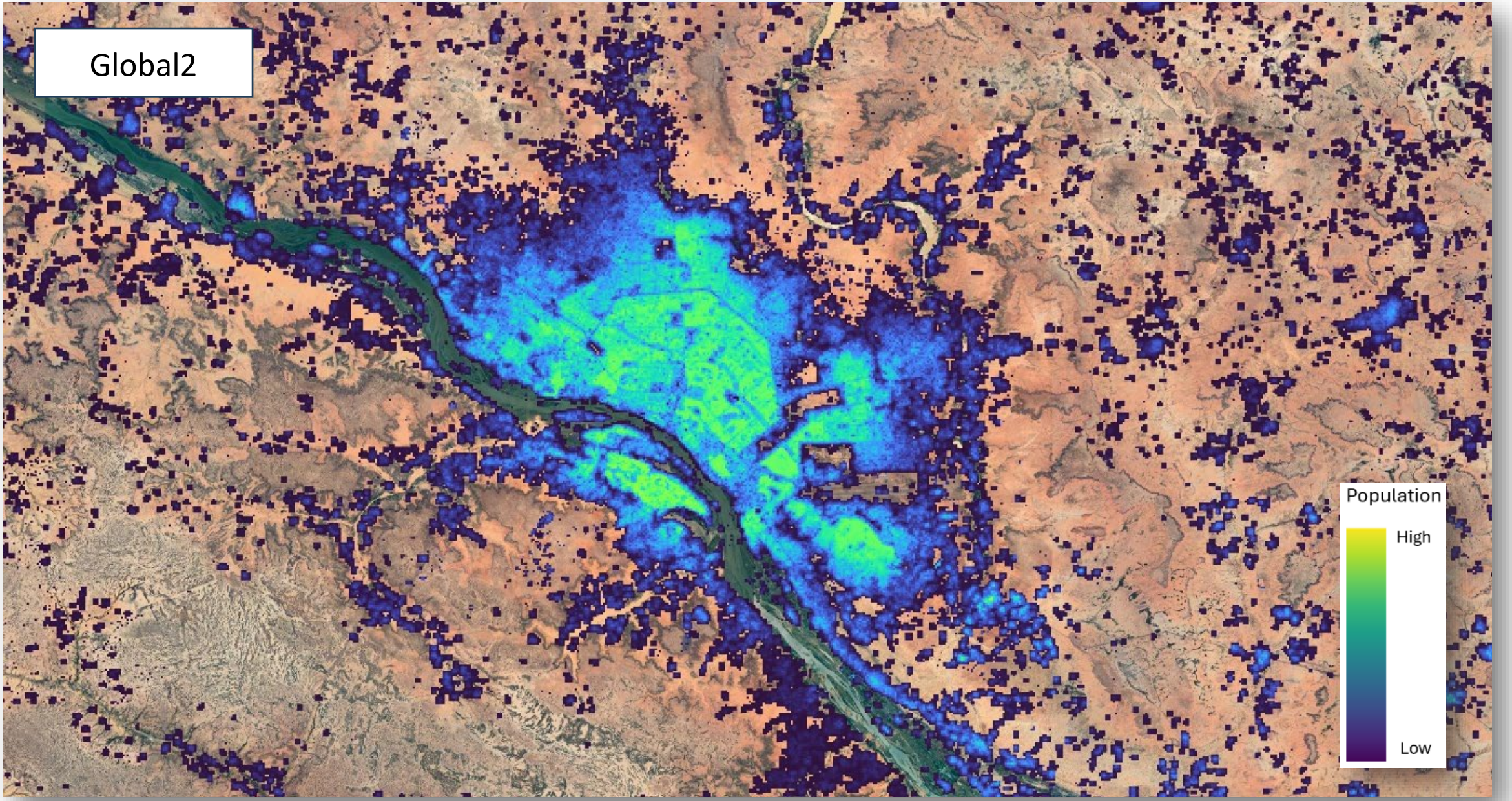
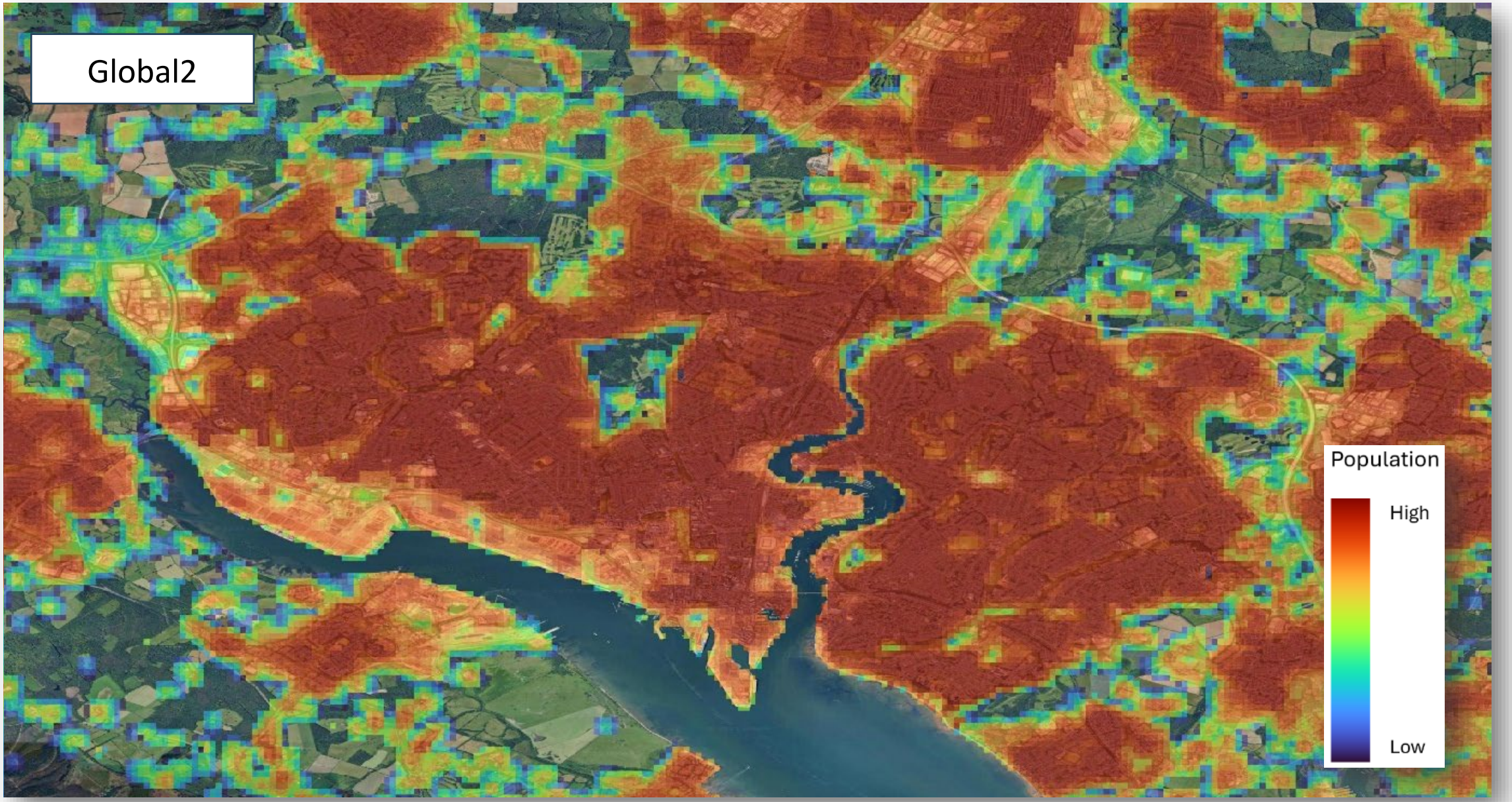
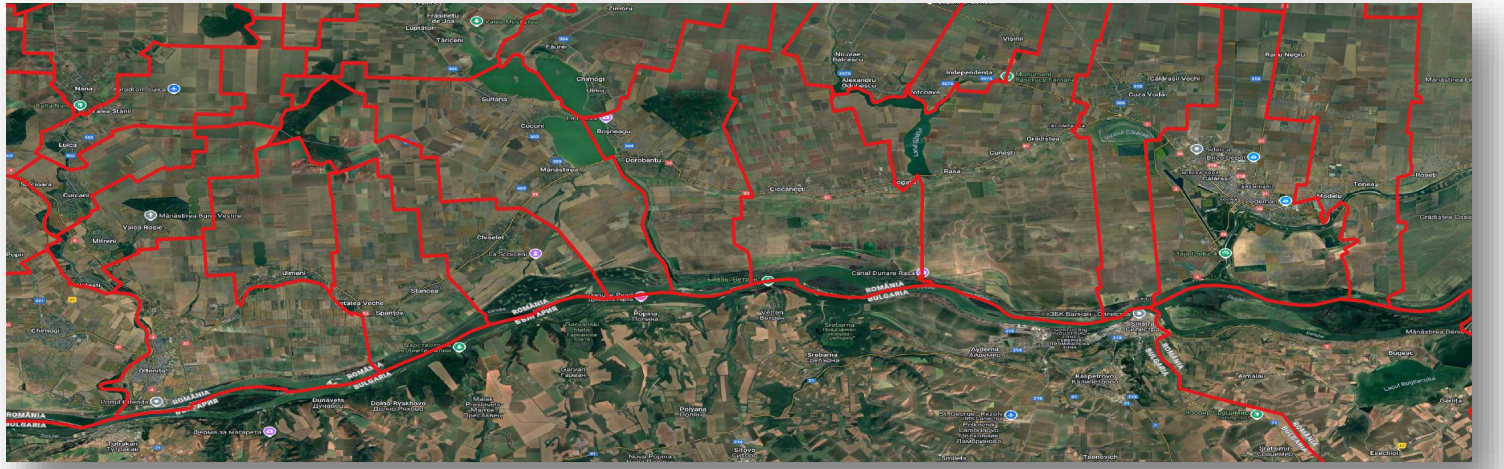

Global 2

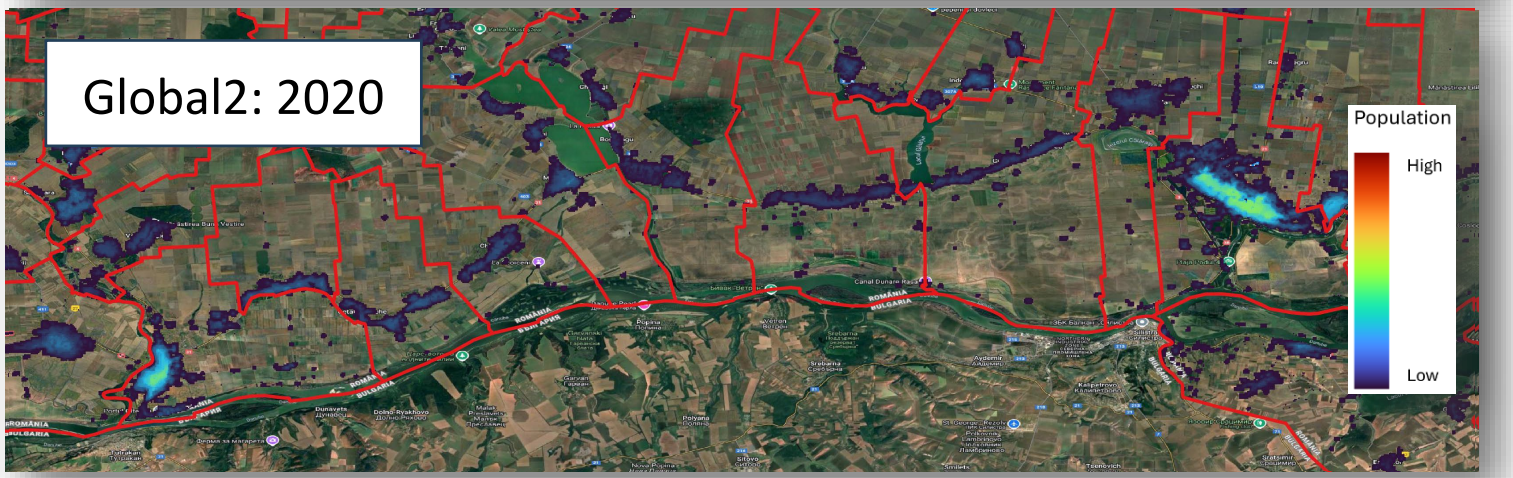

Global 2
Population
High
Low

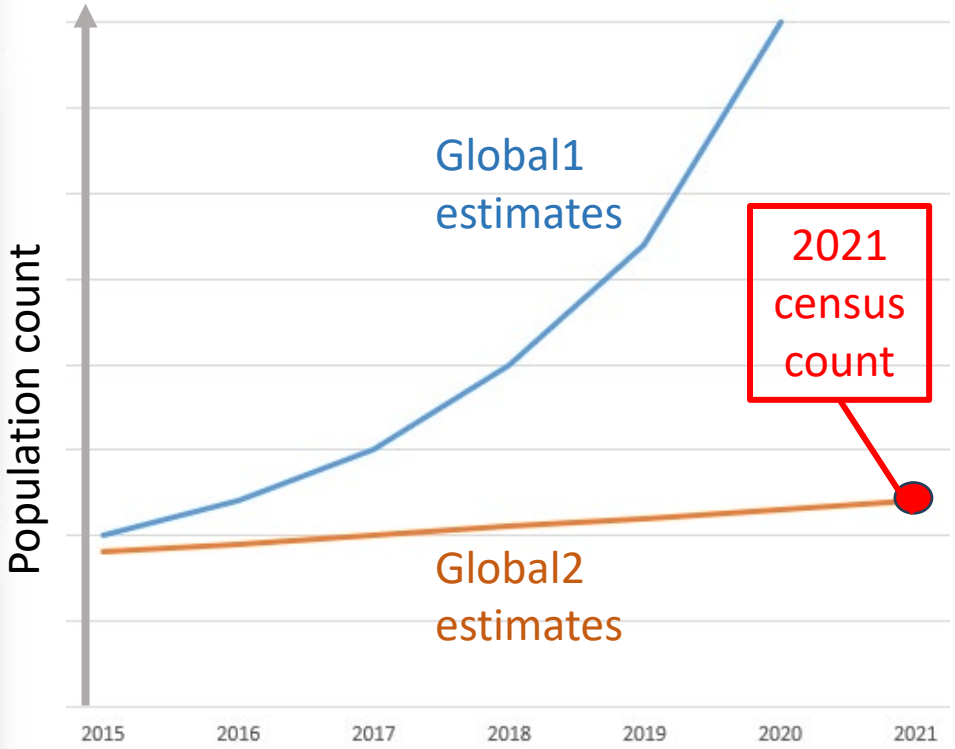

Global2
Population
High
Low

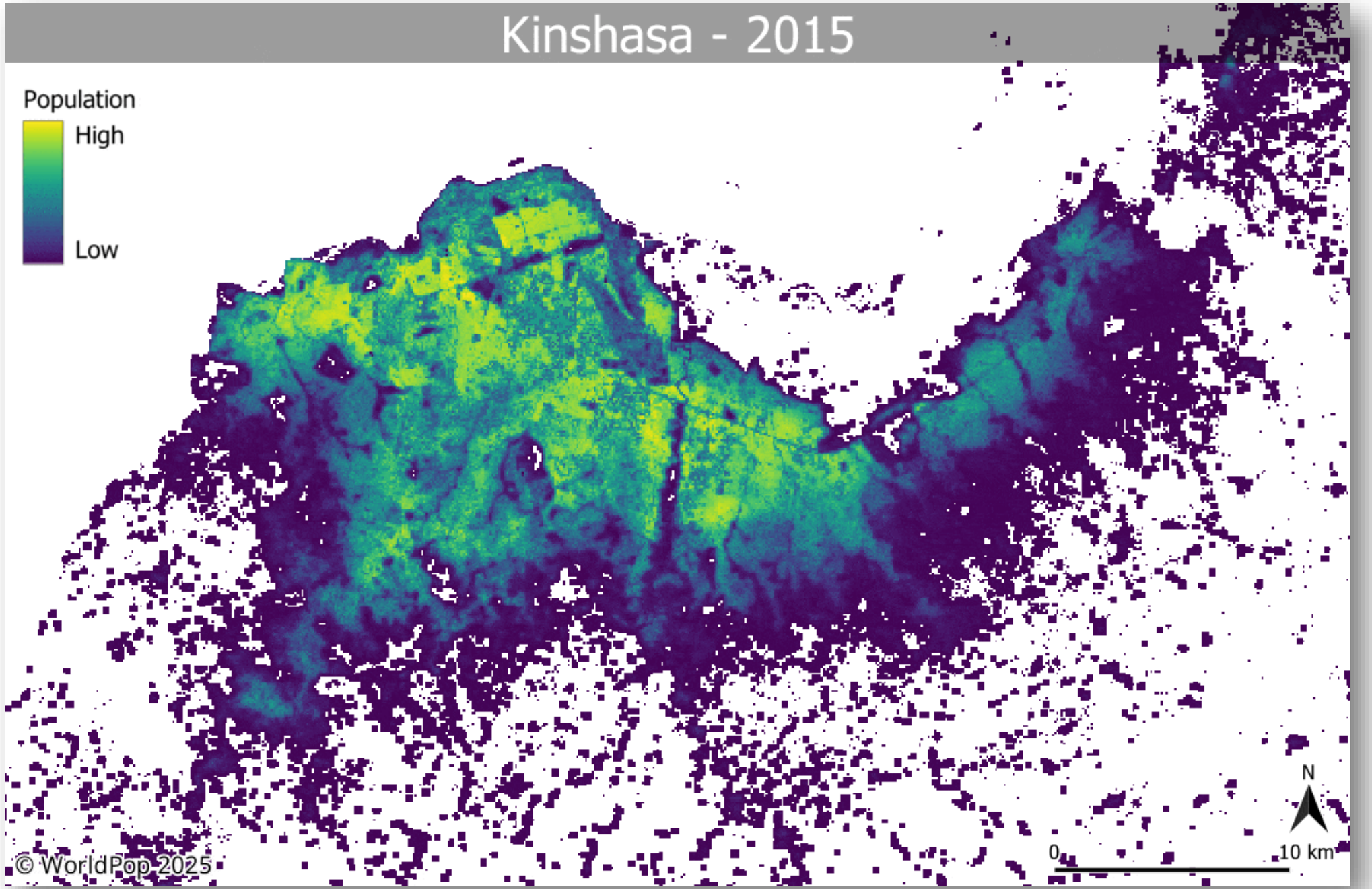

Global2
Population
High
Low

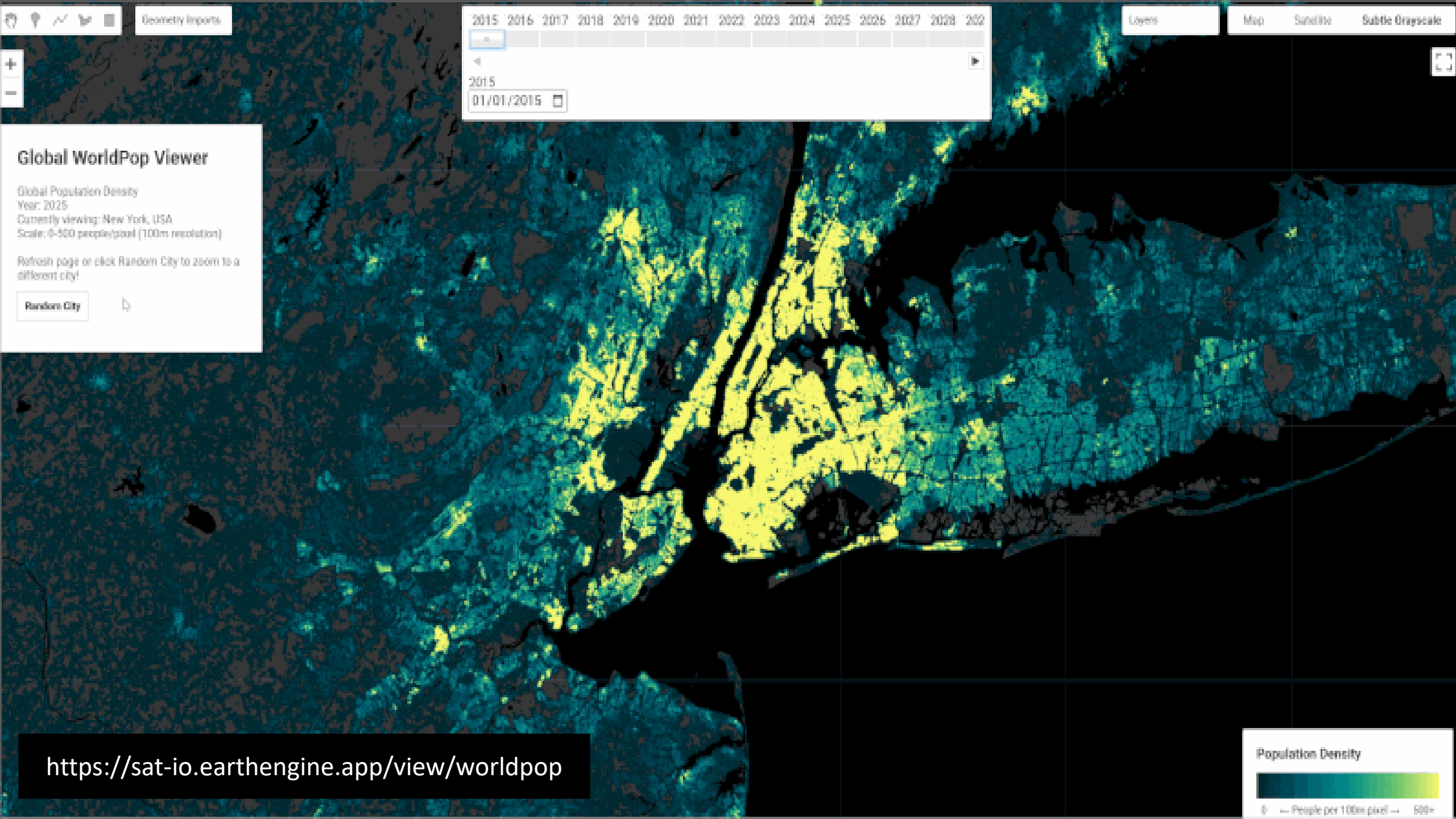



Global1: 2020
Population
High
Low


Global2: 2020
Population
High
Low

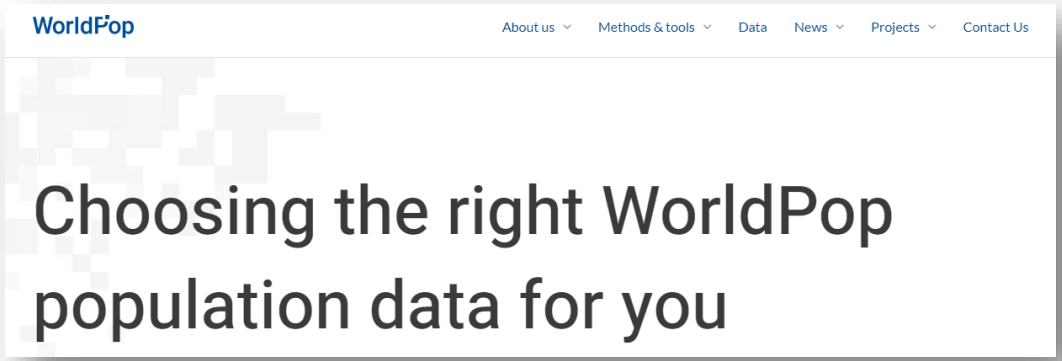

Population count
Global1 estimates
2021 census count
Global2 estimates
2015
2016
2017
2018
2019
2020
2021


Kinshasa - 2015
Population
High
Low
© WorldPop 2025
N
0
10 km


Geometry Imports
2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 202
2015
01/01/2015
Layers
Map
Satellite
Subtle Grayscale
Global WorldPop Viewer
Global Population Density
Year: 2025
Currently viewing: New York, USA
Scale: 0-500 people/pixel (100m resolution)
Refresh page or click Random City to zoom to a different city!
Random City
Population Density
0
— People per 100m pixel —
500+
https://sat-io.earthengine.app/view/worldpop

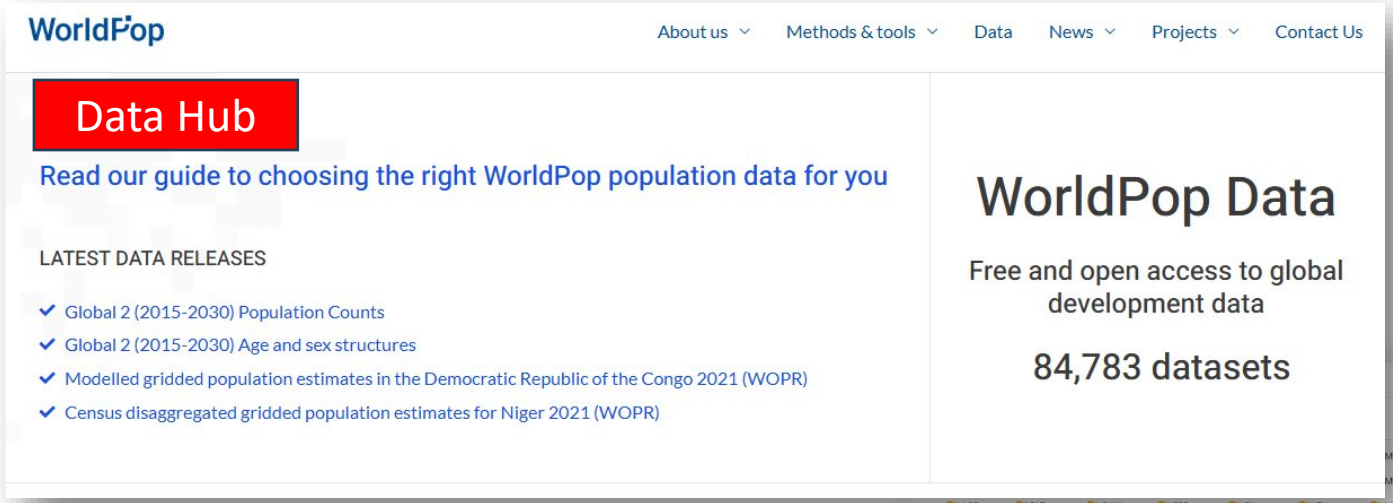
Limitations

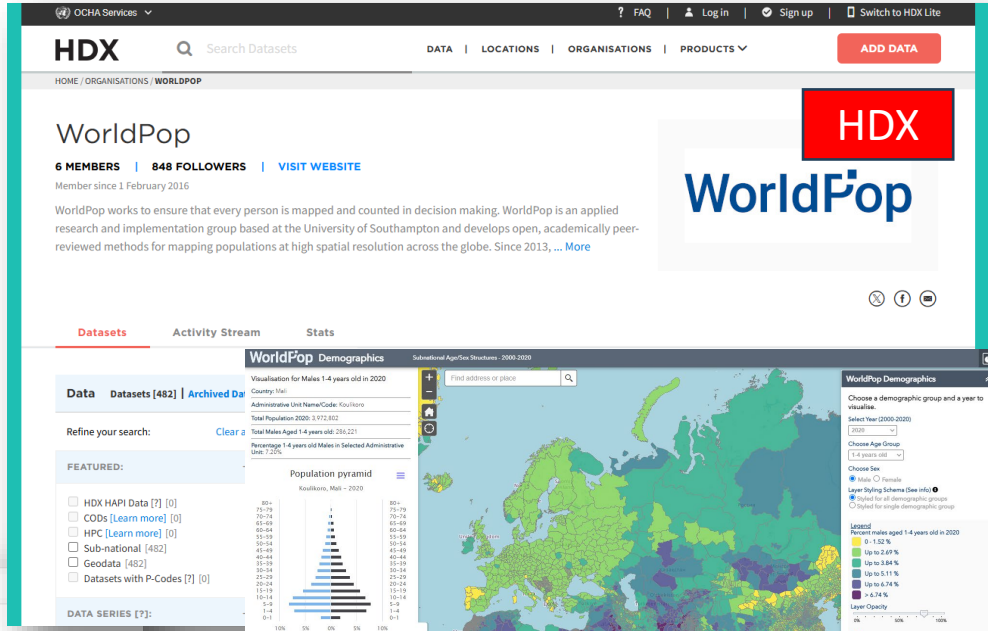
- These are ‘top-down’ disaggregations, so uncertainties and errors in input estimates feed through to the gridded outputs
- Each country is modelled separately leading to some inconsistencies between countries, depending on inputs
- Population projections can be highly uncertain, especially at subnational scales and for countries without recent censuses
- See the Global2 release statement for further details, and read our page on data choices to check which data make sense for your application

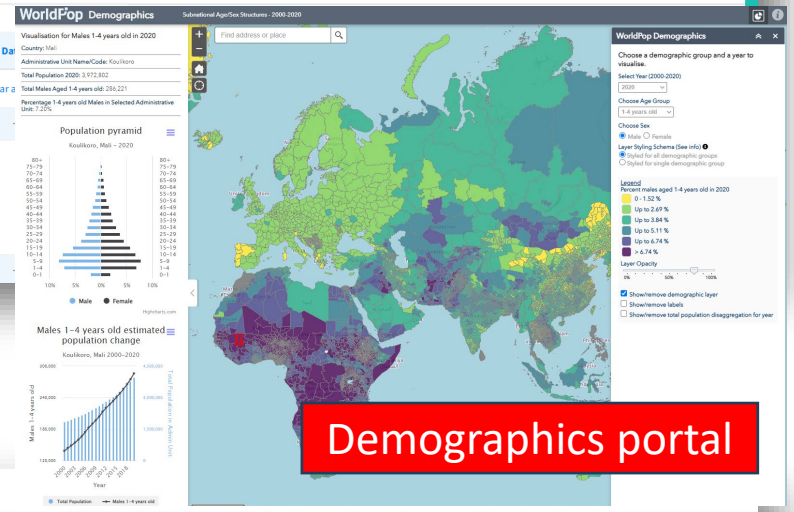


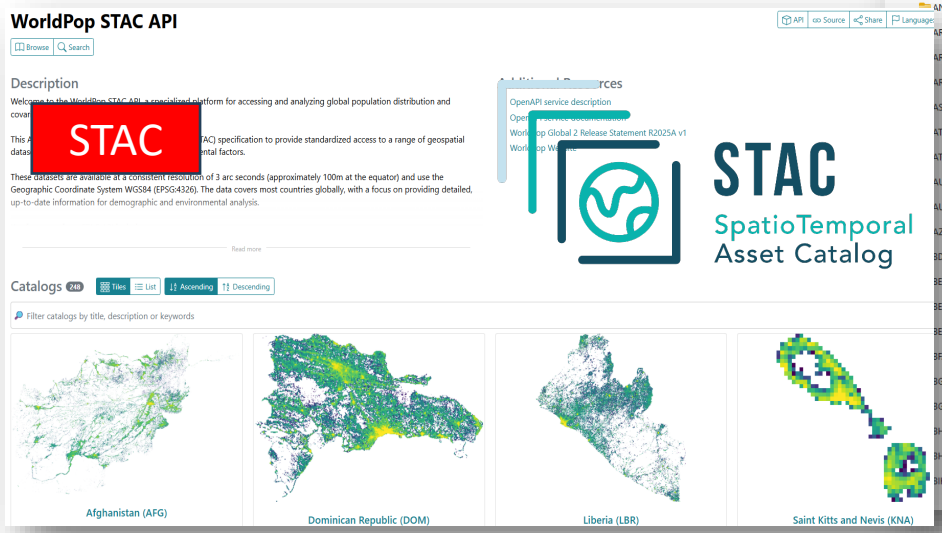
https://www.worldpop.org/choosing-the-right-worldpop-population-data-for-you/

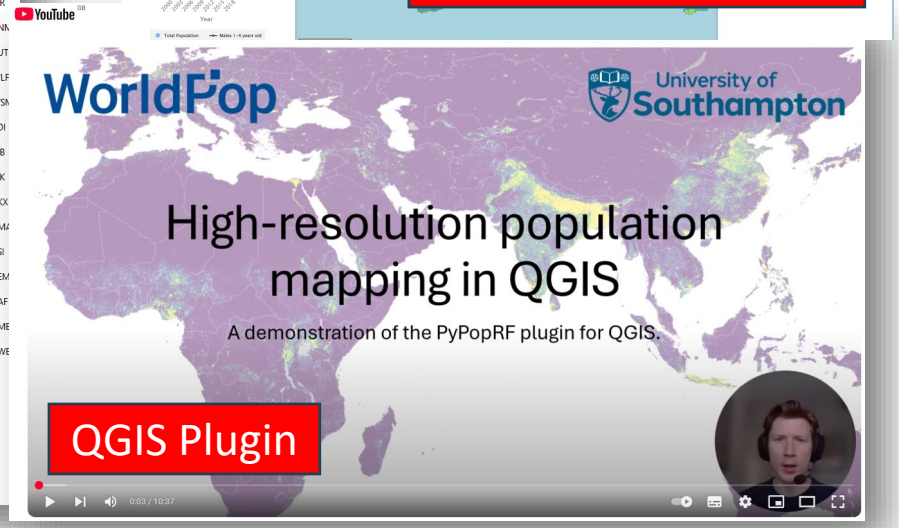
Accessing Global2 data











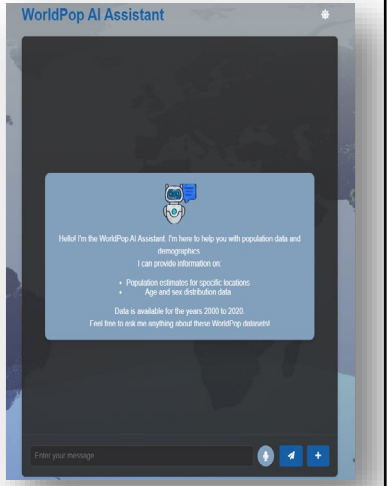
What next?

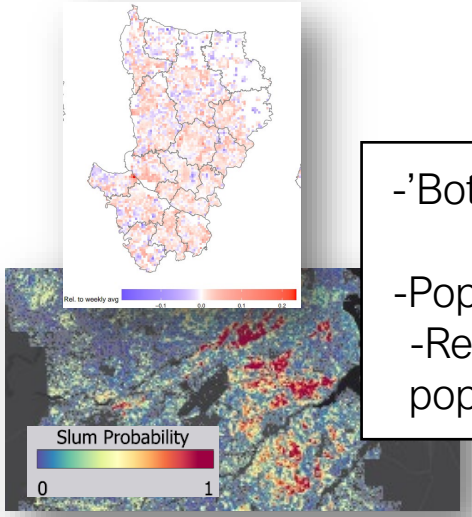
ArcGIS Living Atlas of the World

Google Earth Engine

Global2

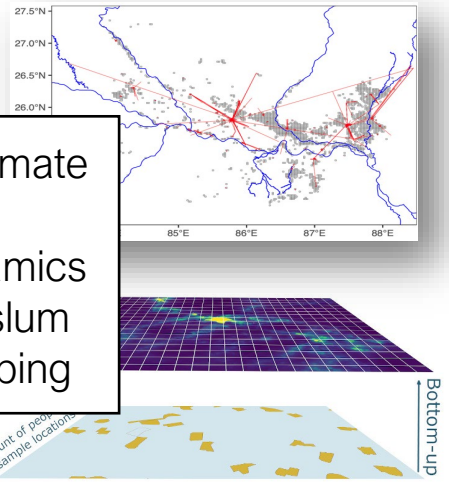
-Pop density
-Admin unit totals
-Degree of Urbanization
-Integer versions
-Additional age classes

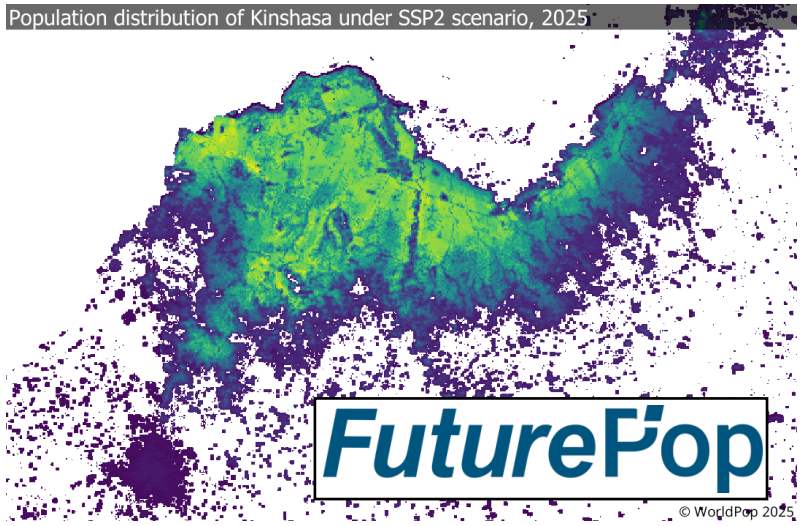




Global3

-'Bottom-up' estimate integration
-Population dynamics
-Remote rural, slum population mapping





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University of Southampton

University of BRISTOL

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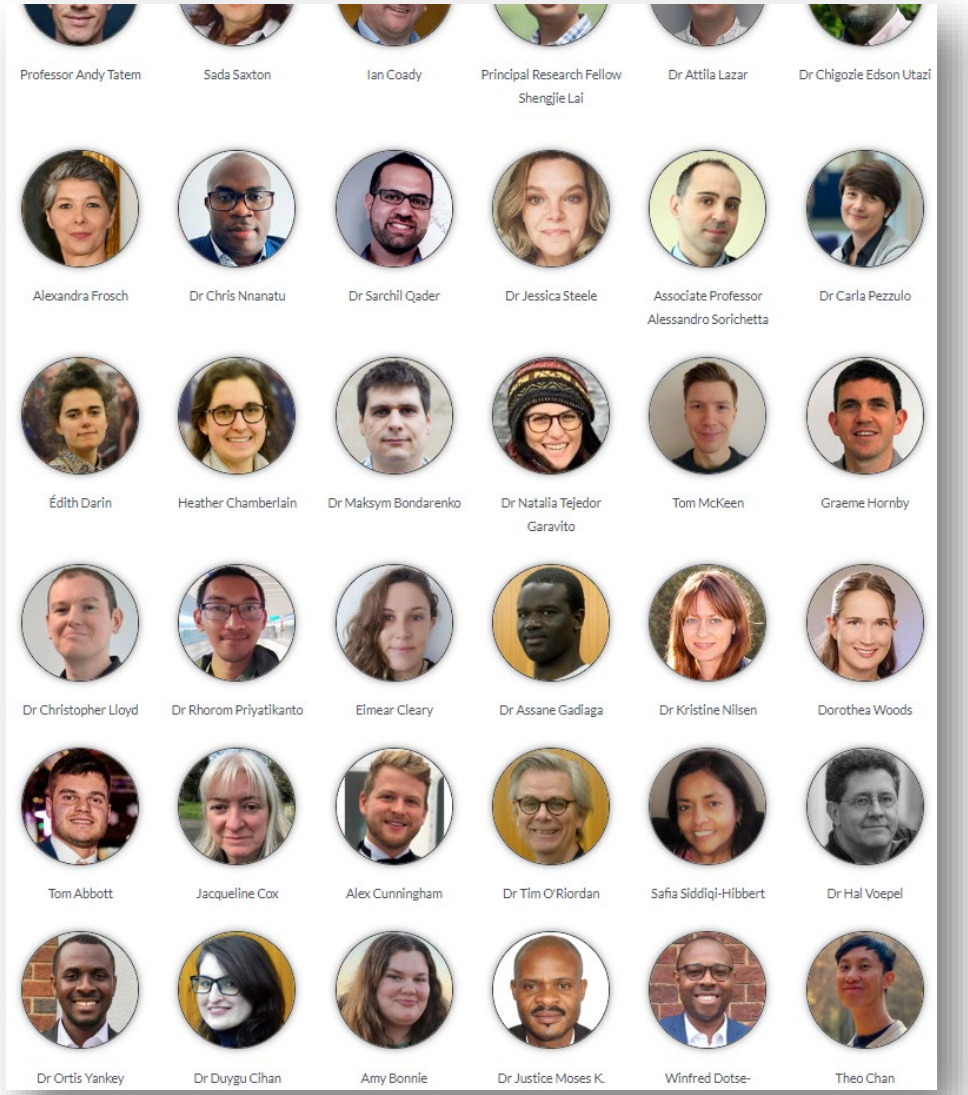
Iridis

JADE UNIVERSITY OF APPLIED SCIENCES

Wilhelmshaven Oldenburg Elsfleth

Center for International Earth Science Information Network

EARTH INSTITUTE | COLUMBIA UNIVERSITY



https://www.worldpop.org/team/list/

A.J.Tatem@soton.ac.uk

WorldPop

Part 1 – From research to real world

Panel & Guest speakers

					
Professor Andy Tatem Founder and Director of **WorldPop** and Professor of Spatial Demography and Epidemiology at University of Southampton	**Dr Jessica Espey** Associate Professor in the School of Geography and Environmental Sciences at University of Southampton, Deputy Director Research at **WorldPop**	**Mr Andrew Bob Johnny** Statistician General Statistics Sierra Leone	**Dr Mollie Van Gordon** Senior Program Officer leading the Geospatial Insights portfolio at the Gates Foundation	**Dr Sabrina Juran** Regional Advisor, Data and Population Dynamics, Latin America and the Caribbean at the United Nations Population Fund (UNFPA)	**Dr Maksym Bondarenko** Head of **WorldPop's** Spatial Data Infrastructure Team

WorldPop

Part 2 – Hands-on discovery

WorldPop

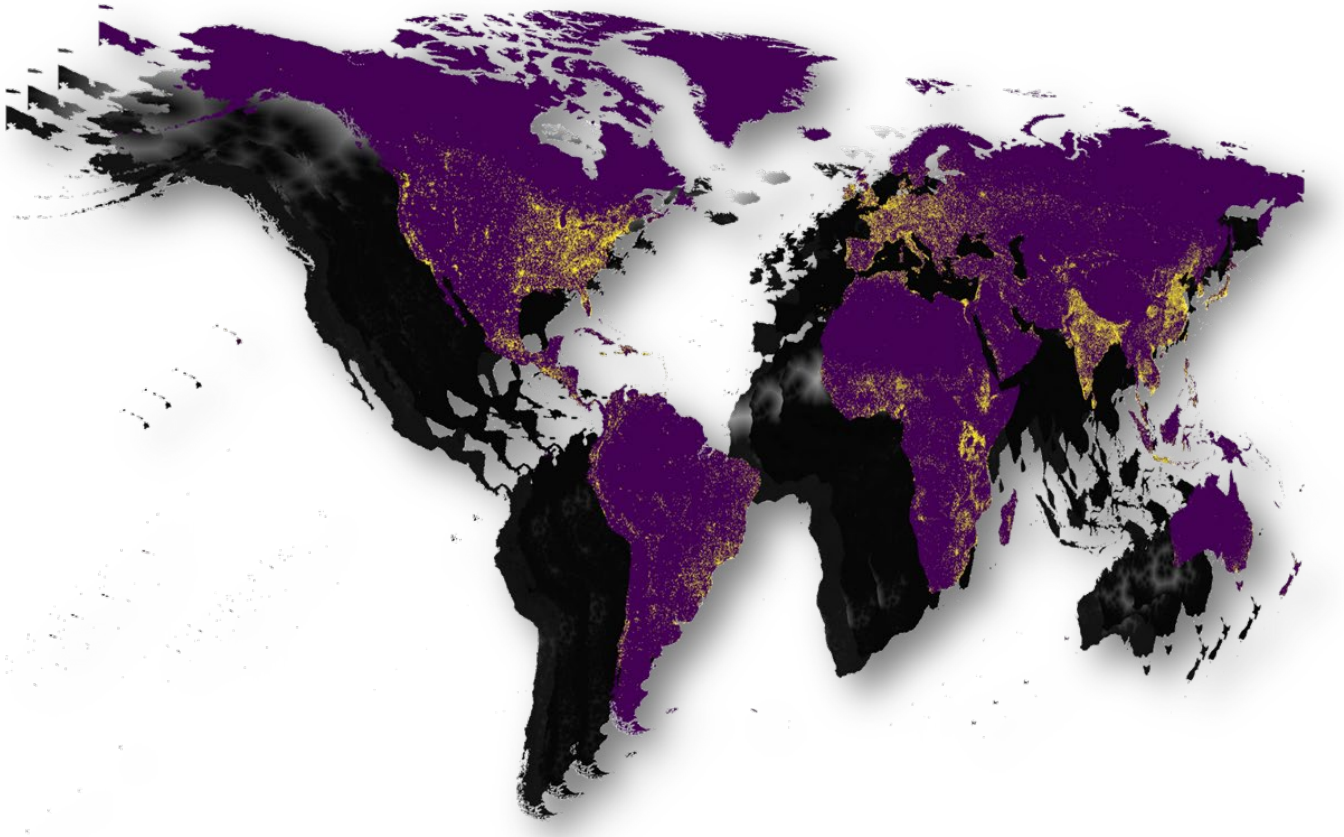
WorldPop Global Demographic Data (Global 2)

The Power of Population Data: Introducing WorldPop Global 2015–2030

Dr. Maksym Bondarenko

Thursday, 4 September

WorldPop



Hands-on discovery

Input data, tools, technical deep-dive & country use cases

The Random Forest model

WorldPop

Random forest is a machine learning algorithm that builds an ensemble of individual regression trees to predict values of a response variable (e.g. population density) based on its relationships with geospatial covariates.

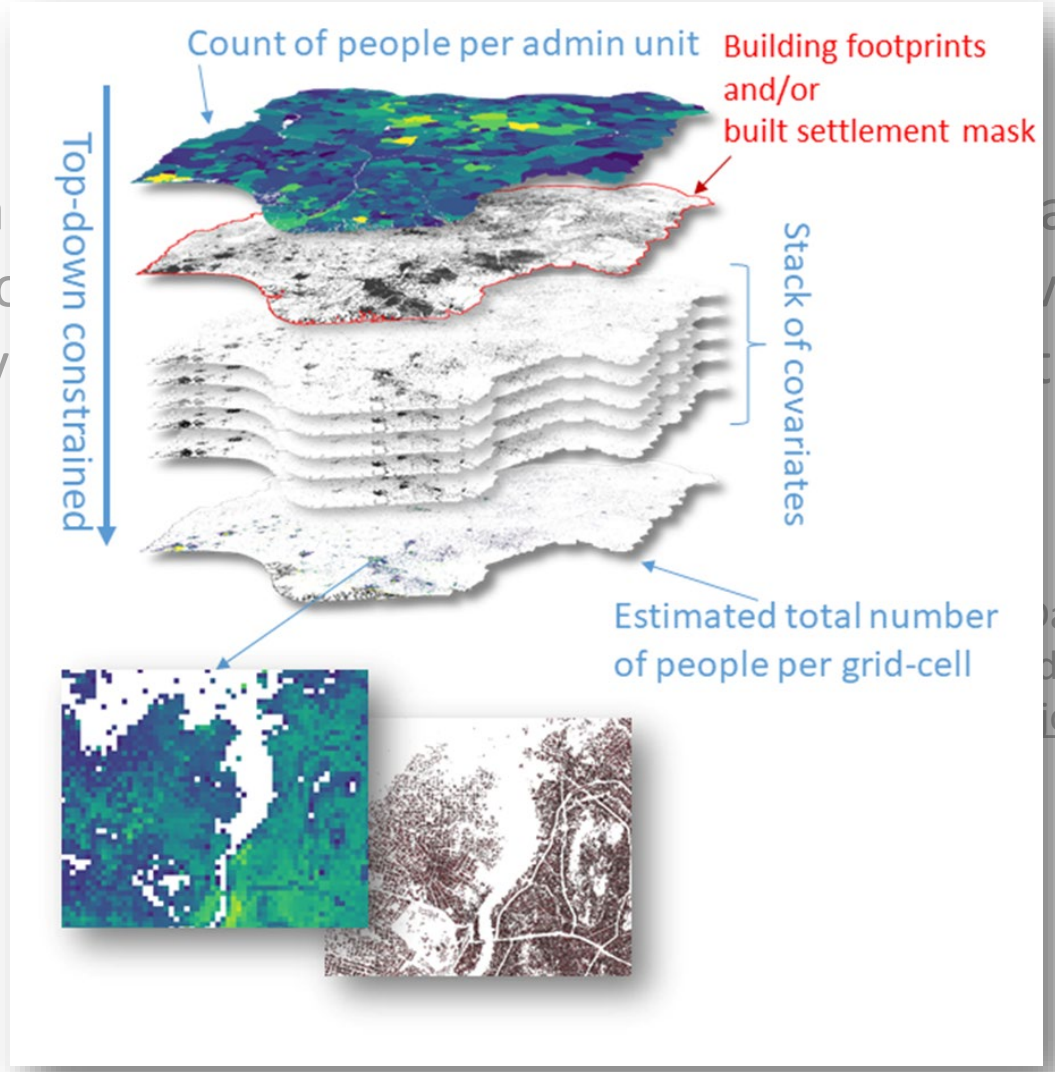
Stevens et al (2015) Disaggregating Census Data for Population Mapping Using Random Forests with Remotely-Sensed and Ancillary Data. PLoS ONE 10, e0107042 https://doi.org/10.1371/journal.pone.0107042

The Random Forest model

WorldPop

Random forest is a
individual regressio
population density

an ensemble of
variable (e.g.
tial covariates.



ata for Population Mapping
d and Ancillary Data. PLoS
journal.pone.0107042

Global 2: MasterGrid

WorldPop

Global 2

Extent	-180, -59.999999424 , 179.999998559, 84
Dimensions	X: 432000 Y: 172800
Pixel Size	0.000833333329, 0.000833333329

Global 2: MasterGrid

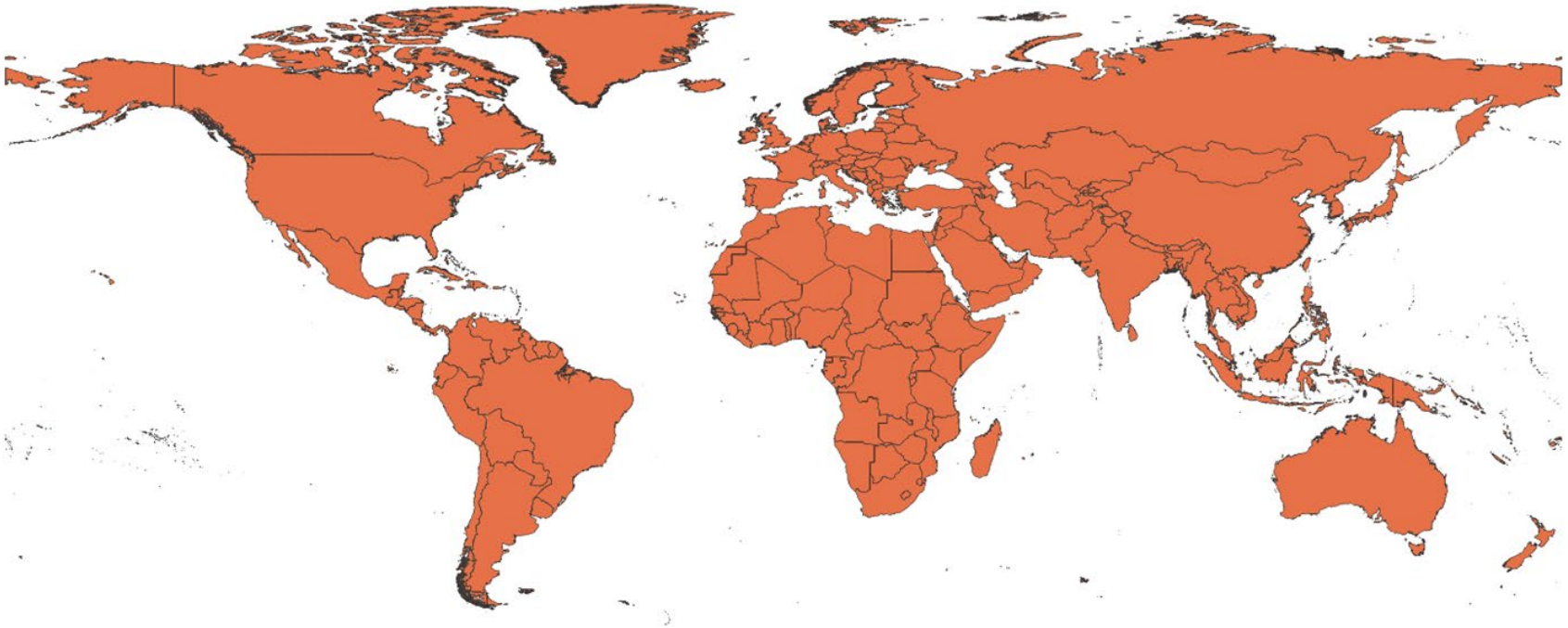
WorldPop

Global 2	
Extent	-180, -59.999999424 , 179.999998559, 84
Dimensions	X: 432000 Y: 172800
Pixel Size	0.000833333329, 0.000833333329

Global 1	
Extent	-180.00124, -72.0, 180.00124, 84
Dimensions	X: 432003 Y: 187203
Pixel Size	0.000833333329, 0.000833333329

Global 2: MasterGrid

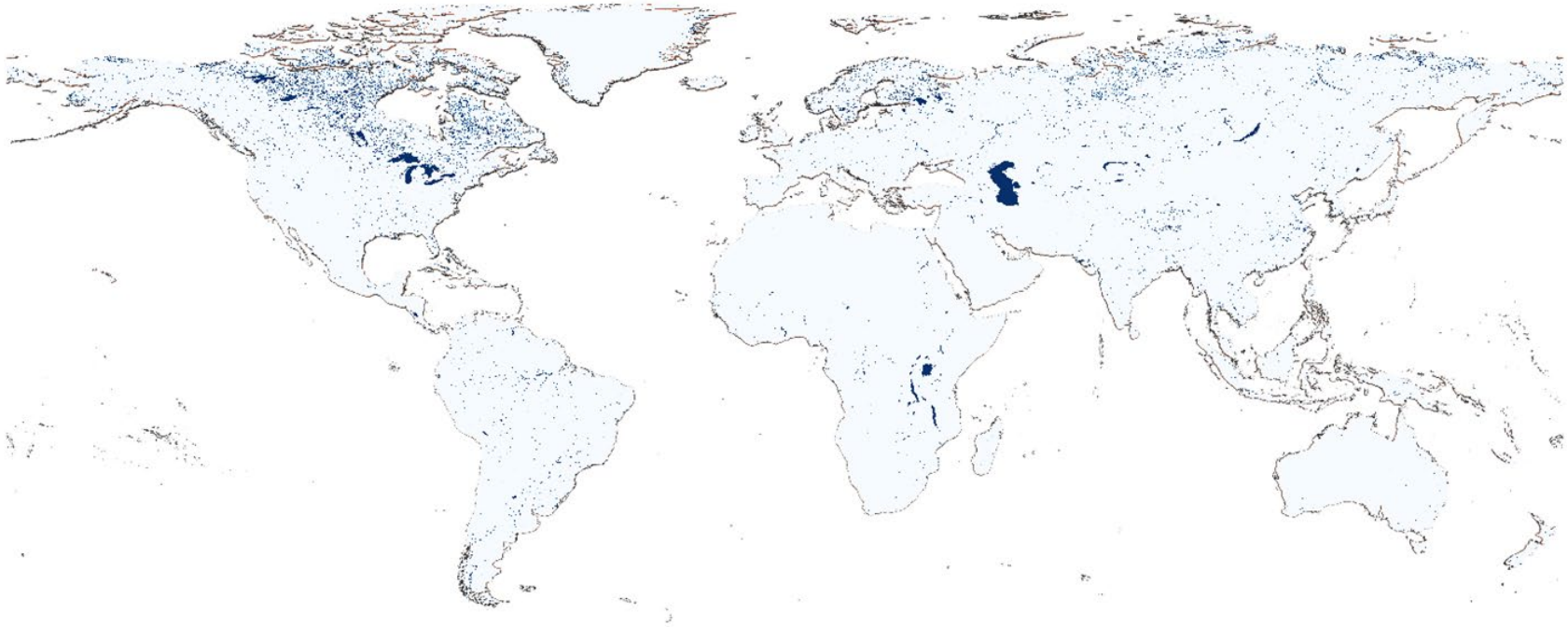
WorldPop



The Large Scale International Boundaries (LSIB)
The Office of the Geographer and Global Issues at the U.S. Department of State
https://geonode.state.gov/layers/catalog:geonode:LSIB

Global 2: WaterMask and Coastline

WorldPop



WorldCover global land cover at 10 m resolution based on Sentinel-2 data.

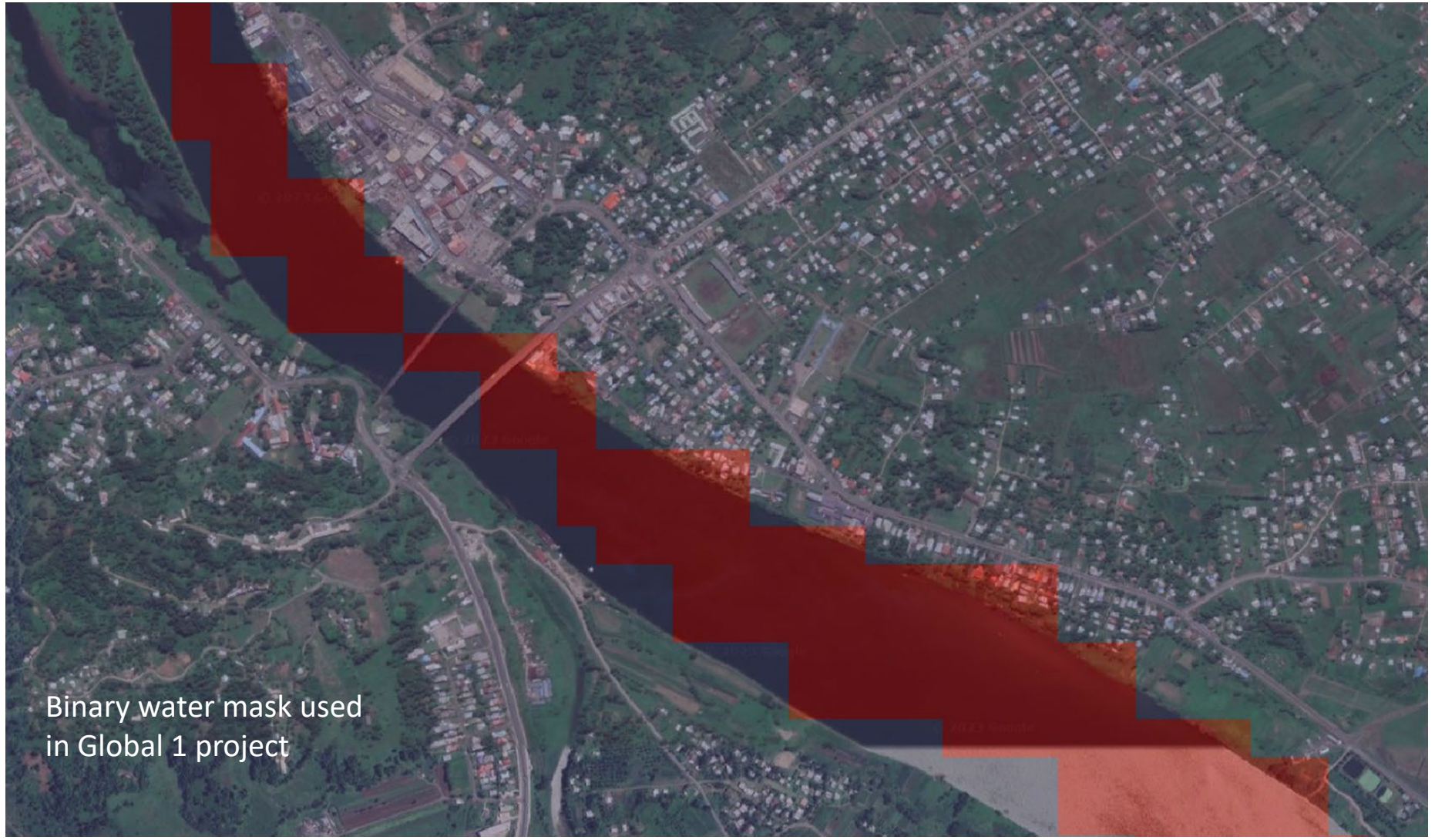
Global 2: WaterMask and Coastline

Coastline defined as if a pixel has less then 75% water

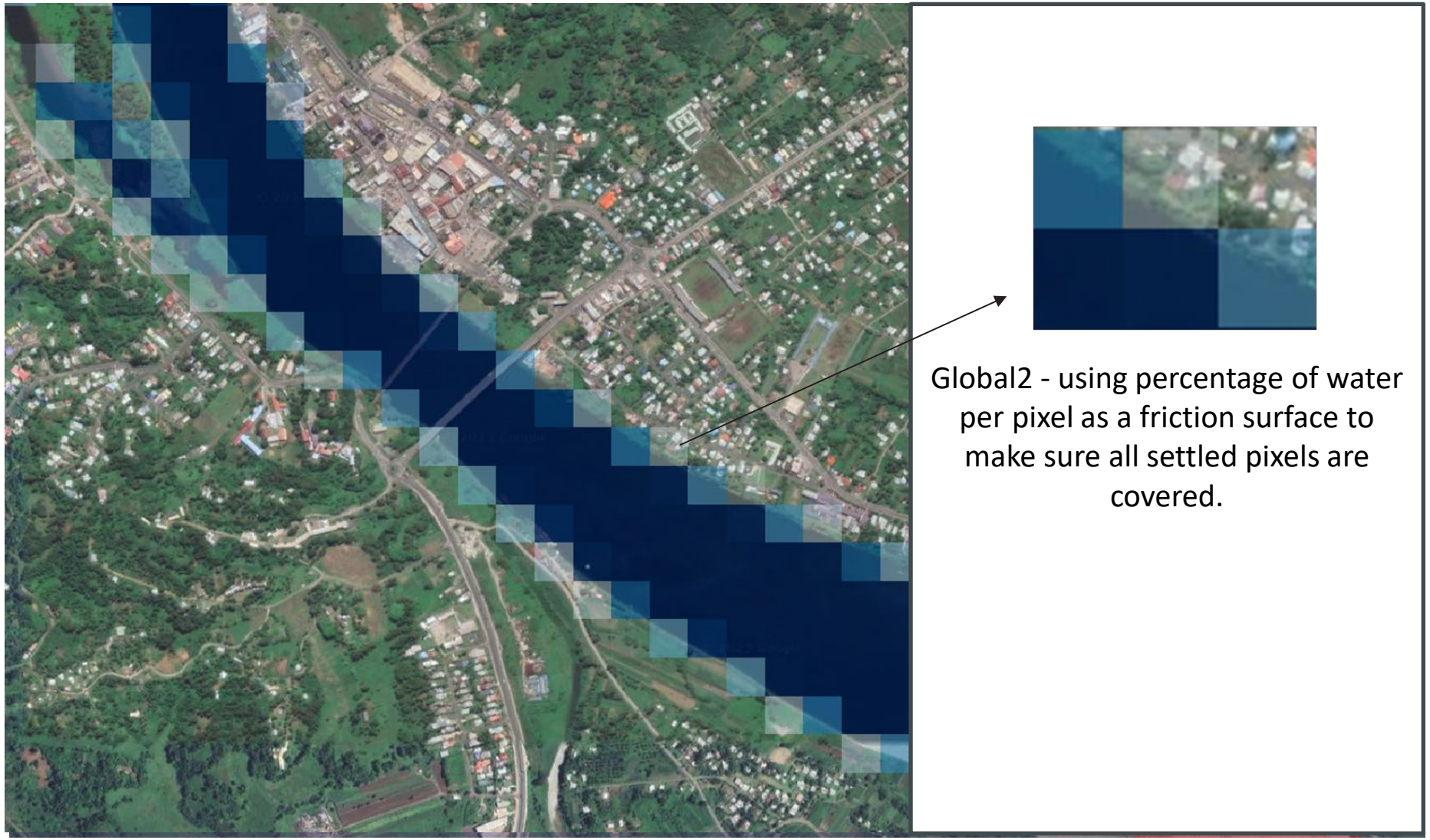
Global 2: WaterMask and Coastline

Coastline defined as if a pixel has less then 75% water

Global 2: Inland water



Global 2: Inland water



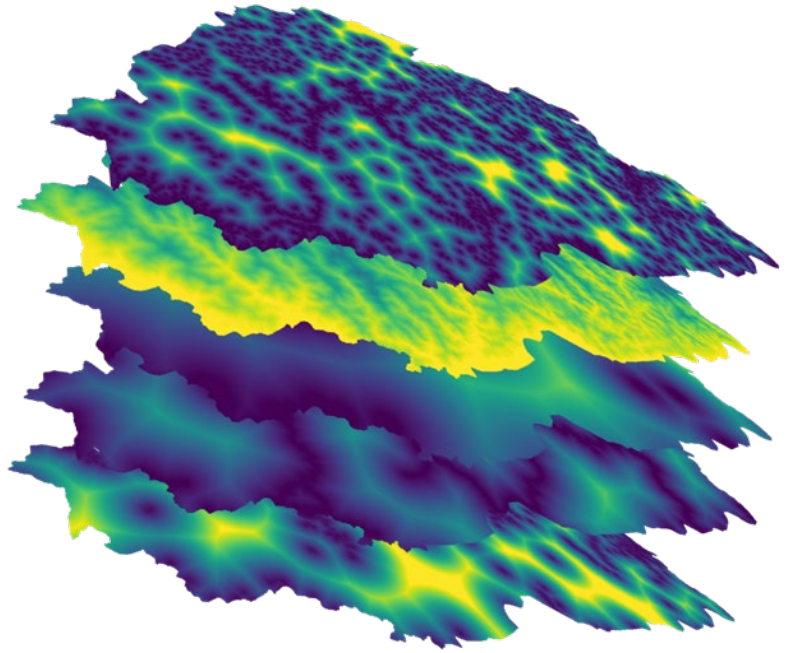
Global2 - using percentage of water per pixel as a friction surface to make sure all settled pixels are covered.

Global 2: Covariates

WorldPop

Covariates

- Distance to ESA-CCI-LC inland water per country
- Distance to IUCN strict nature reserve and wilderness area edges
- Distance to open-water coastline per country
- Distance to OSM major road intersections
- Distance to OSM major roads
- Distance to OSM major waterways
- Resampled DMSP-OLS night-time lights
- Resampled VIIRS night-time lights
- SRTM-based elevation per country
- SRTM-based slope per country
- Distance to edges of reclassified ESA-CCI-LC classes for
- Distance to ESA-CCI-LC cultivated area edges
    - Distance to ESA-CCI-LC woody-tree area edges
    - Distance to ESA-CCI-LC shrub area edges
    - Distance to ESA-CCI-LC herbaceous area edges
    - Distance to ESA-CCI-LC sparse vegetation area edges
    - Distance to ESA-CCI-LC aquatic vegetation area edges
    - Distance to ESA-CCI-LC artificial surface edges
    - Distance to ESA-CCI-LC bare area edges



Datasets are provided as global, annual time series, where pertinent at the timescale of population analyses and where data is available, for use in the construction of population distribution layers.
“Distance to” is one of the important measure for understanding and global analysis of population distance to a different covariate.

All data are gridded to 3 arc-second (0.00083333333 decimal degree) spatial resolution.

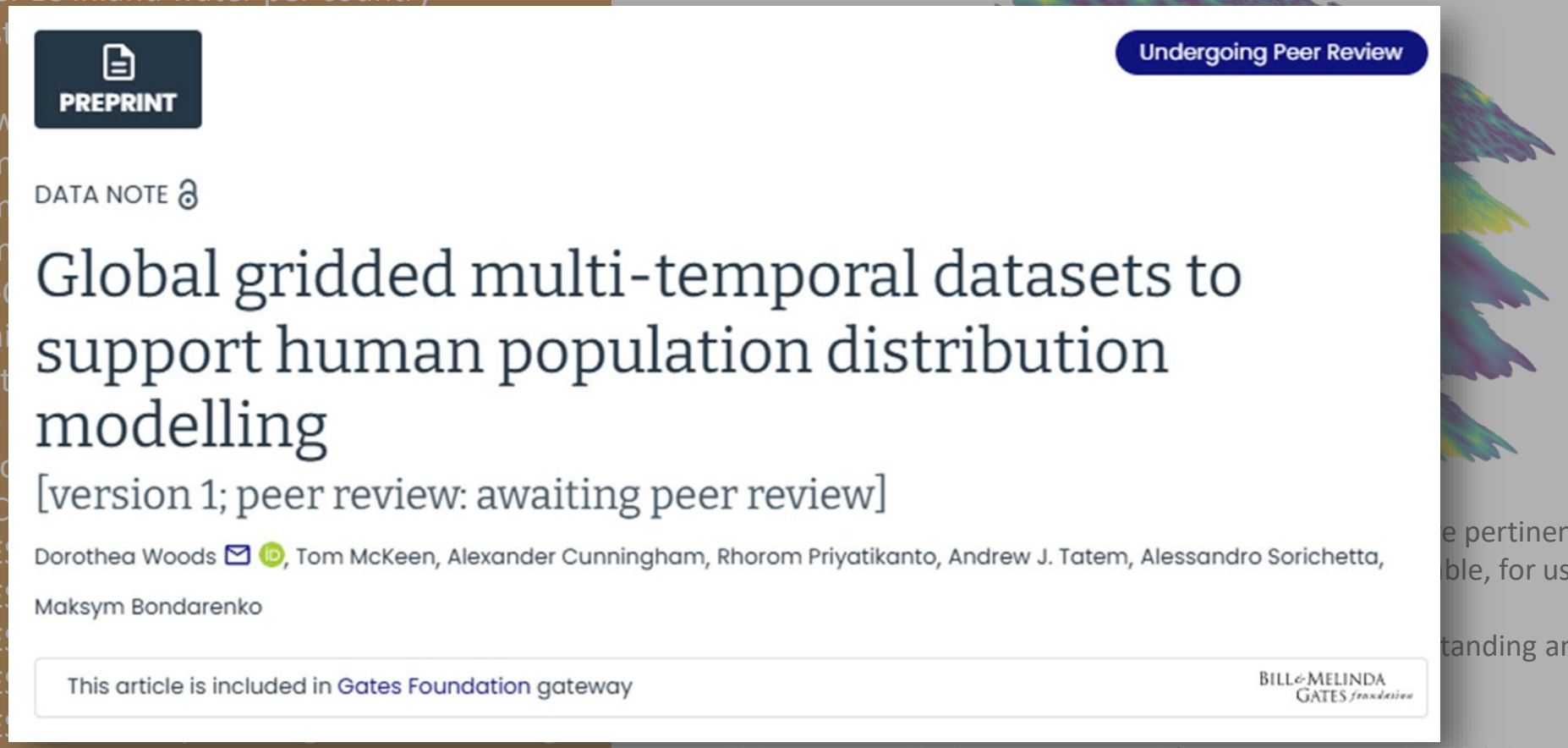
https://www.worldpop.org/datacatalog/

Global 2: Covariates

WorldPop

Covariates

- Distance to ESA-CCI-LC inland water per country
- Distance to IUCN st
  edges
- Distance to open-w
- Distance to OSM m
- Distance to OSM m
- Distance to OSM m
- Resampled DMSP-
- Resampled VIIRS ni
- SRTM-based elevat
- SRTM-based slope
- Distance to edges
- Distance to ESA-CC
  - Distance to E
  - Distance to E
  - Distance to E
  - Distance to E
  - Distance to E
  - Distance to ESA-CCI-LC artificial surface edges
  - Distance to ESA-CCI-LC bare area edges



e pertinent at the
ble, for use in the

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https://www.worldpop.org/datacatalog/

Global 2: Covariates

Covariates

- Distance to ESA-CCI-LC
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  edges
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- Distance to OSM m
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- Distance to OSM m
- Resampled DMSP-
- Resampled VIIRS ni
- SRTM-based elevat
- SRTM-based slope
- Distance to edges
- Distance to ESA-CC
  - Distance to E
  - Distance to E
  - Distance to E
  - Distance to E
  - Distance to E
  - Distance to ESA-
  - Distance to ESA-

WorldPop Hub

DATA | CONTACT

Geospatial covariate data layers

WorldPop high resolution, harmonised annual global geospatial covariates. R2024 Version 1.0

Geospatial covariate data layers play an important role in the production of gridded population estimates where they are used as ancillary datasets to capture, inform and explain the variabilities in population densities and distributions at small area scales. WorldPop systematically collated this extensive geospatial collection of 73 annual, spatio-temporally harmonised datasets aimed at driving improvements in mapping small area population density variation. The gridded datasets address topography, climate, nighttime lights, land cover, inland water, infrastructure, protected areas as well as the built-up environment on a global level at a spatial resolution of 3 arc-seconds (approximately 100 metres). Datasets are available as annual time series from 2015 up to and including at least 2020, and as recent as 2023 where source datasets allow. Such datasets not only support population modelling but also applications across environmental, economic, and health sectors. Further details on the methods can be found in Woods D, McKeen T, Cunningham A et al. Global gridded multi-temporal datasets to support human population distribution modelling [version 1]. VeriXiv 2025, 2:149 (https://doi.org/10.12688/verixiv.1078.1)

Recommended data citation

D. Woods, T. McKeen, A. Cunningham, R. Priyatikanto, A. Sorichetta , A.J. Tatem and M. Bondarenko. 2024 "WorldPop high resolution, harmonised annual global geospatial covariates. Version 1.0." University of Southampton: Southampton, UK. DOI:10.5258/SOTON/WP00772

Older datasets produced for specific individual countries and continents are still available for download here: Global 1

Annual Mean Surface Temperature 2015-2023

Distance to Built-up Surface 2015-2030

Distance to inland water 2021

Distance to open-water coastline 2021

Annual Mean Precipitation 2015-2023

Built-up Surface 2015-2030

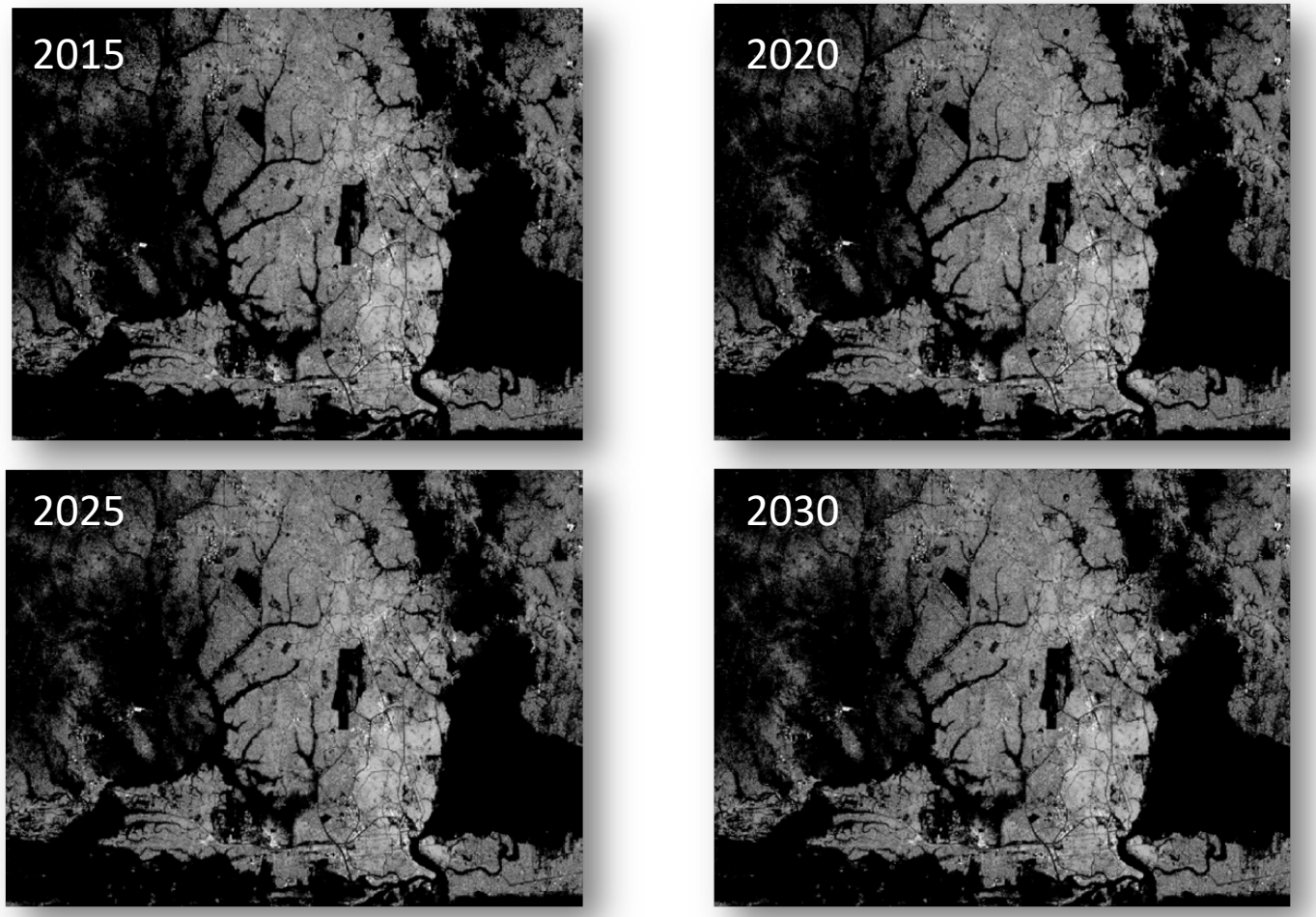
https://www.worldpop.org/datacatalog/

...e pertinent at the
...ble, for use in the

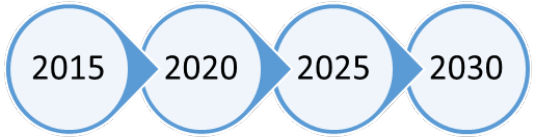
...tanding and global

...ecimal degree) spatial

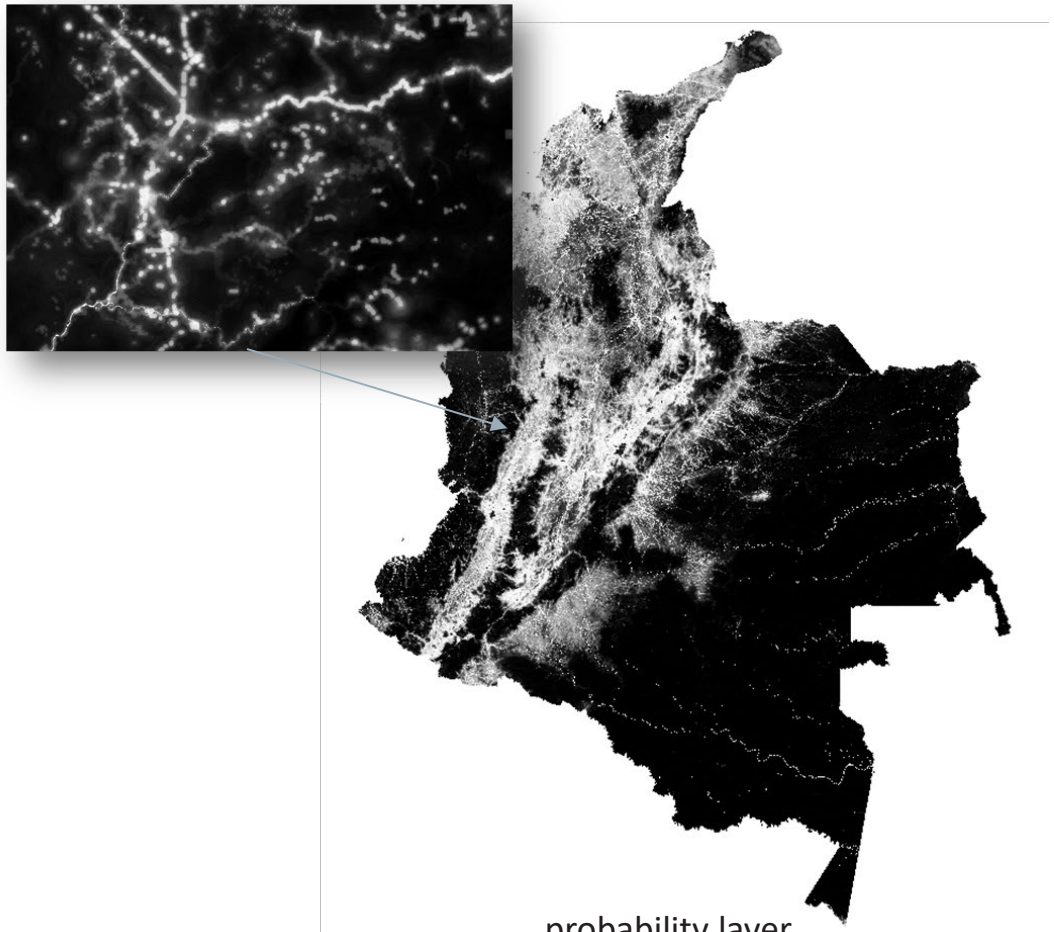
Global 2: Settlement - GHSL – 100m Height/Volume/Surface (residential / non residential)



Built-settlement growth modelling



Built-Settlement Growth Model (BSGM *) interpolation for years 2015-2030 was done. We have used Random Forests with environmental covariates to predict the probability of non-settlement-to-settlement transitions and autoregressive time-series models with population growth curves to predict subnational changes in built-settlement area between the time-specific observations of the urban feature datasets. Original methods was improved using World Settlement Footprint (WSF) 2015 historical development of build-up surface 1985-2015.

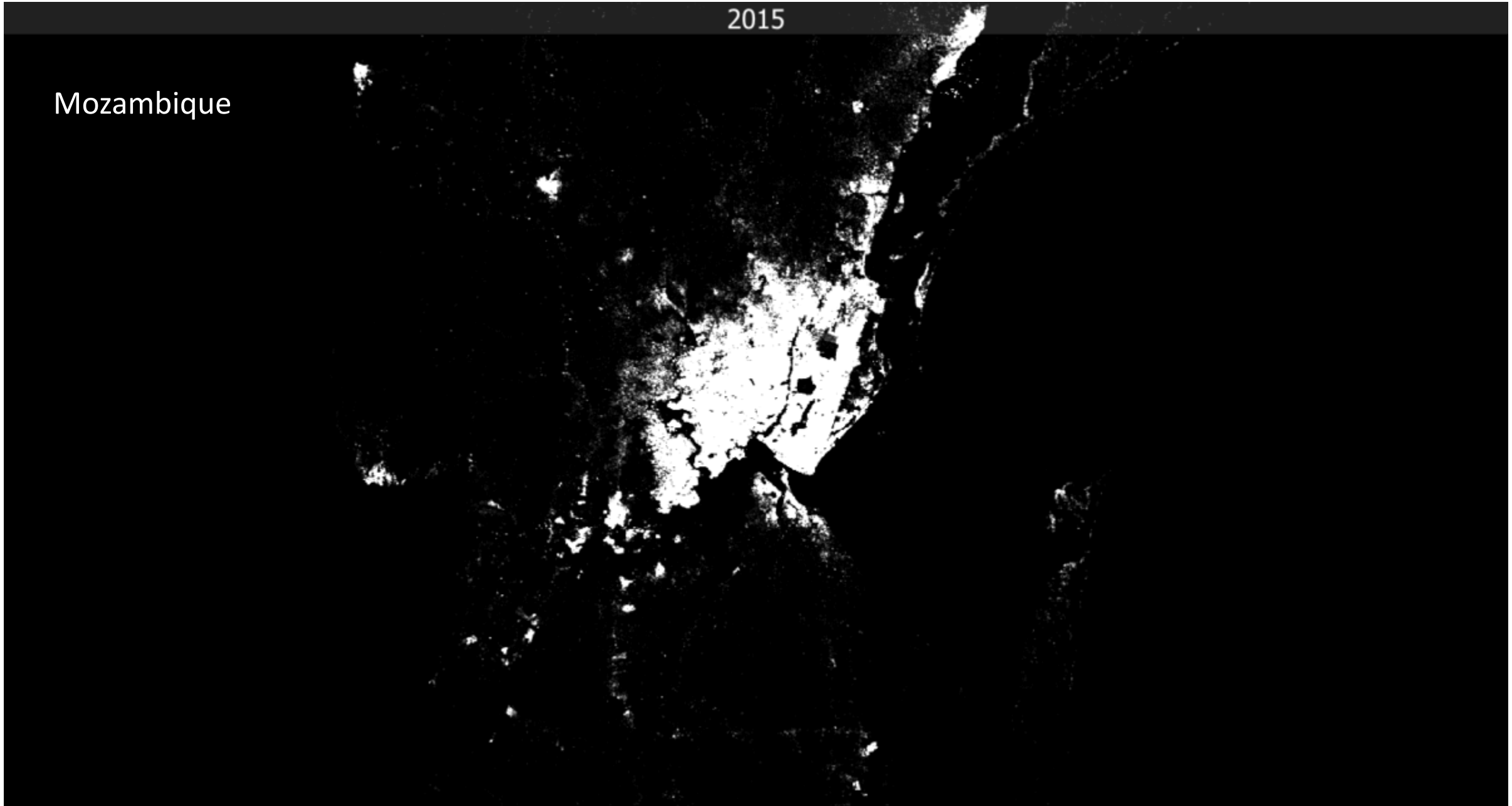


probability layer

Nieves, J.J., Bondarenko, M, Annually modelling built-settlements between remotely-sensed observations using relative changes in subnational populations and lights at night. 2020 Computers, Environment and Urban Systems, https://doi.org/10.1016/j.compenvurbsys.2019.101444.

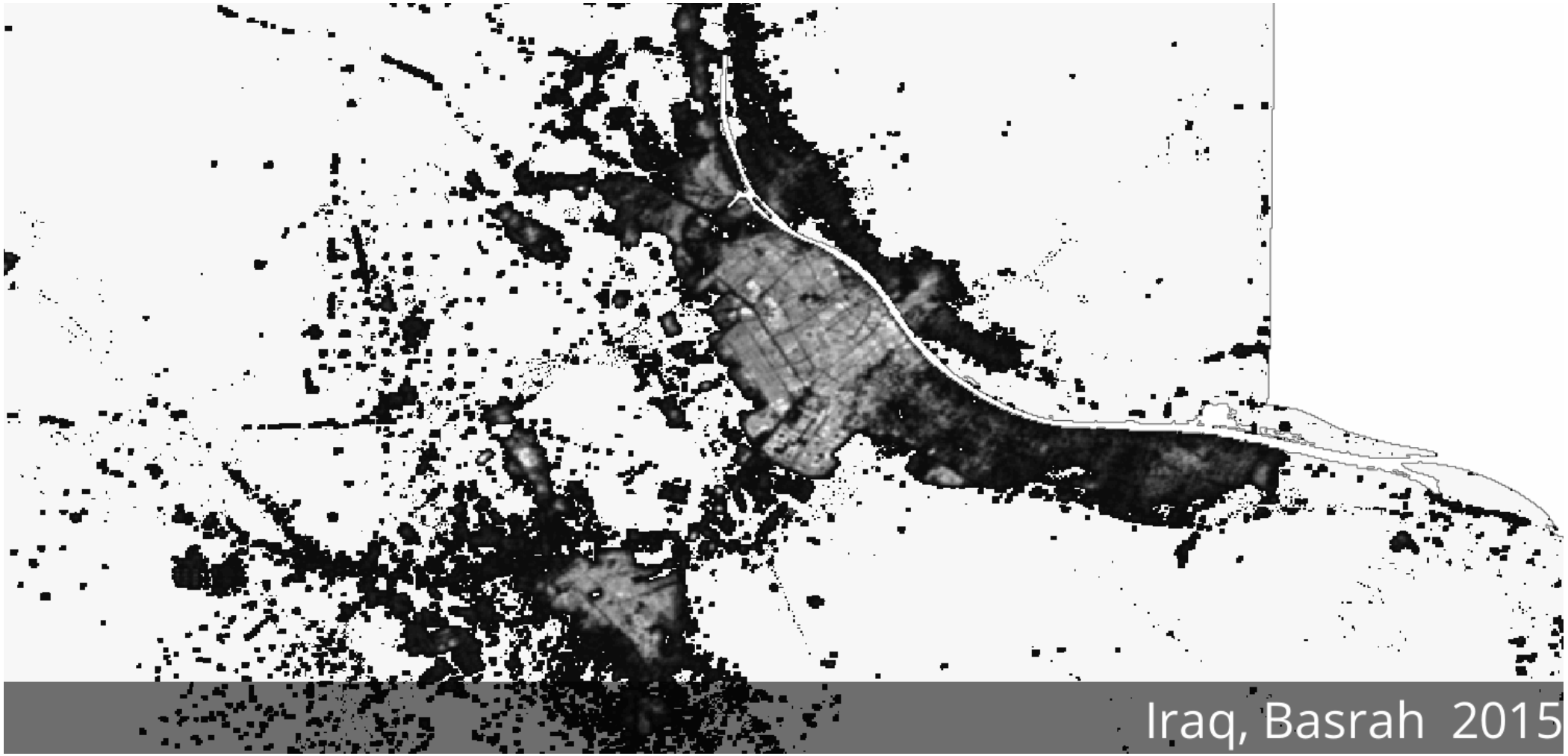
Global 2: Built-up Settlement

WorldPop



Global 2: Built-up Settlement

WorldPop



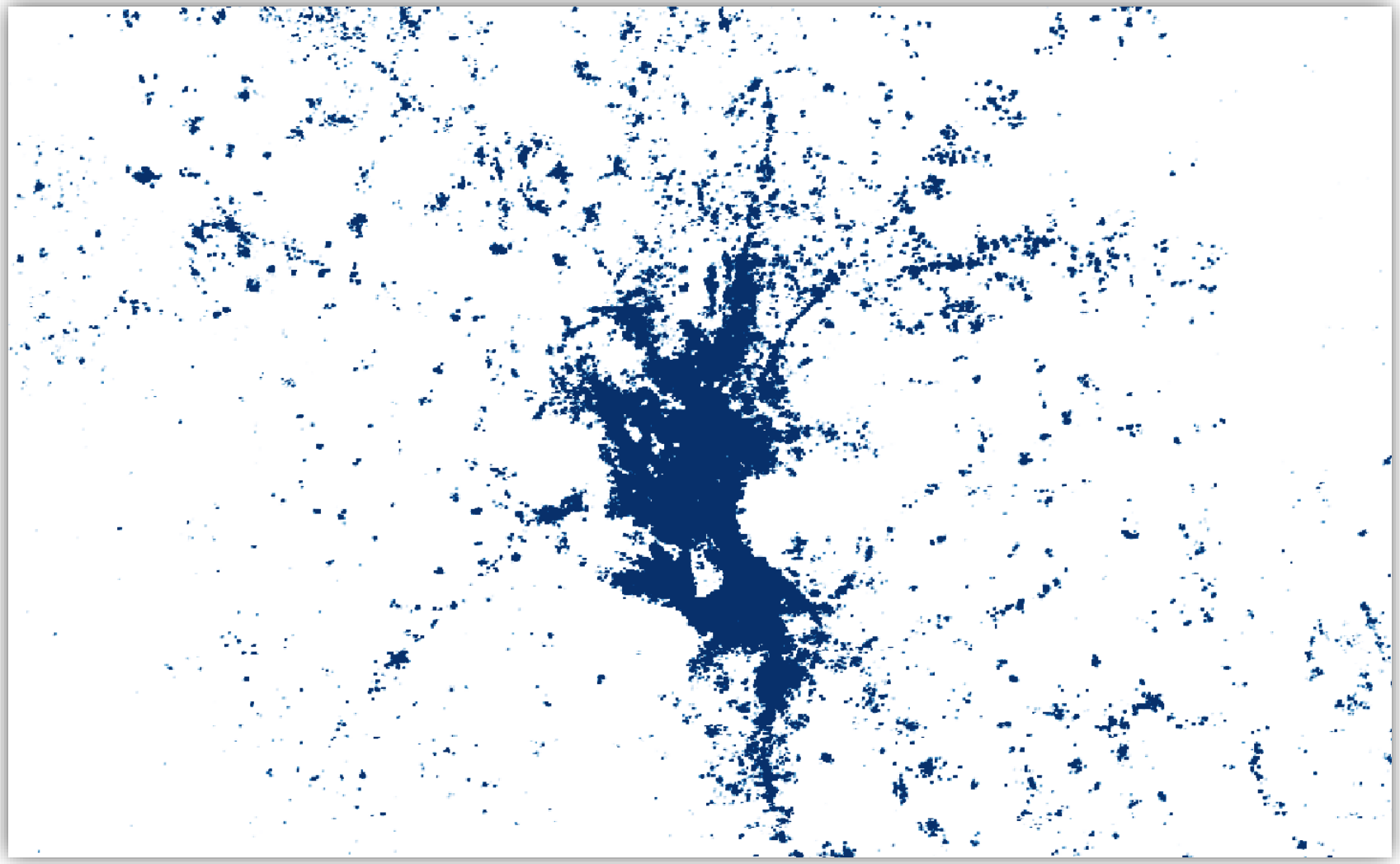
Global 2: Built-up Settlement

WorldPop

Microsoft and google building footprint

Global 2: Built-up Settlement

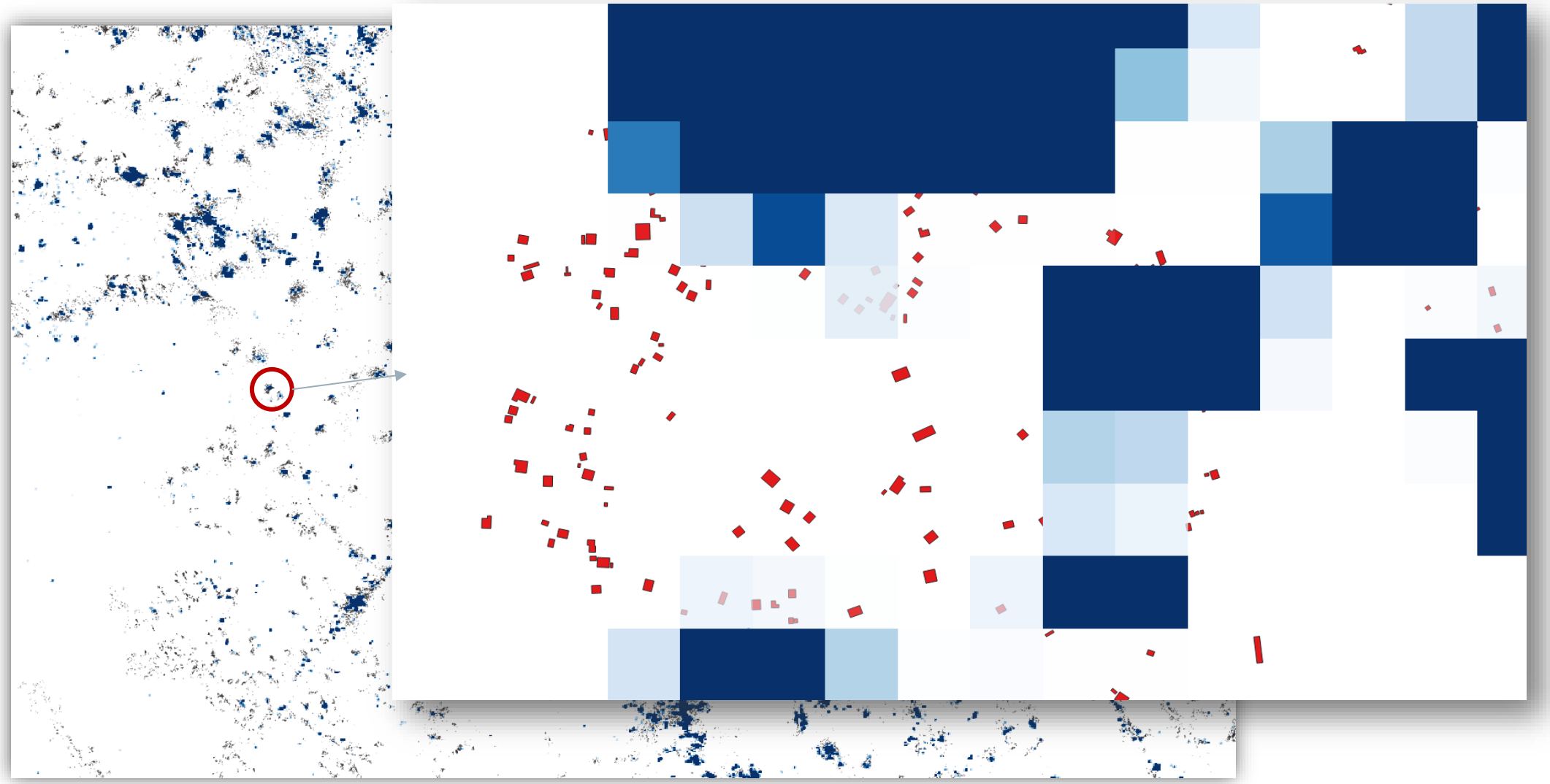
GHS built-up surface



Global 2: Built-up Settlement

WorldPop

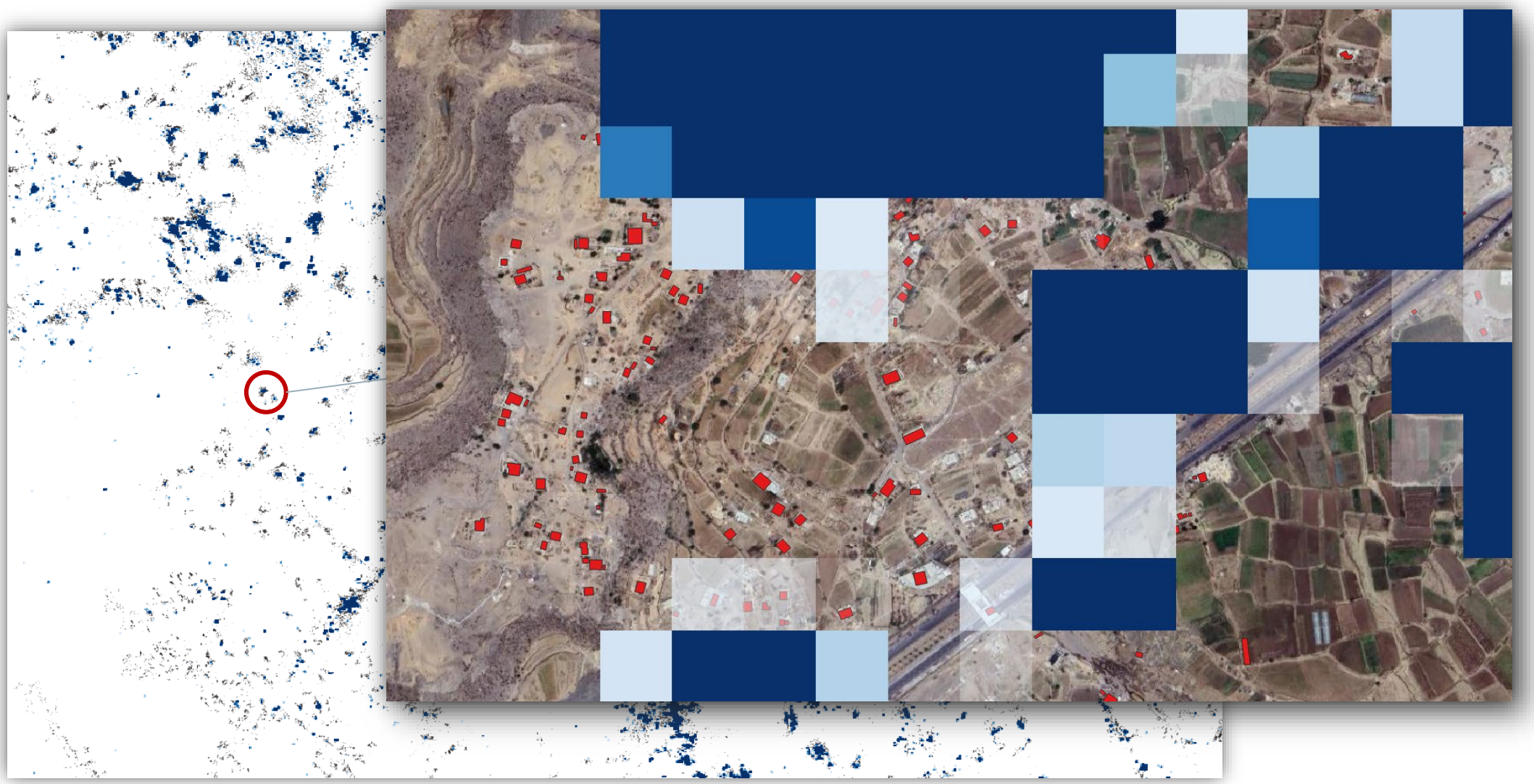
Microsoft building footprint and GHS built-up surface



Global 2: Built-up Settlement

WorldPop

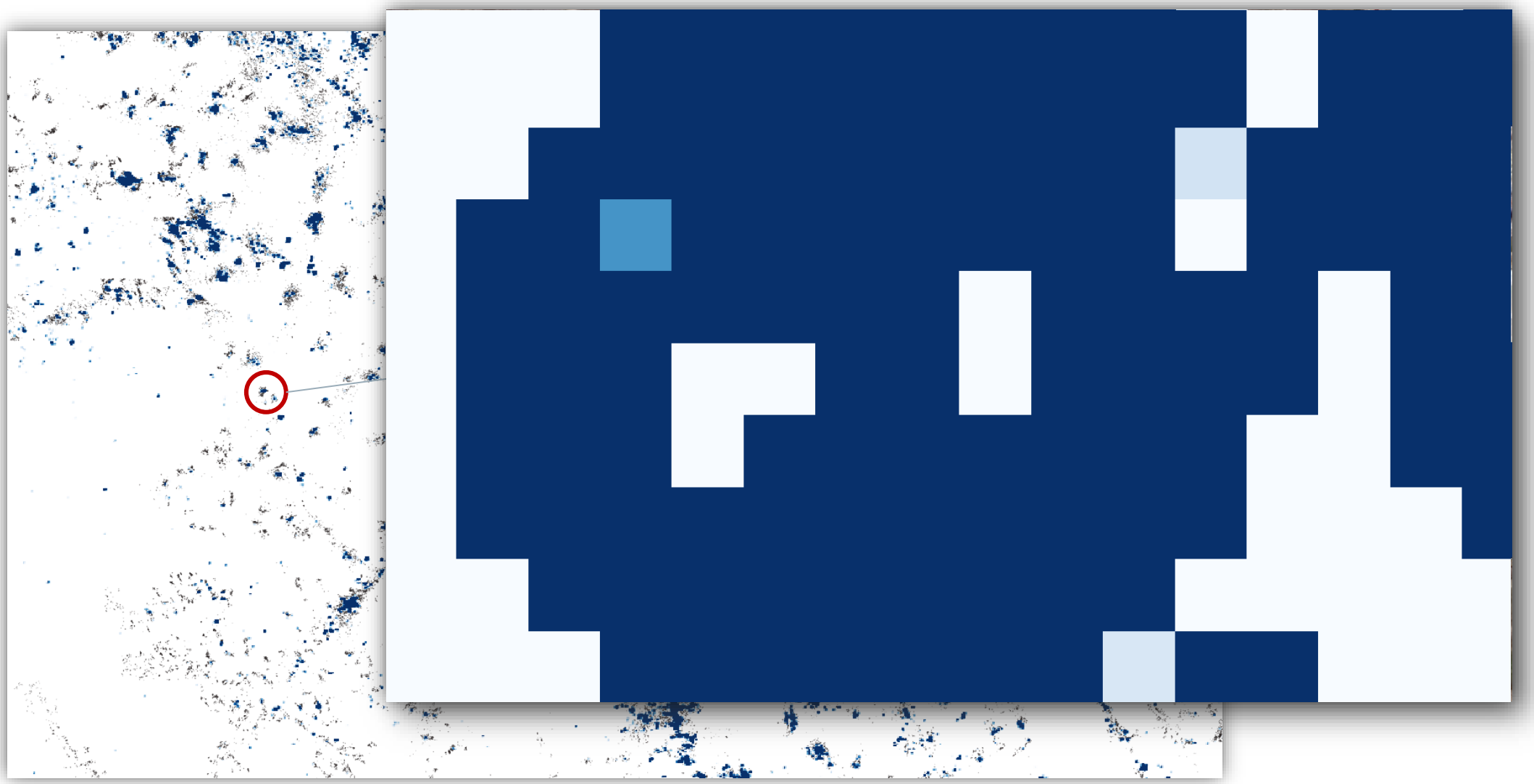
Microsoft building footprint and GHS built-up surface



Global 2: Built-up Settlement

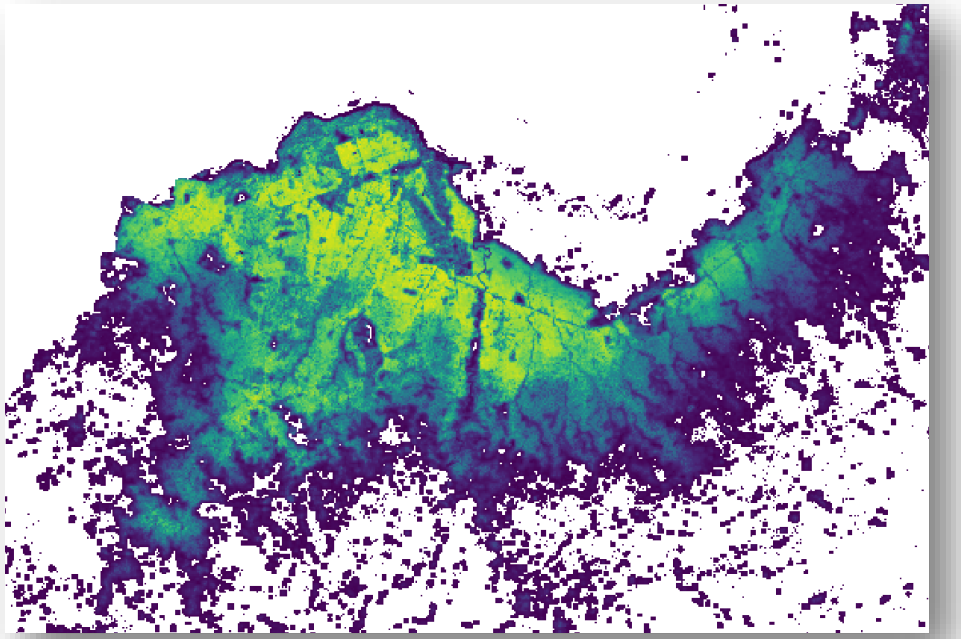
WorldPop

Microsoft building footprint and GHS built-up surface



Globla2 project - Non-residential settlement

Non residential settlement covariate = GHSL NRES + OSM (2024)

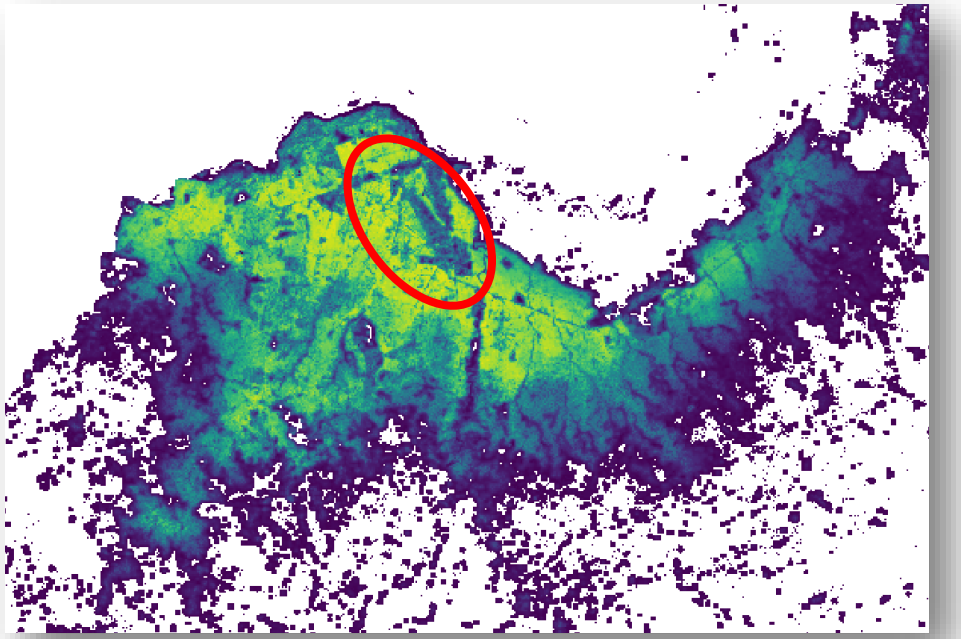


Democratic Republic of the Congo - Kinshasa

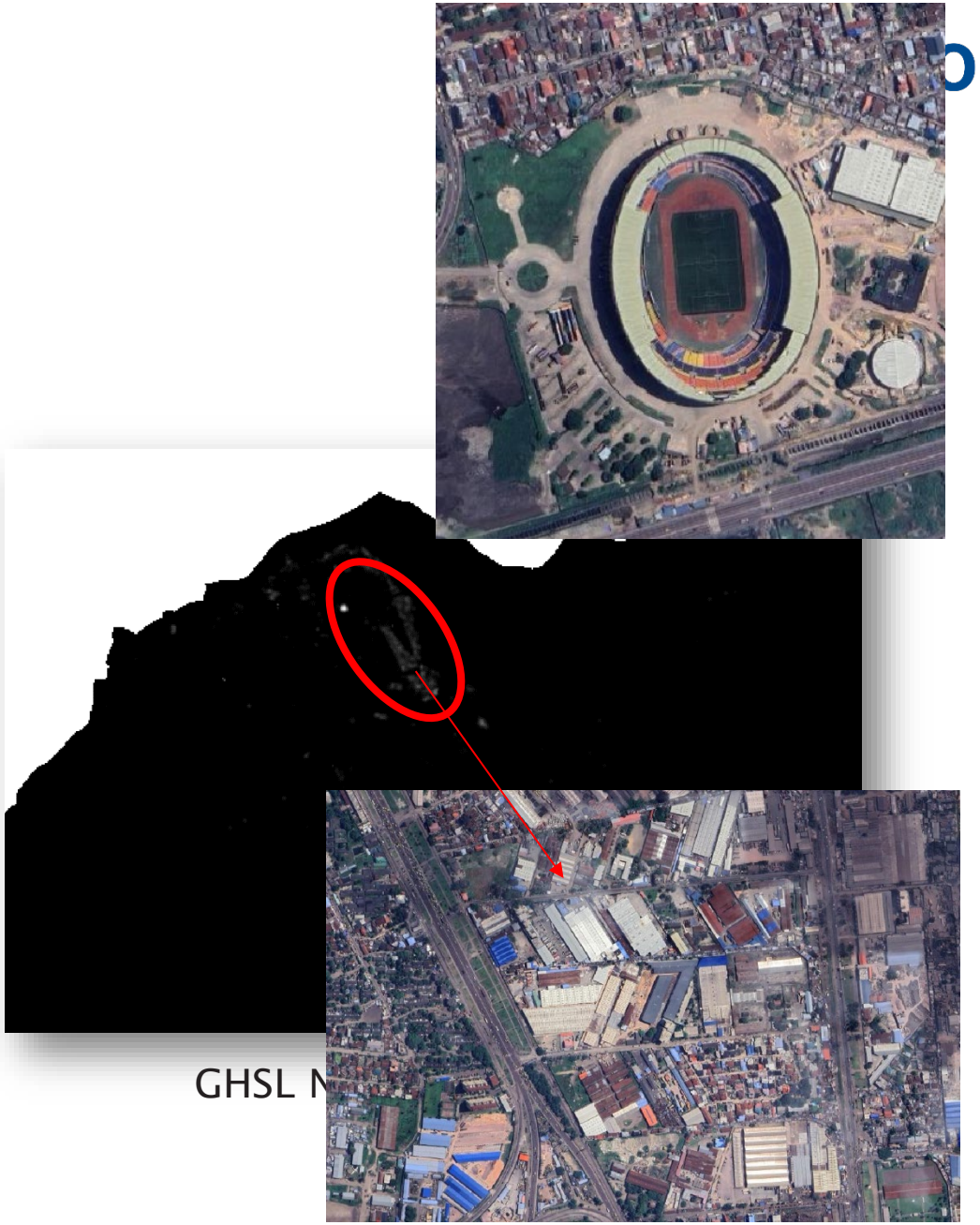
GHSL NRES + OSM (2024)

Globla2 project - Non-residential settlement

Non residential settlement covariate = GHSL NRES + OSM (2024)



Democratic Republic of the Congo - Kinshasa



GHSL N

Globla2 project - Non-residential settlement

Non residential settlement covariate = GHSL NRES + OSM (2024)

Colombia, Bogotá (grey - built-up surface , red- NRES)

Globla2 project - Non-residential settlement

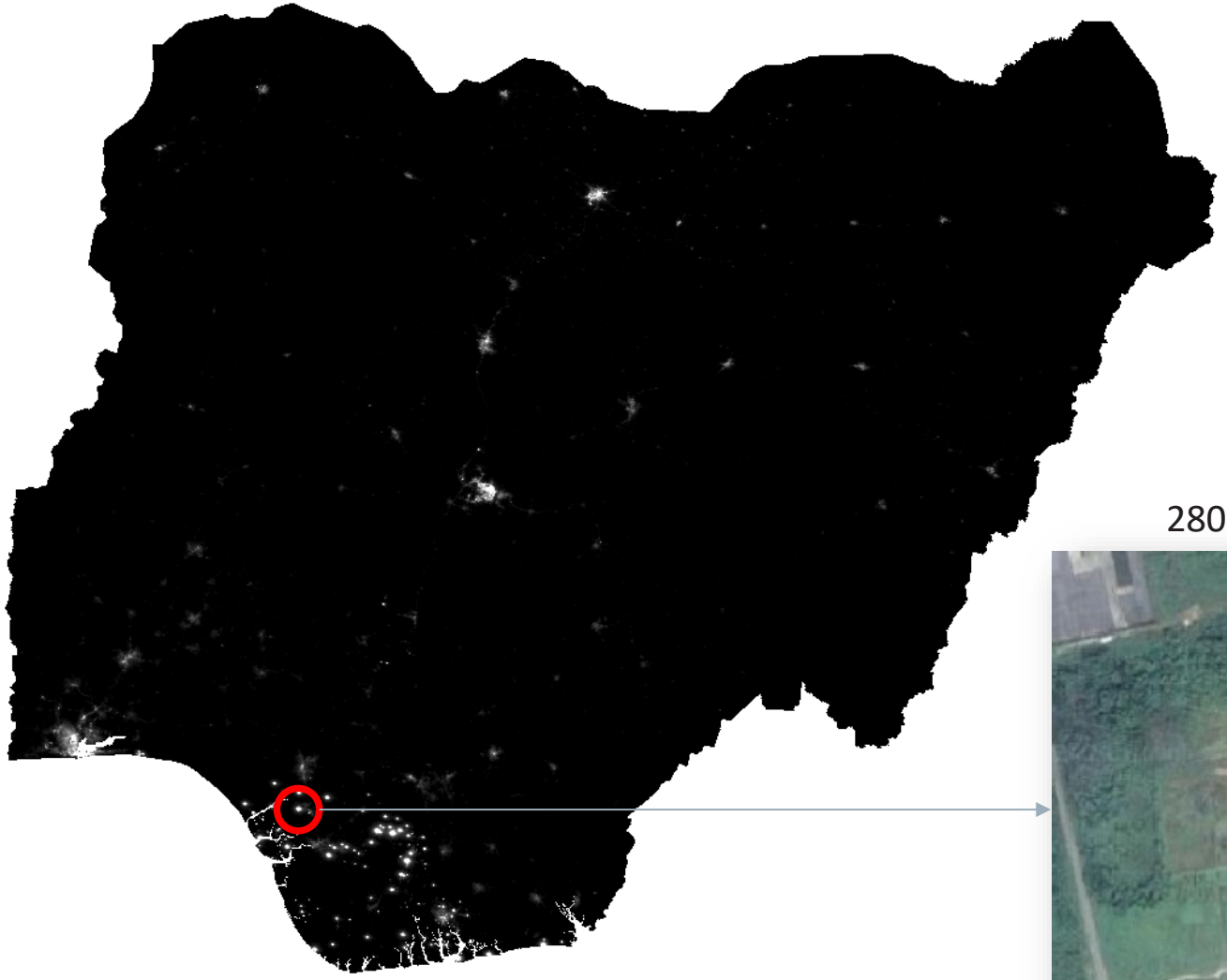
Non residential settlement covariate = GHSL NRES + OSM (2024)

Colombia, Bogotá (grey - built-up surface , red- NRES)

Global 2: Night-time light covariate

VIIRS 2023 area in Nigeria

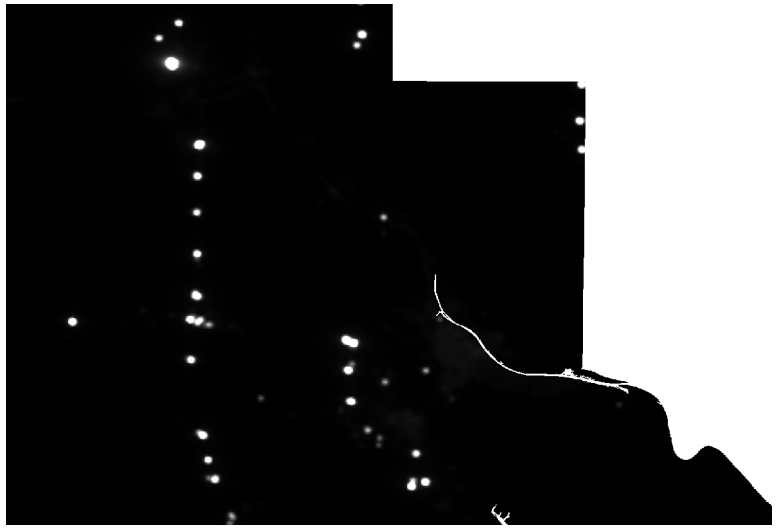
Global 2: Night-time light covariate



VIIRS 2023 area in Nigeria

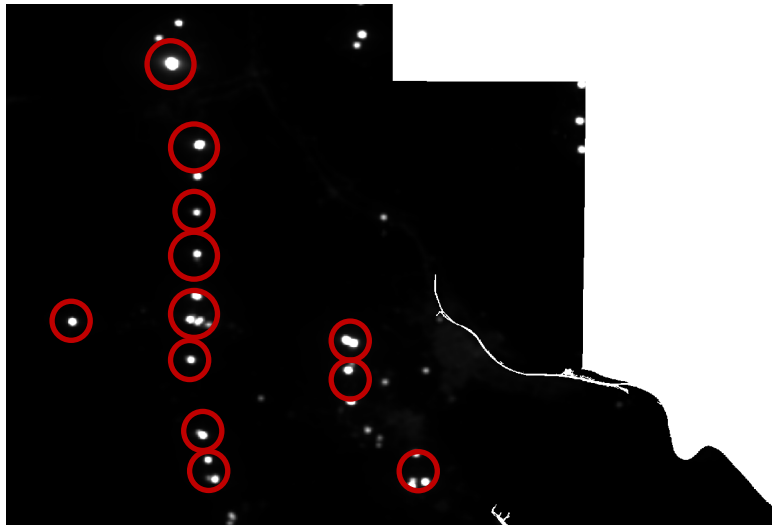
2800 nW/cm^2/sr

Global 2: Night-time light covariate



VIIRS 2023 area in Iraq (Basrah)

Global 2: Night-time light covariate



VIIRS 2023 area in Iraq (Basrah)

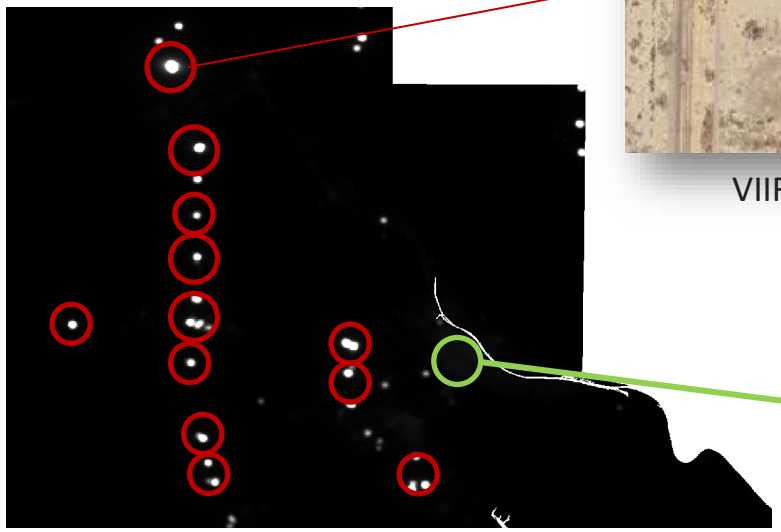
Global 2: Night-time light covariate

VIIRS ~ 68,000 nm

VIIRS 2023 area in Iraq (Basrah)

Global 2: Night-time light covariate

VIIRS ~ 68,000 nm

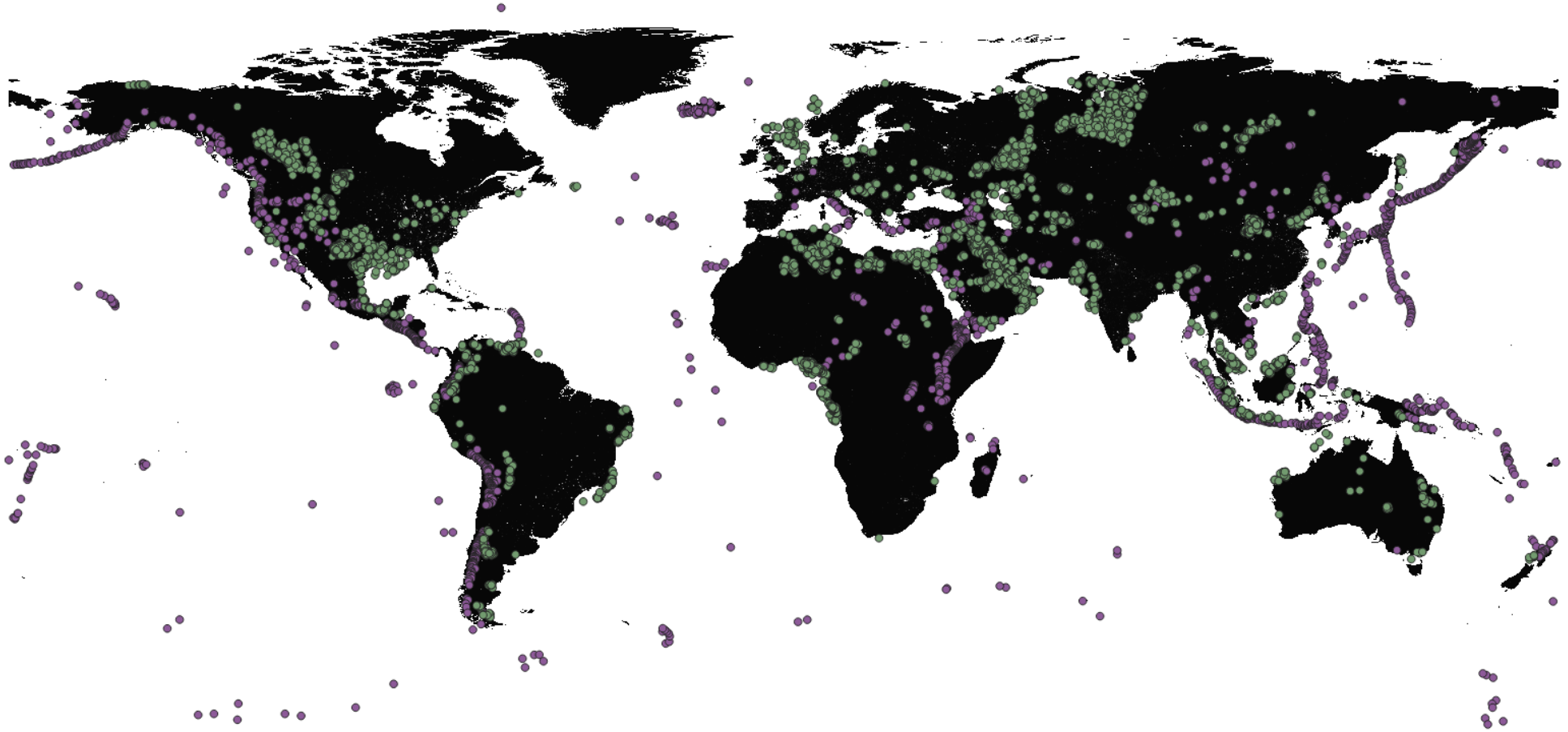


VIIRS 2023 area in Iraq (Basrah)

VIIRS ~ 150 nm

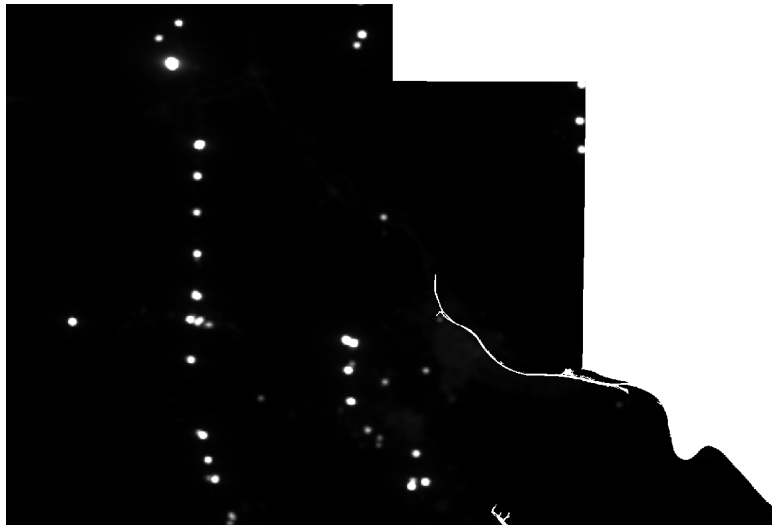
Global 2: Night-time light covariate

WorldPop



We used “Global Gas Flaring Data Database” from WorldBank and location of volcanoes “Global GIS : volcanoes of the world”. We used the outlier removal algorithm developed for DMSP-OLS night-time lights (Baugh et al. 2010).

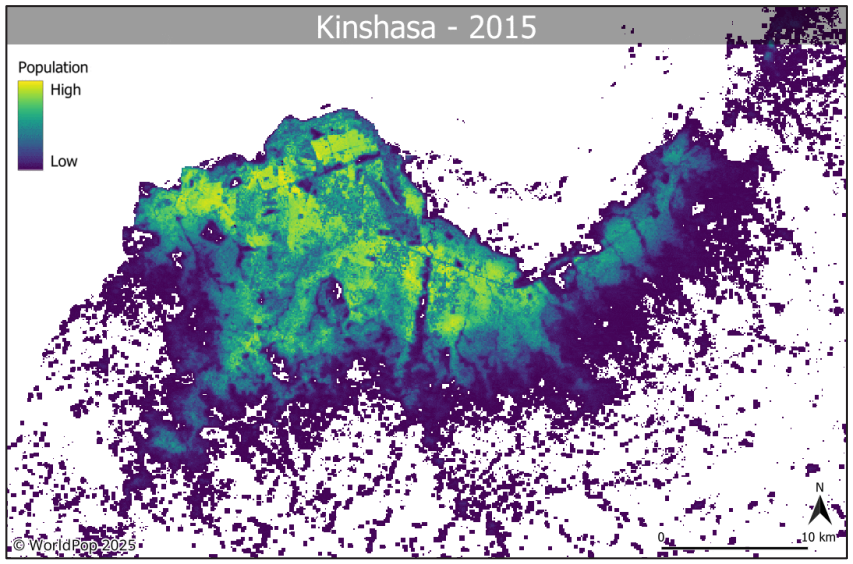
Global 2: Night-time light covariate

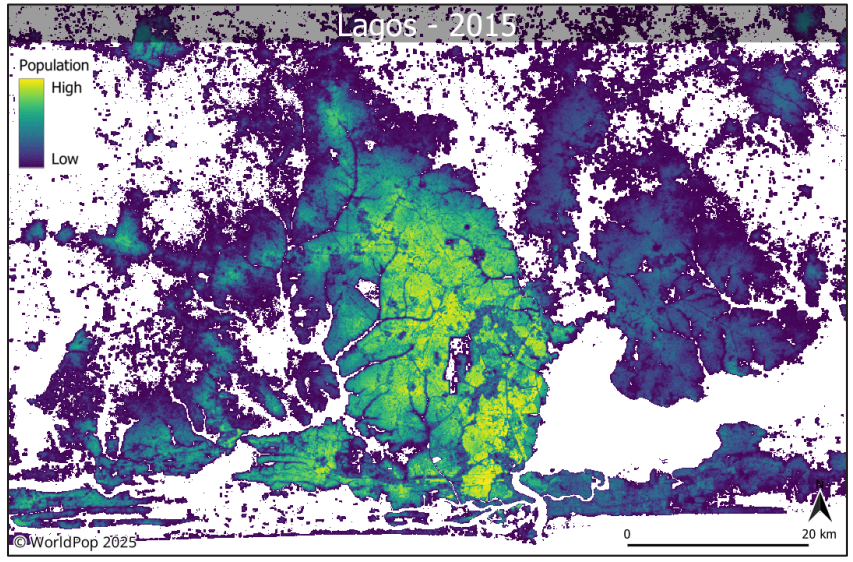


VIIRS 2023 area in Iraq (Basrah)

Filtered VIIRS 2023 area in Iraq (Basrah)

Improving method to filter night-time light data from flares and volcanoes and other abnormal reflections (e.q solar panels, greenhouses).

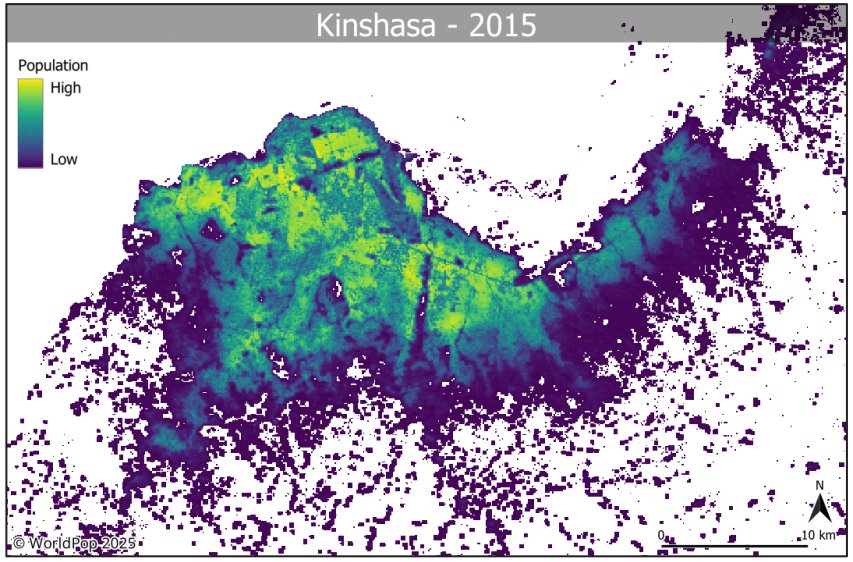


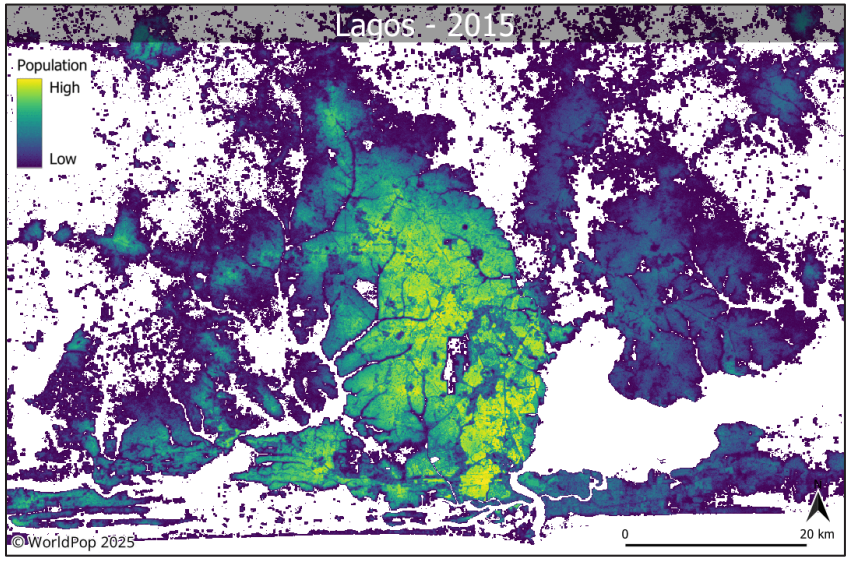


WorldPop Global 2015–2030

R2025A version

- Population Counts at 100m 2015-2030 (individual countries)
- Population Counts at 1km 2015-2030 (individual countries and global mosaicked)
- Estimates of total number of people per grid square at 100m and 1km broken down by gender and age groupings (including 0-1 and by 5-year up to 90+)
- Estimates of total number of people under the age of 18 years old and broken down by male and female.





WorldPop Global 2015–2030

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- Population Counts at 100m 2015-2030 (individual countries)
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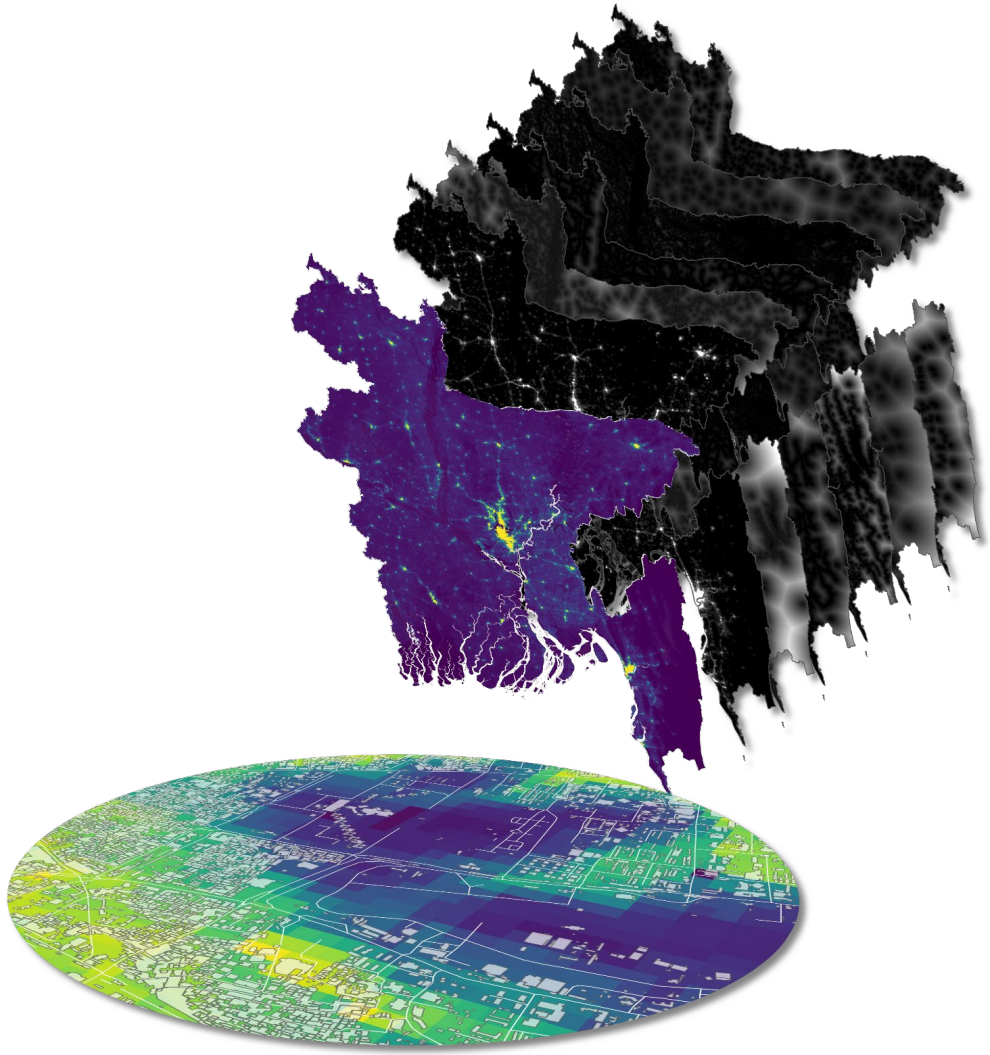
- Estimates of total number of people under the age of 18 years old and broken down by male and female.
- Population Density (coming soon)

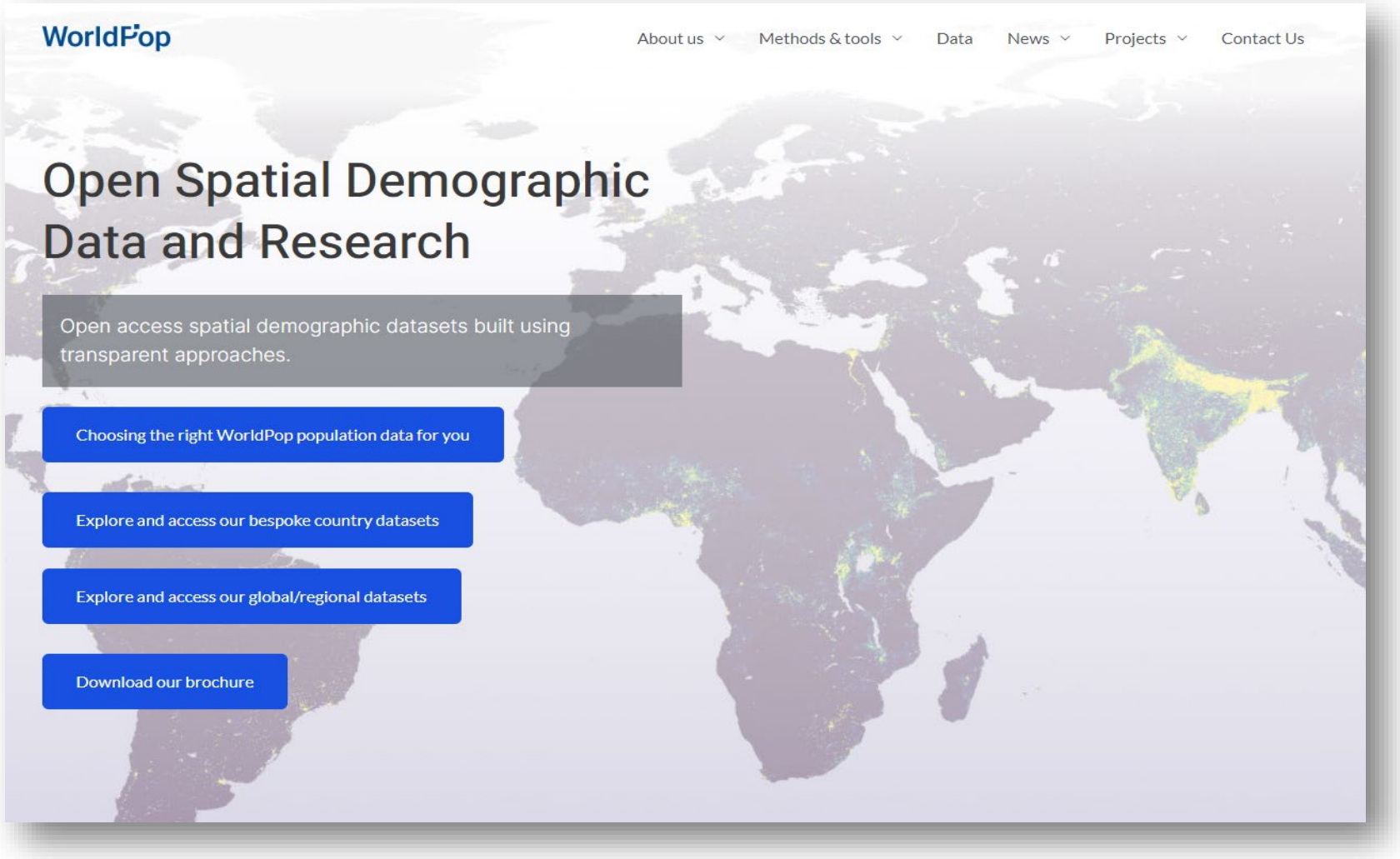
WorldPop

Hands-on discovery

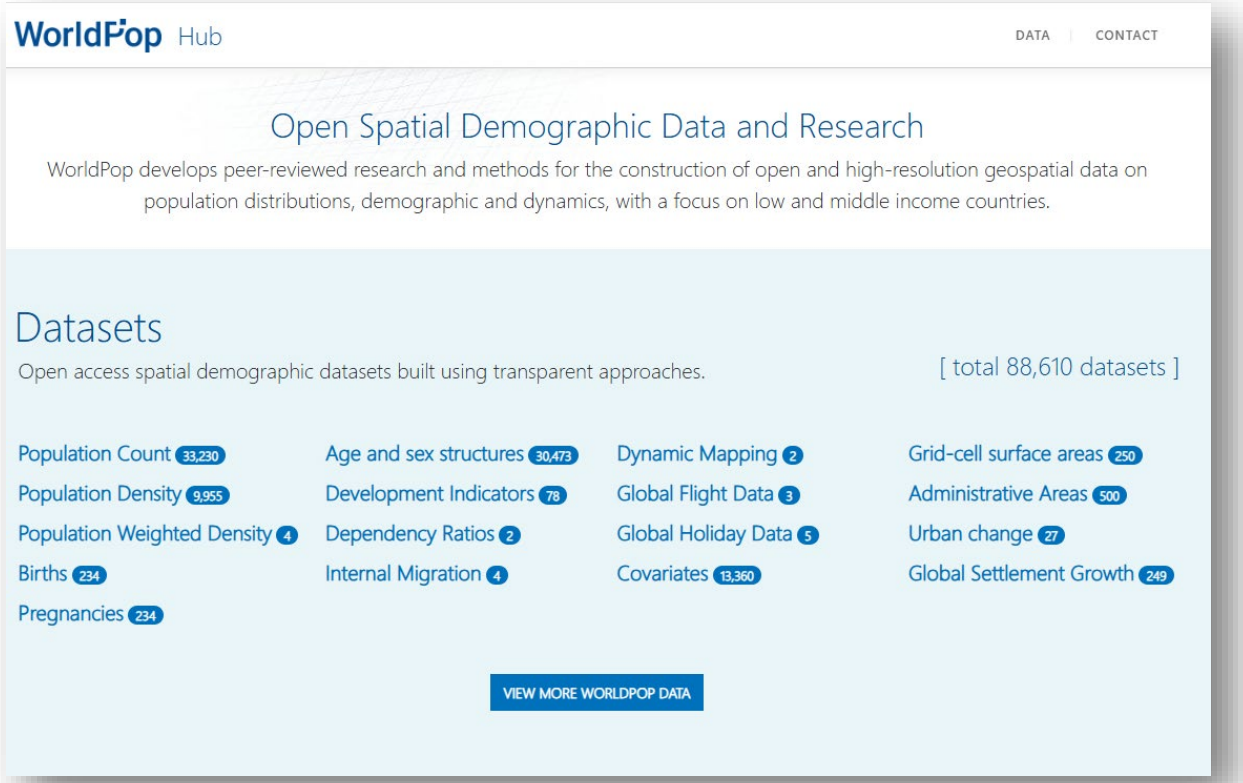
Tools and technical deep-dive



WorldPop website https://www.worldpop.org

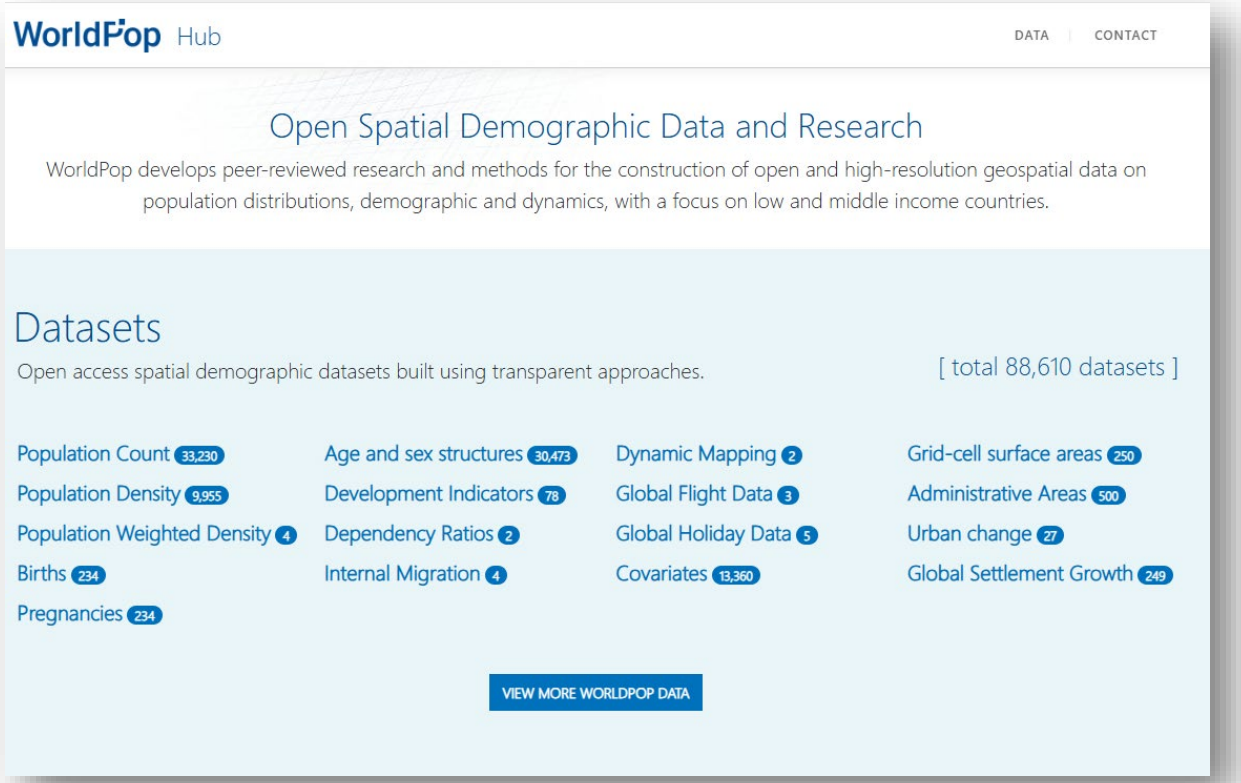


WorldPop Data Hub

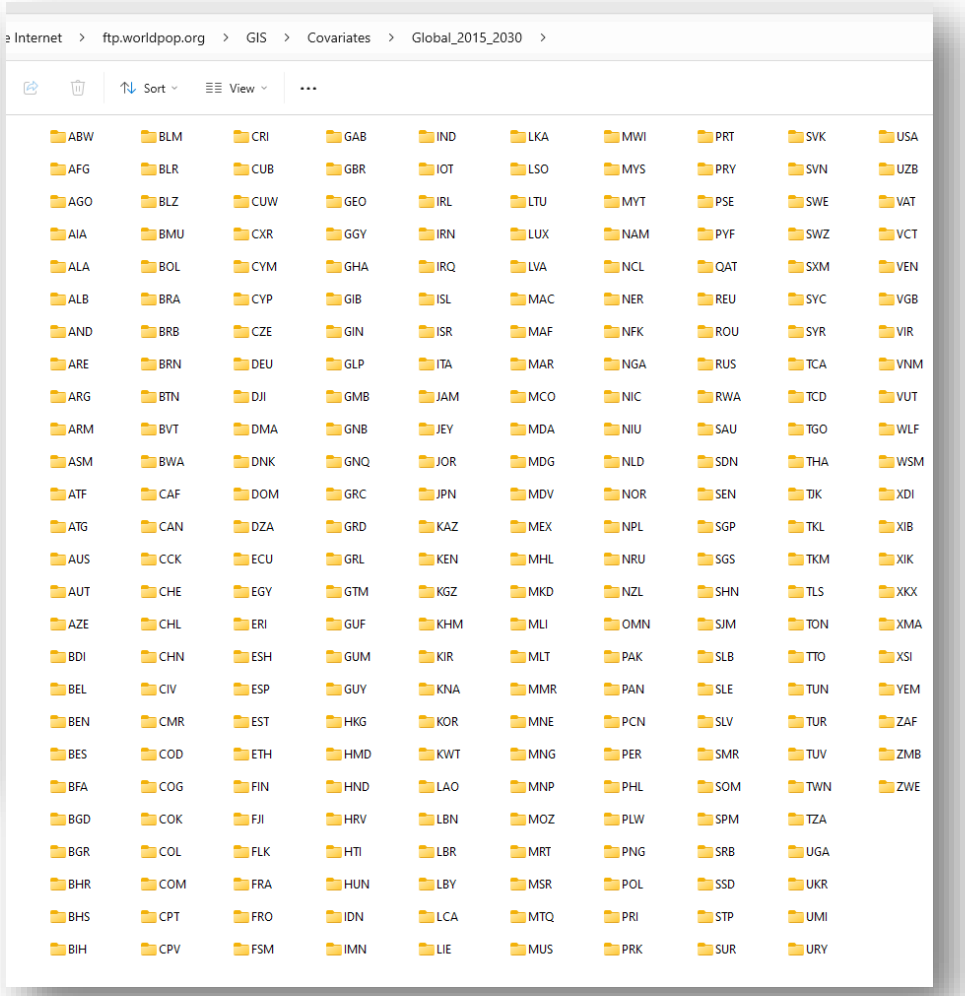


https://worldpop.org

WorldPop Data Hub

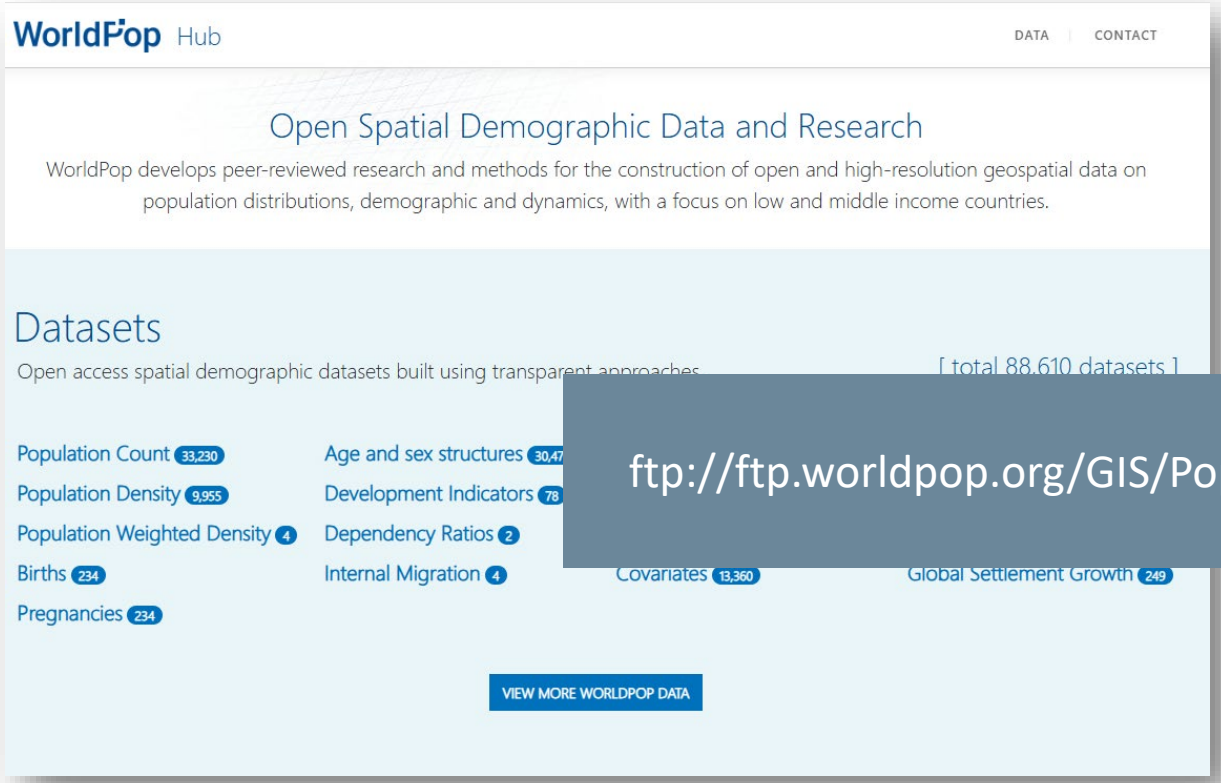


https://worldpop.org

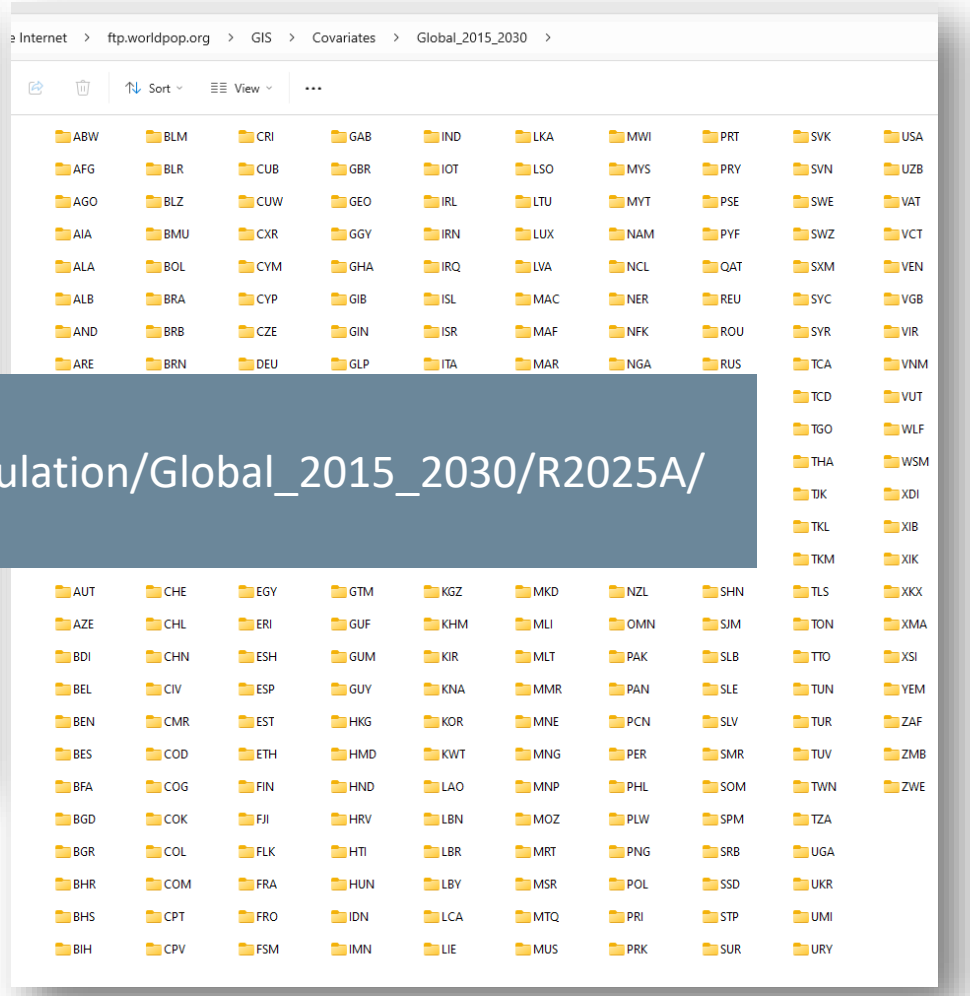


ftp://ftp.worldpop.org

WorldPop Data Hub



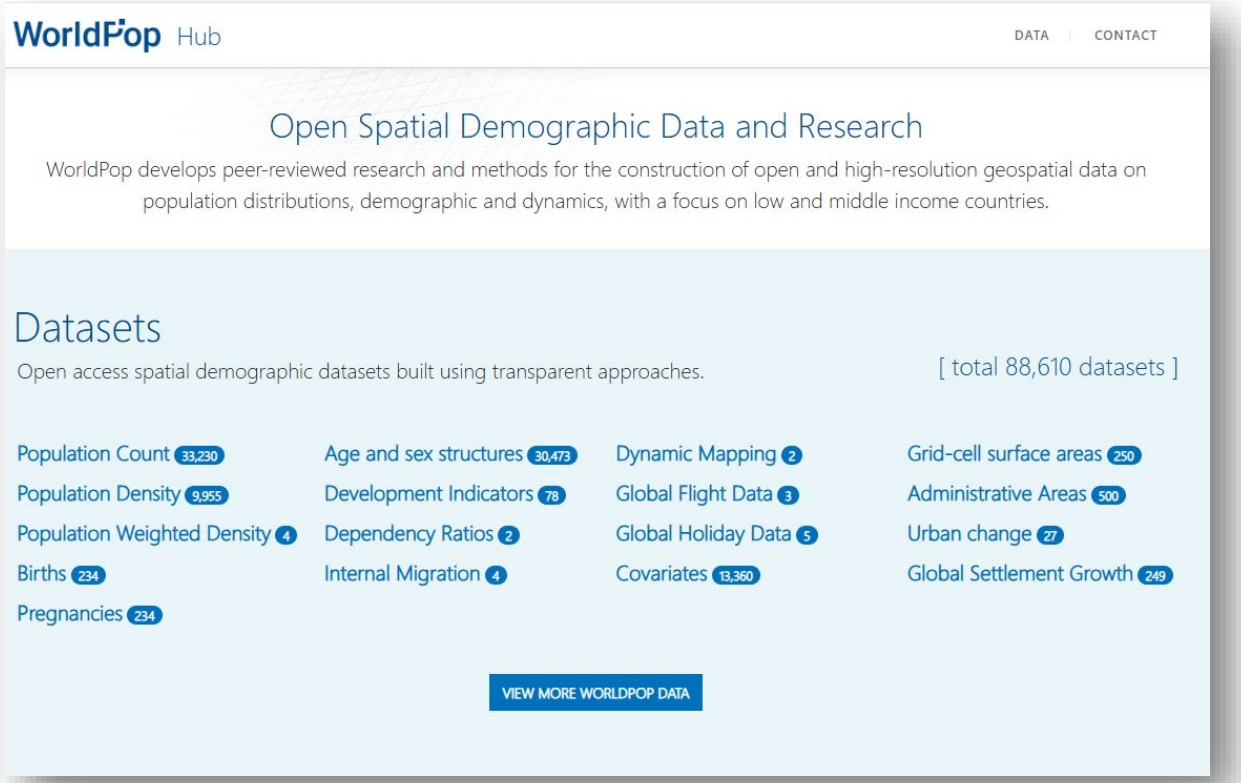
https://worldpop.org



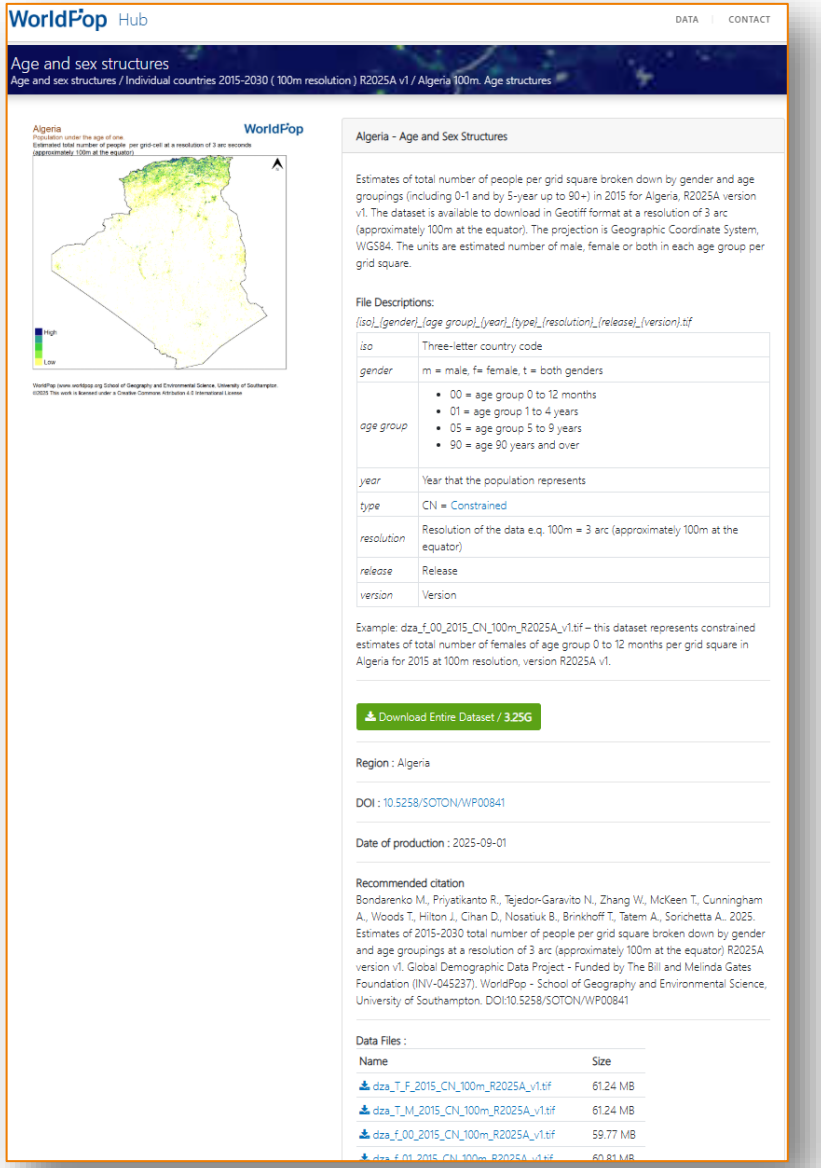
ftp://ftp.worldpop.org/GIS/Population/Global_2015_2030/R2025A/

ftp://ftp.worldpop.org

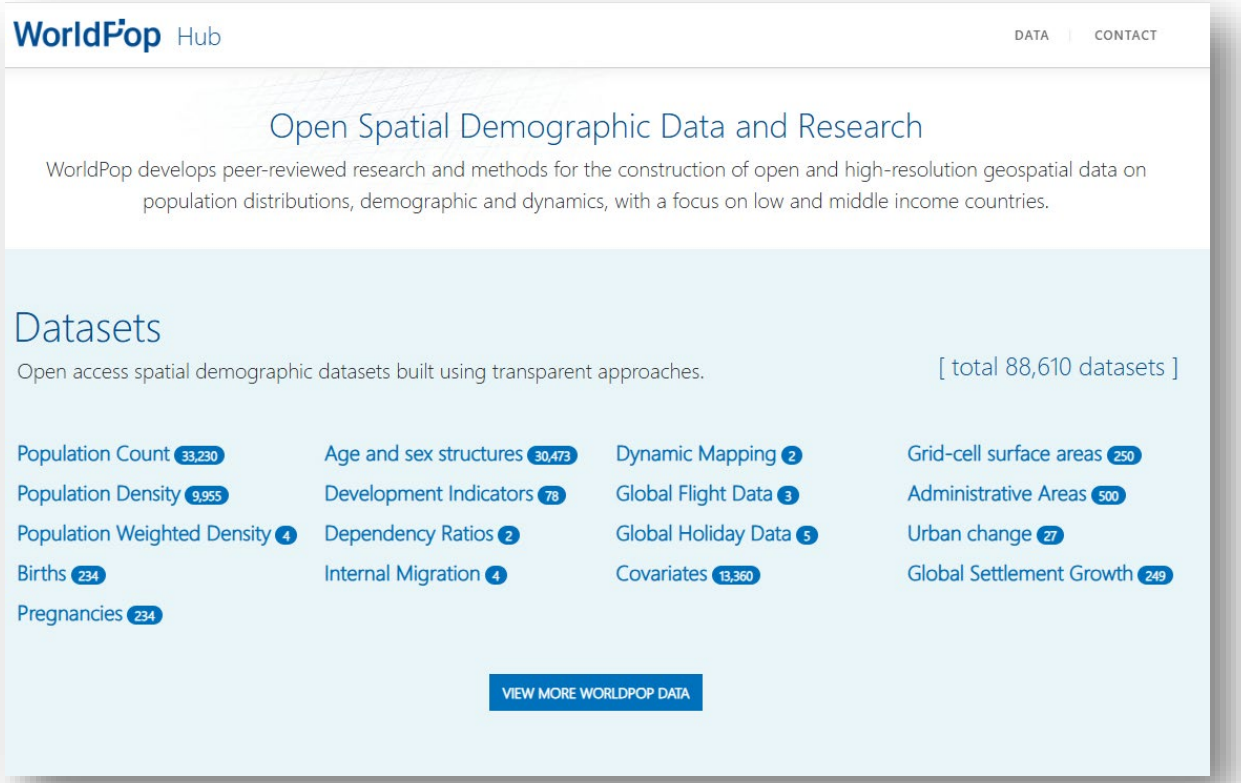
WorldPop Data Hub



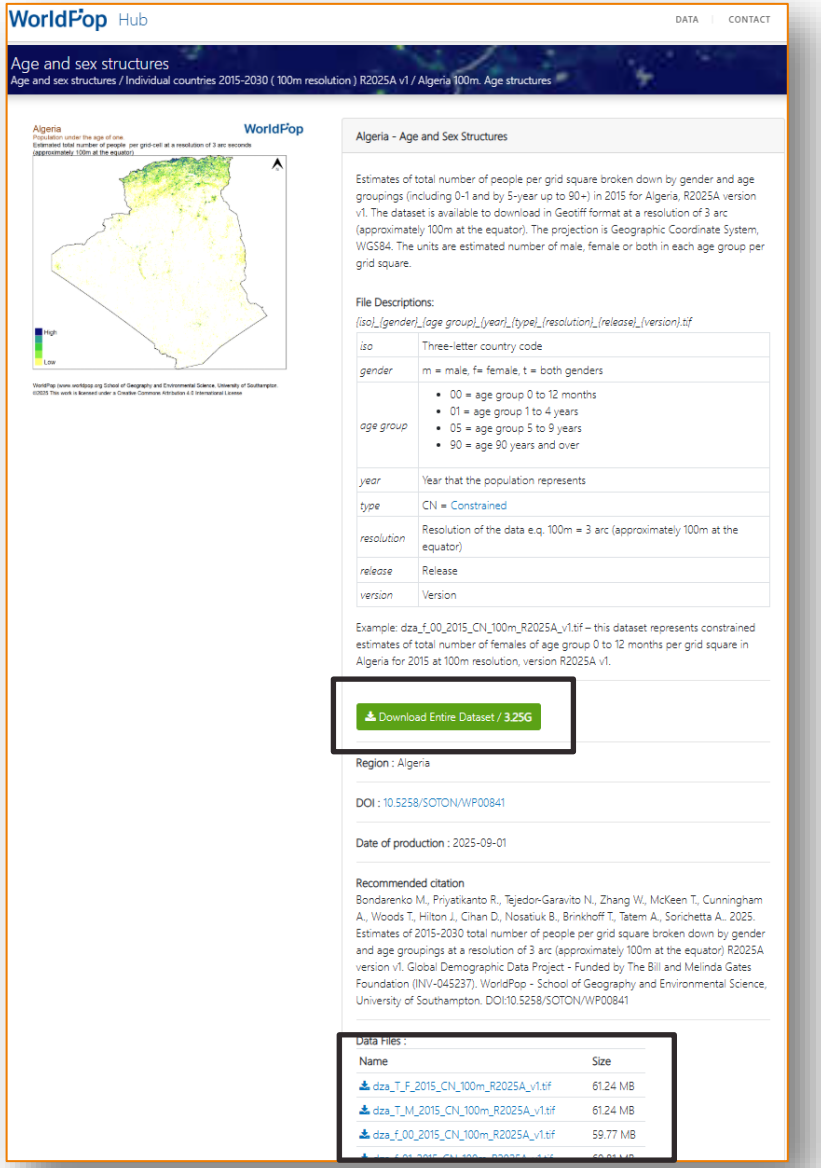
https://worldpop.org



WorldPop Data Hub



https://worldpop.org



WorldPop SpatioTemporal Asset Catalogs (STAC)

The STAC specification is a **common language to describe geospatial information**, so it can more easily be worked with, indexed, and discovered https://stacspec.org/en/about/datasets/

STAC was created for

- Simplified data discovery and access
- Standardized metadata structure
- Enhanced interoperability
- Improved data sharing capabilities
- Better collaboration opportunities

https://stac.worldpop.org

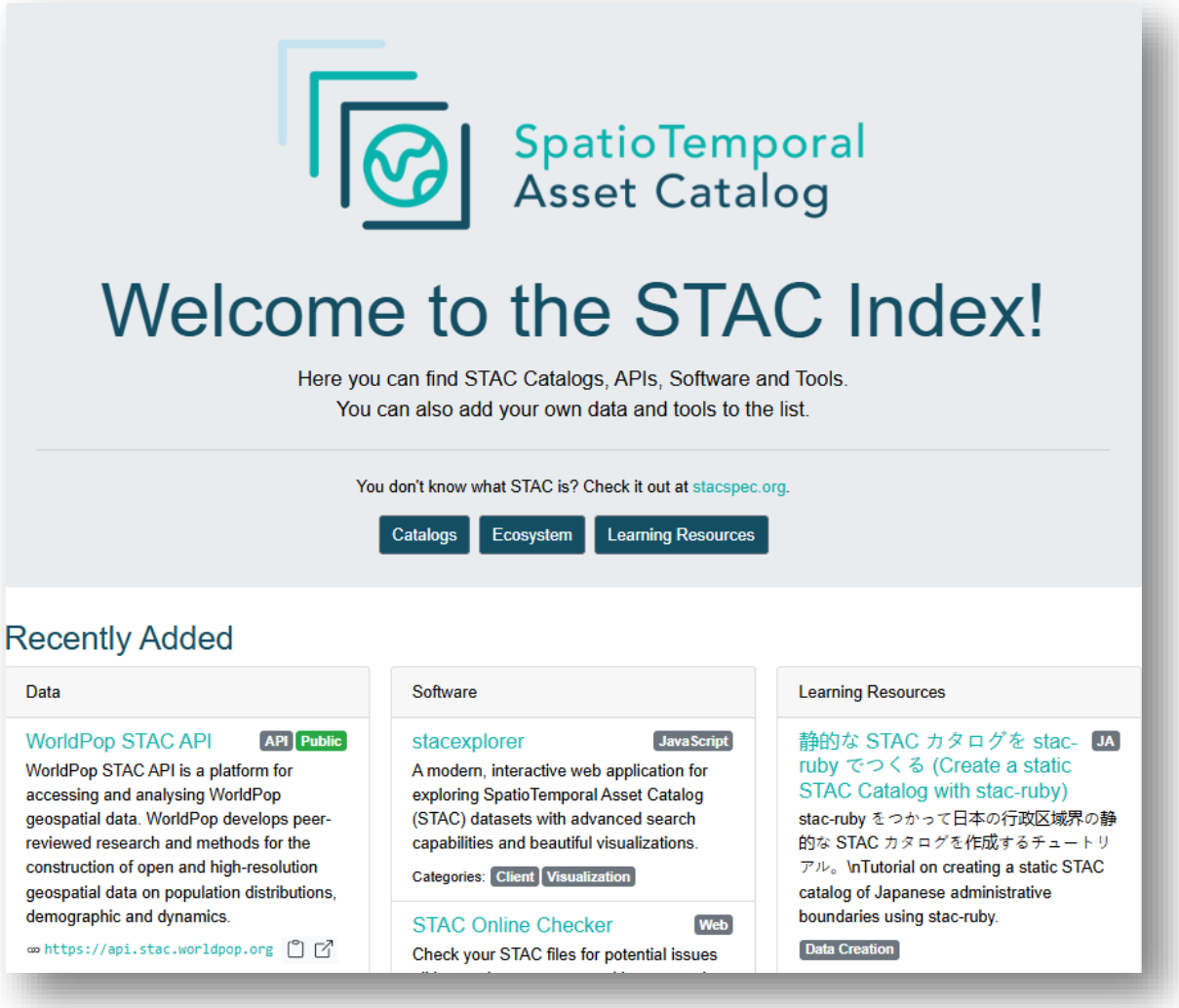
https://api.stac.worldpop.org

WorldPop SpatioTemporal Asset Catalogs (STAC)

- WorldPop STAC API has been listed on STAC Index

https://stac.worldpop.org

https://api.stac.worldpop.org



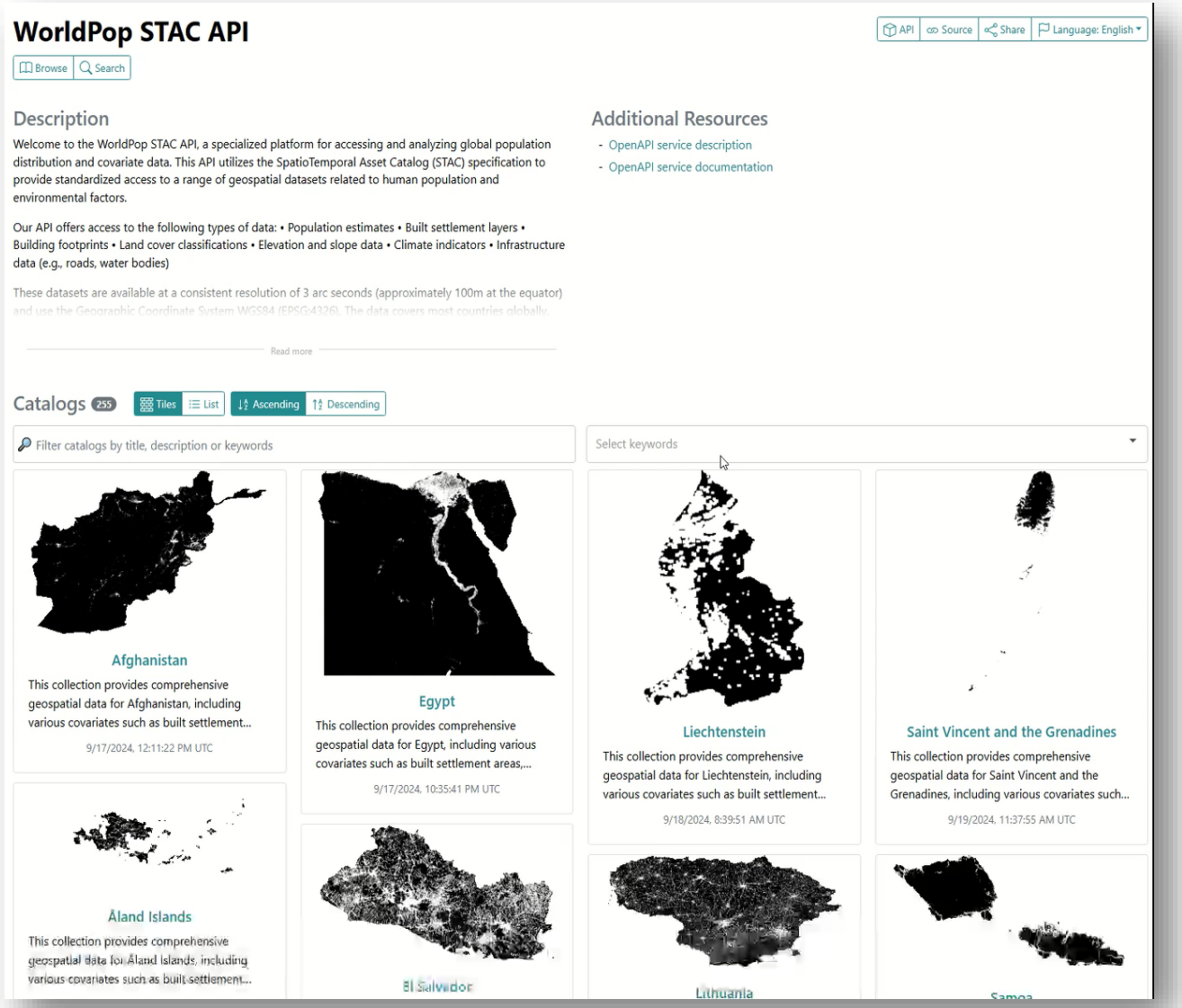
https://stacindex.org/

WorldPop SpatioTemporal Asset Catalogs (STAC)

STAC Browser Interface

- Intuitive data exploration
- Visual preview capabilities
- Advanced filtering options
- Direct data access

https://stac.worldpop.org



WorldPop SpatioTemporal Asset Catalogs (STAC)

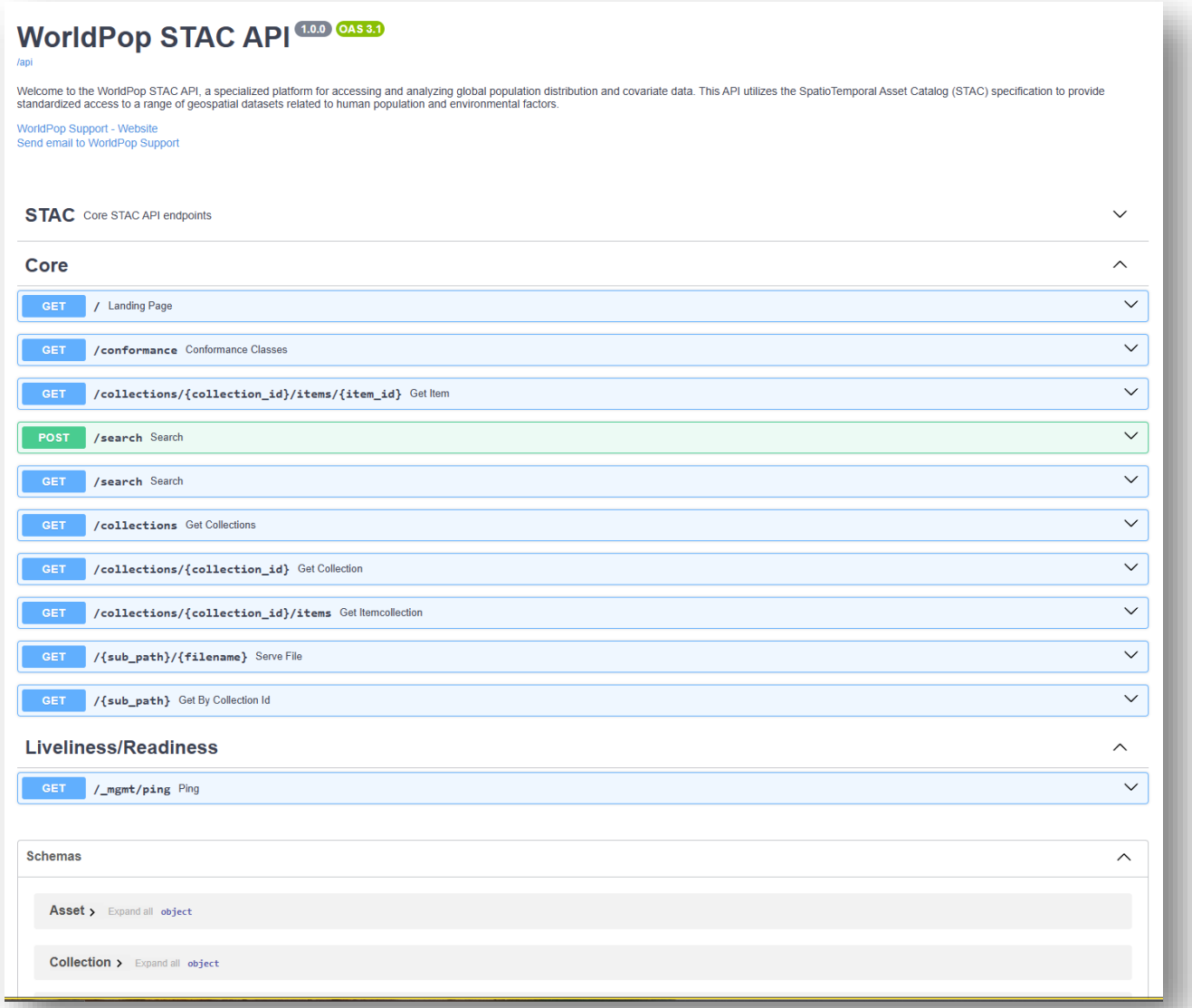
Swagger Integration

Interactive API documentation

Real-time testing capability

Clear endpoint descriptions

Easy integration for developers



WorldPop SpatioTemporal Asset Catalogs (STAC)

WorldPop

Using STAC

- STAC & Python
- STAC & QGIS
- STAC & R
- STAC & CLI

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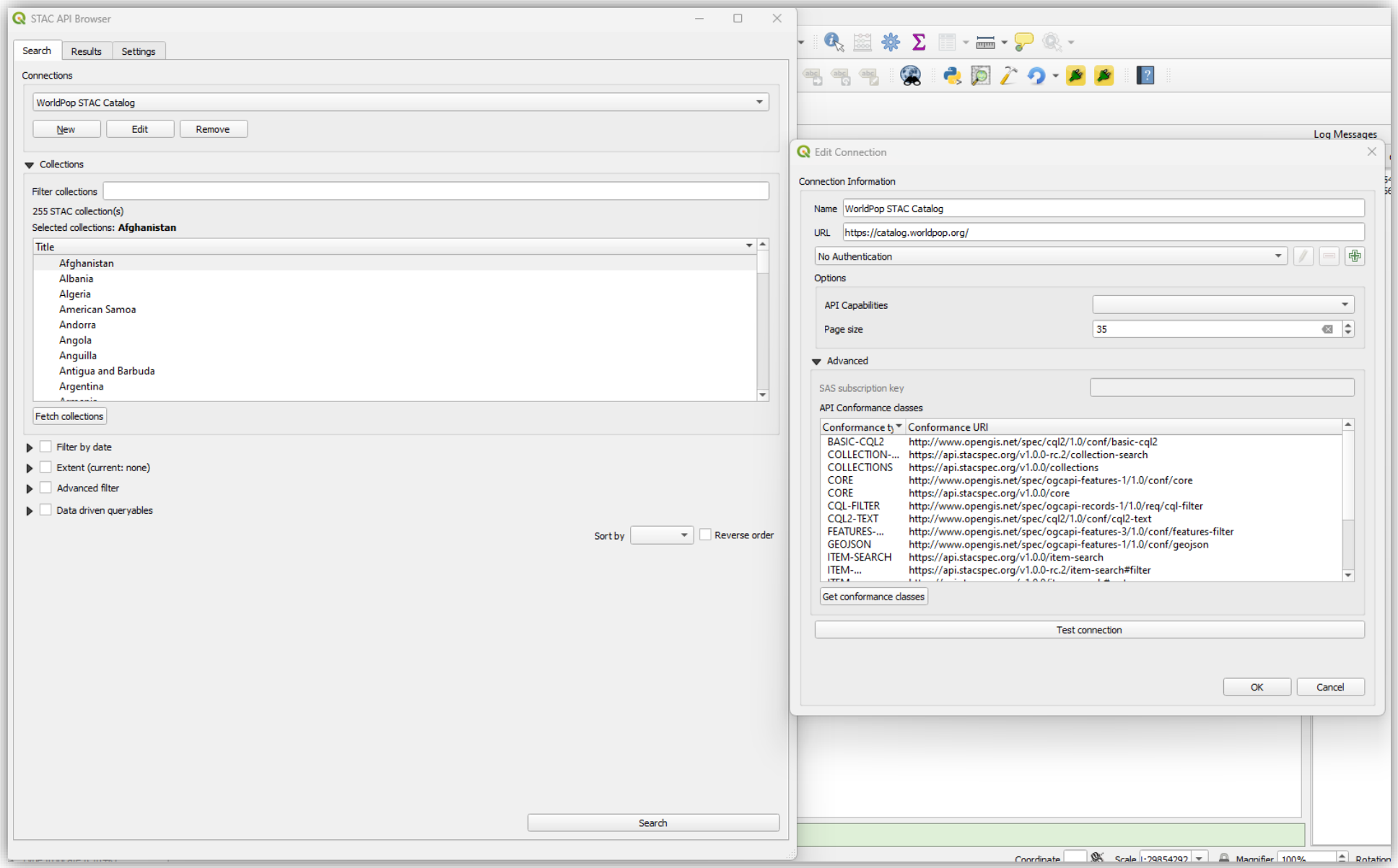
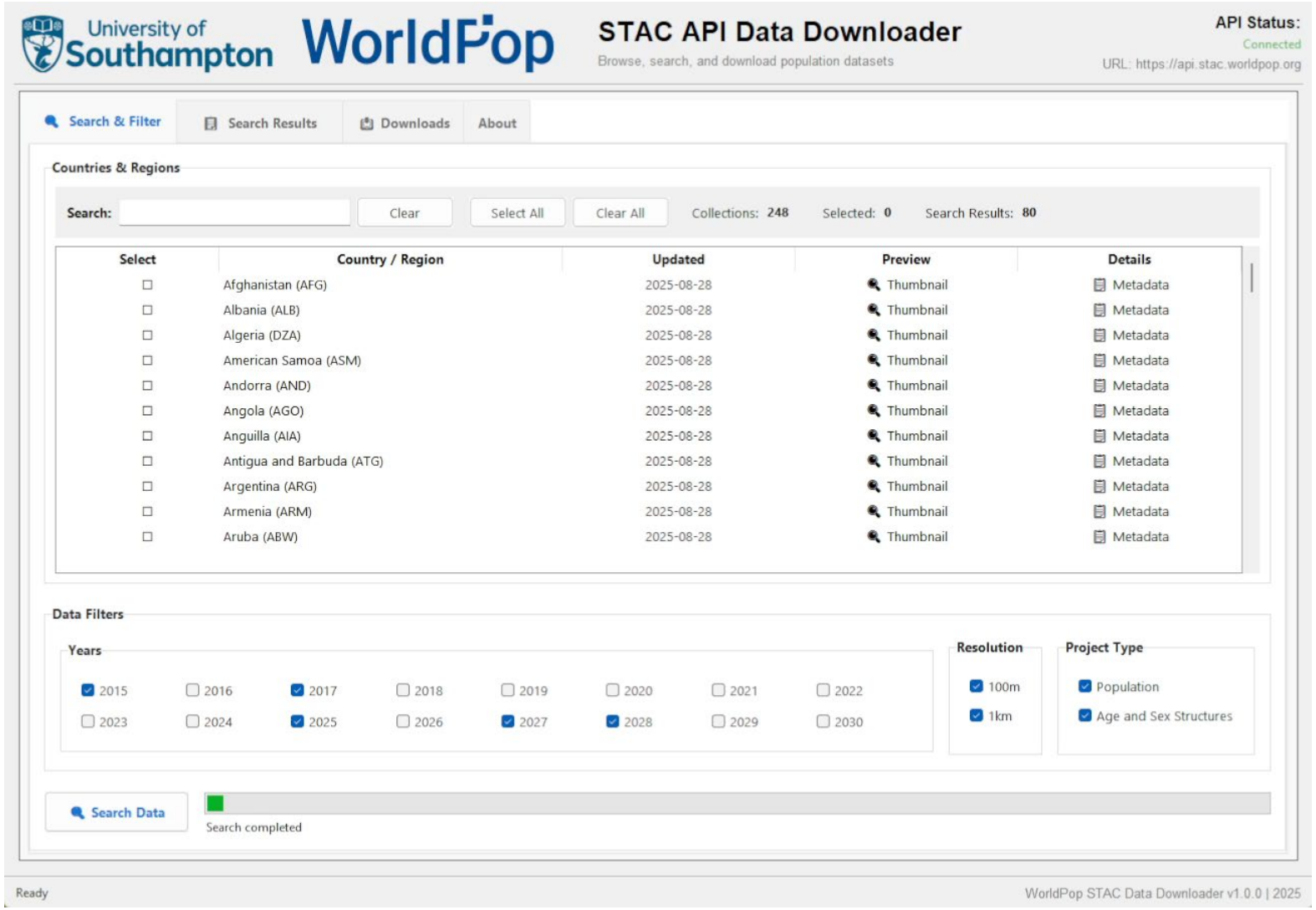


WorldPop SpatioTemporal Asset Catalogs (STAC)

WorldPop STAC Data Downloader

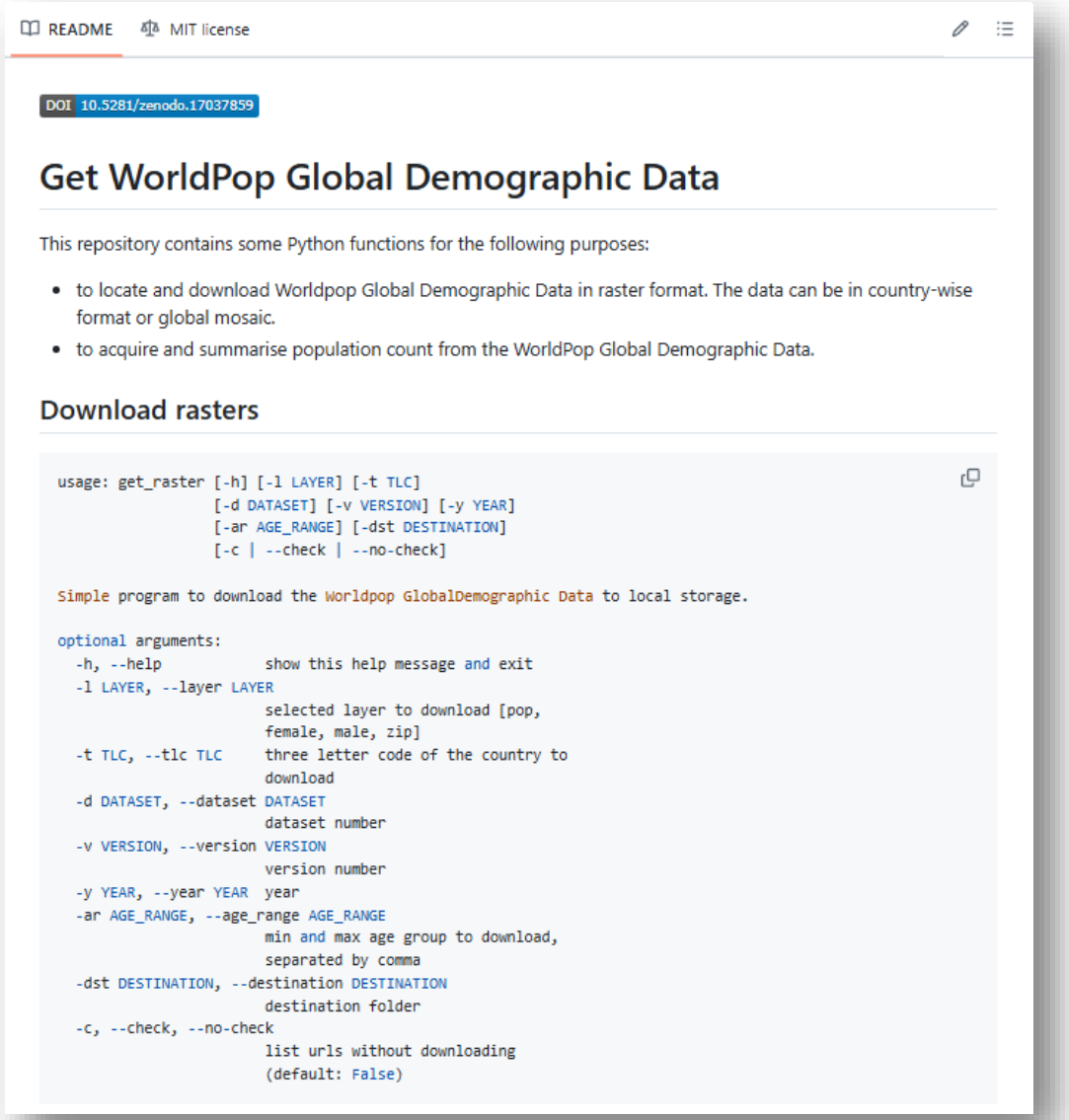
A desktop application for downloading WorldPop population data through the STAC API.



https://github.com/wpgp/worldpop-stac-data-downloader

Python package to locate and download Worldpop Global Demographic Data and acquire/summarise population count from the WorldPop Global Demographic Data.

https://github.com/wpgp/get_wp_global



README MIT license

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Get WorldPop Global Demographic Data

This repository contains some Python functions for the following purposes:

- to locate and download Worldpop Global Demographic Data in raster format. The data can be in country-wise format or global mosaic.
- to acquire and summarise population count from the WorldPop Global Demographic Data.

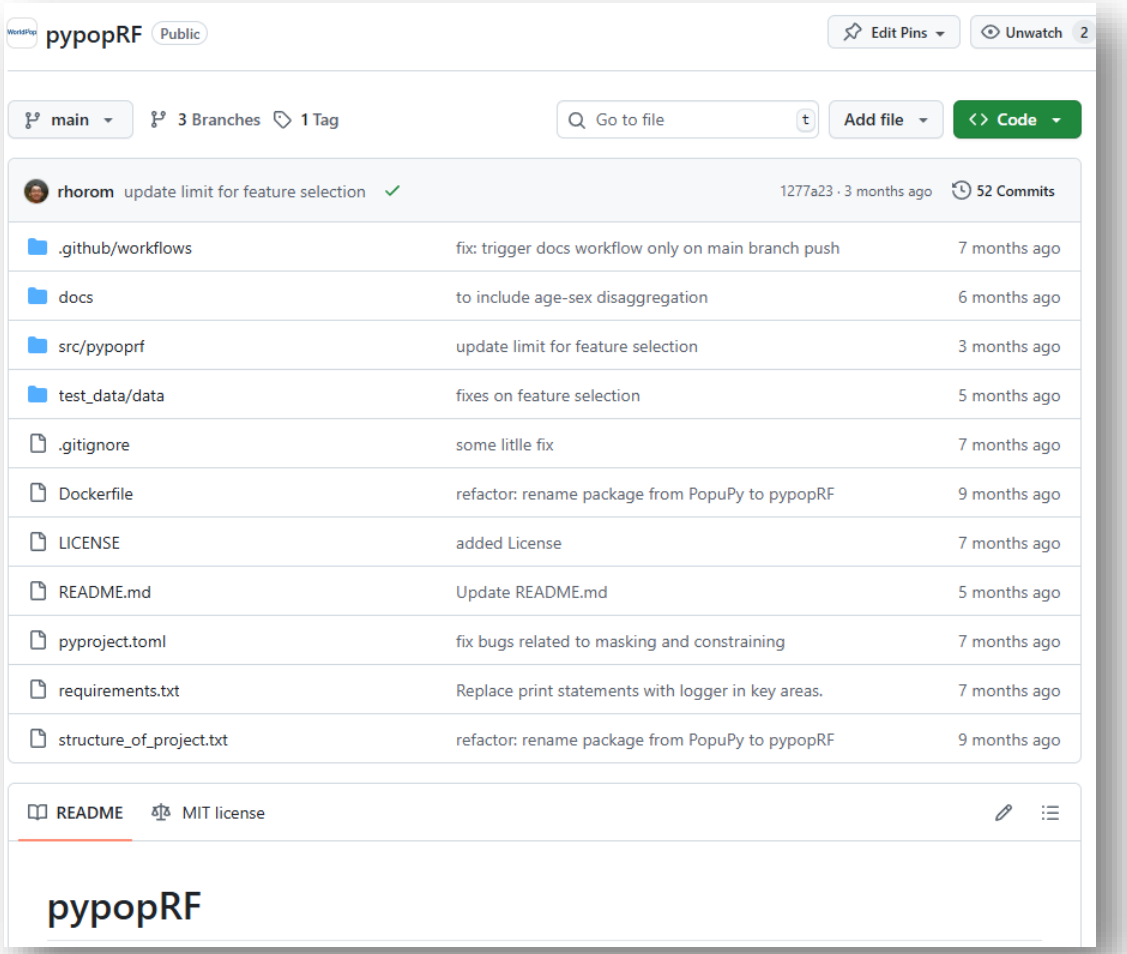
Download rasters

```
usage: get_raster [-h] [-l LAYER] [-t TLC]
                  [-d DATASET] [-v VERSION] [-y YEAR]
                  [-ar AGE_RANGE] [-dst DESTINATION]
                  [-c | --check | --no-check]

Simple program to download the Worldpop GlobalDemographic Data to local storage.

optional arguments:
  -h, --help            show this help message and exit
  -l LAYER, --layer LAYER
                        selected layer to download [pop,
                        female, male, zip]
  -t TLC, --tlc TLC     three letter code of the country to
                        download
  -d DATASET, --dataset DATASET
                        dataset number
  -v VERSION, --version VERSION
                        version number
  -y YEAR, --year YEAR  year
  -ar AGE_RANGE, --age_range AGE_RANGE
                        min and max age group to download,
                        separated by comma
  -dst DESTINATION, --destination DESTINATION
                        destination folder
  -c, --check, --no-check
                        list urls without downloading
                        (default: False)
```

pypopRF

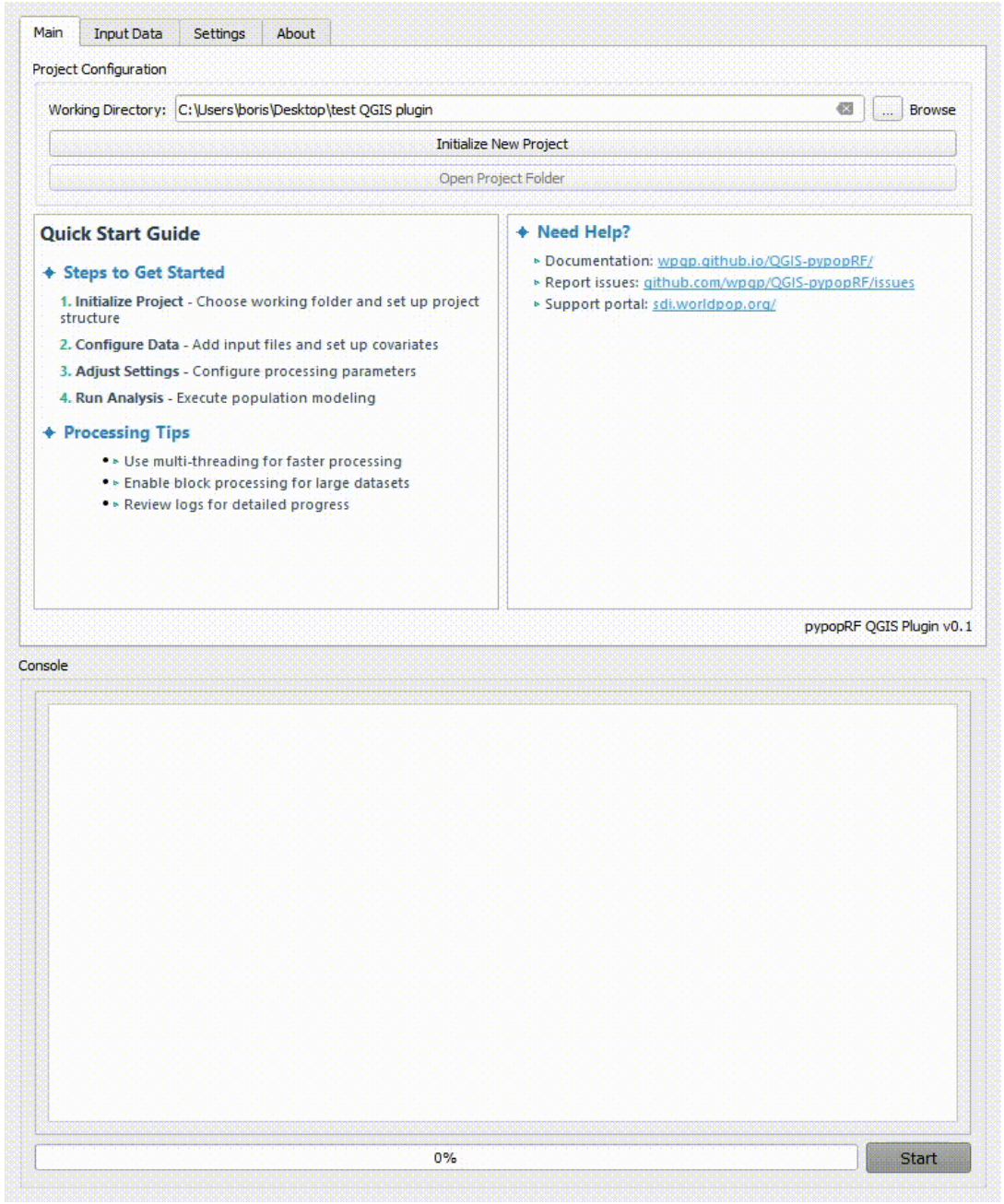


Python package for top-down population disaggregation using Random Forest

pypopRF is a Python package for population prediction and dasymetric mapping using machine learning techniques. It provides a comprehensive toolkit for processing geospatial data, training models, and generating high-resolution population distribution maps.

- Feature extraction from multiple geospatial covariates
- Random Forest-based population prediction with automatic feature selection
- Parallel processing support for large datasets
- Dissymmetric mapping for high-resolution population redistribution
- Visualization tools for analysis and validation
- Command-line interface for easy project management

https://github.com/wpgp/pypopRF



QGIS pypopRF Plugin

QGIS plugin for population prediction and dissymmetric mapping.

1. Project Setup
   - Initialize workspace
   - Configure output directory
   - Set processing parameters

2. Data Management
   - Mastergrid integration
   - Covariate handling
   - Census data import
   - Optional masks & constraints

https://github.com/wpgp/QGIS-pypopRF

https://www.youtube.com/watch?v=WPStOdqE8xE&t=13s

WorldPop

The team behind the project.

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CITY POPULATION

University of Southampton

GRID3

Gates Foundation

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at the University of Southampton

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Thank you.

Any questions?

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Interactive Q&A

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Thank you!

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