

Release Statement

The spatial distribution of population broken down by gender and age groupings at a resolution of 30 arc (approximately 1km at the equator), for each year from 2000 to 2015 and aligned with Global2, version 2.0.

1 Oct 2026

Abstract

This dataset provides high-resolution gridded population estimates from 2000 to 2015 at a spatial resolution of 30 arcseconds (approx. 1 km at the equator). Population counts are disaggregated by age and gender groups, including infants (0-1 years) and standard 5-year cohorts up to 80+ years.

The dataset represents a harmonized refinement merging legacy unconstrained population models (Global 1 [1]) with updated census- and model-derived WorldPop Demographic Data R2025A v1 Global 2 [2]. This integration ensures temporal consistency and smoother transitions across multi-decadal population trends.

Suggested Citations

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Input Data Sources

- Global1 [1] Data: Unconstrained, 1-km resolution gridded population estimates disaggregated by age and gender (covering 2000–2020). These layers serve as the baseline probability distribution for the adjusted population counts.
- Global2 [2] Data: 1-km resolution gridded population data disaggregated by age and gender, constrained by annually interpolated Global Human Settlement Layer (GHSL) data (covering 2015–2030).
- Global Human Settlement Layer ([GHSL](#)): Temporal built-environment layers used to constrain and refine population distribution based on the nearest available reference year.
- World Population Prospects ([WPP](#)): National-level population totals by specific age and gender cohorts sourced from United Nations Department of Economic and Social Affairs (UNDESA).
- GeoBoundaries (geoboundaries.org): Level 2 administrative boundaries utilized as the foundational framework for spatial aggregation and disaggregation routines.

Methodology & Harmonization Workflow

To ensure temporal continuity and smooth population redistribution across the Global 1 (2000–2020) and Global 2 (2015–2030) data regimes, a multi-step processing pipeline was implemented:

1. **Subnational Proportion Trajectory:** Subnational population proportions (the proportion of a country's population residing within each administrative unit) are modeled to transition gradually over time.
2. **Regime Anchoring:** Subnational proportions are anchored to the Global 1 dataset for the year 2000 and align with the Global 2 dataset from 2015 onward.
3. **Cubic Spline Interpolation:** For the intermediate window between 2000 and 2015, subnational scaling factors (i.e., proportions of population at subnational levels) are interpolated using cubic splines, incorporating benchmark years (2000, 2015, through 2025) as control points.
4. **National-to-Subnational Scaling:** National population totals from UNDESA WPP are disaggregated to subnational administrative levels according to the temporally interpolated proportions.
5. **Dasymetric Disaggregation:** Administrative-level population totals are further distributed to the 30-arcsecond grid cells using the Global 1 data as the spatial probability layer. This layer is constrained dynamically by the temporally nearest GHSL built-up layers.

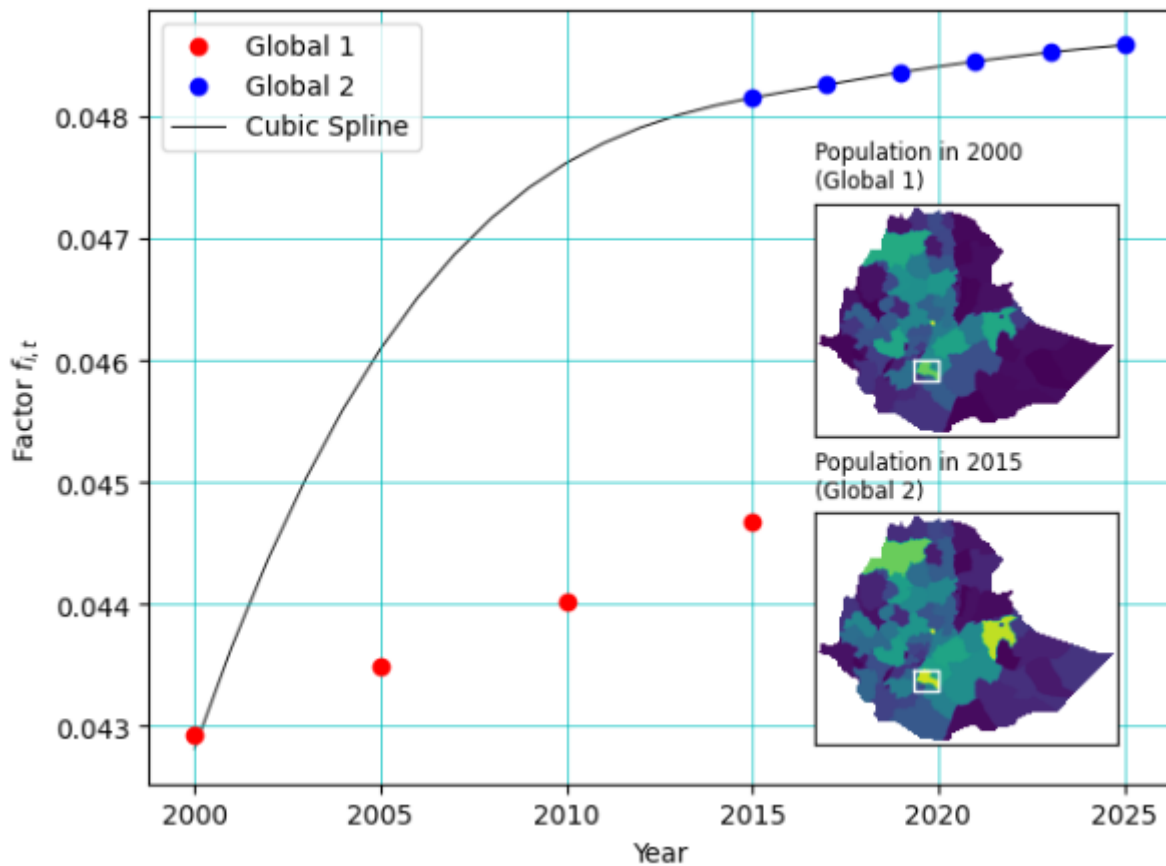


Figure 1: Scaling factor that follows cubic spline is used to resolve temporal discontinuity between Global 1 and Global 2 estimates .

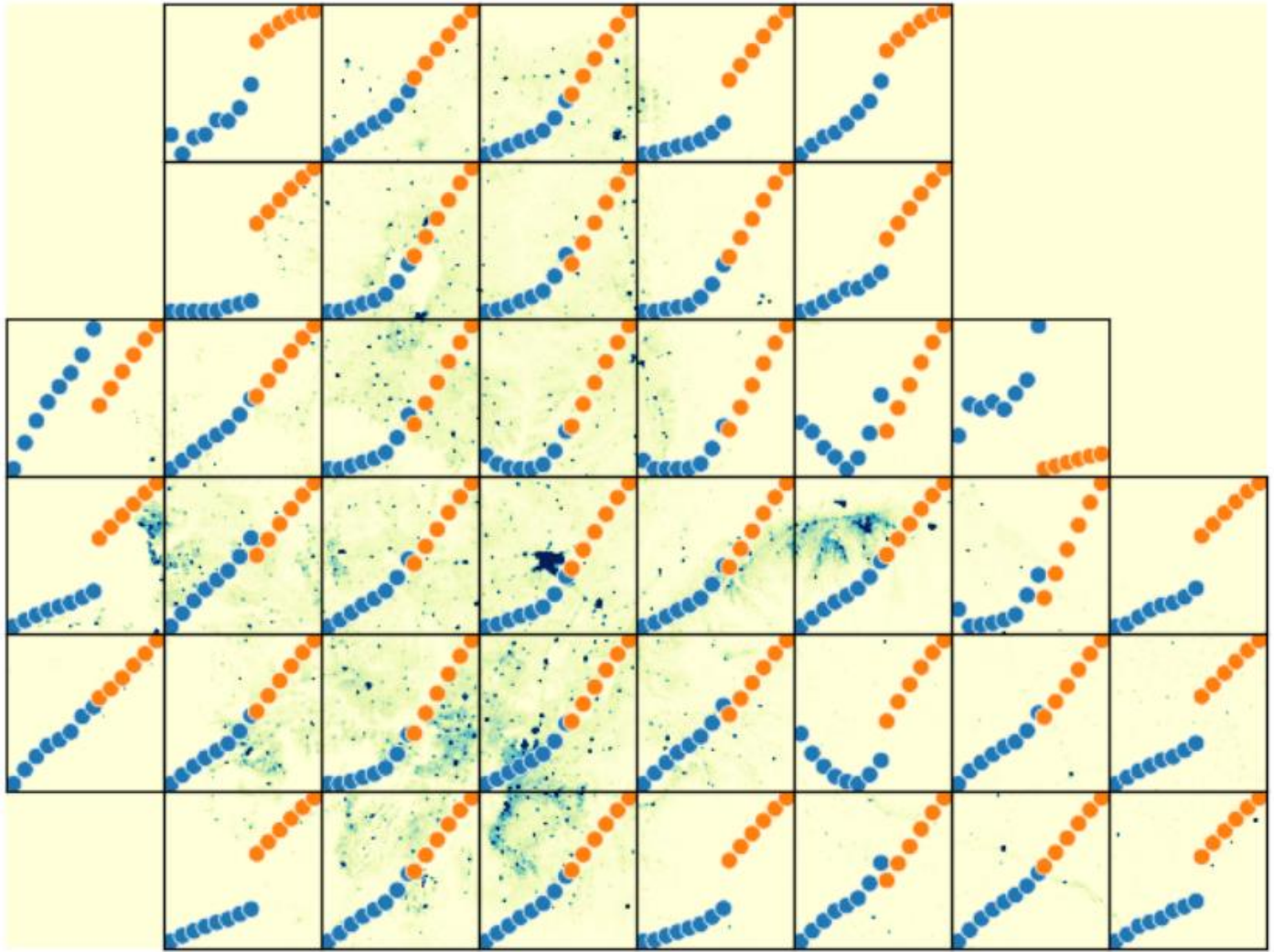


Figure 2: Timeseries plots of total population estimates from the adjusted Global 1 (blue dots) and the Global 2 (orange dots). The population counts are aggregated at rectangular regions and min-max scaled for visualisation.

References

- [1] Bondarenko M., Kerr D., Sorichetta A., and Tatem, A.J. 2020. Estimates of 2020 total number of people per grid square broken down by gender and age groupings using Built-Settlement Growth Model (BSGM) outputs. WorldPop, University of Southampton, UK. doi:10.5258/SOTON/WP00695
- [2] Bondarenko M., Priyatikanto R., Tejedor-Garavito N., Zhang W., McKeen T., Cunningham A., Woods T., Hilton J., Cihan D., Nosatiuk B., Brinkhoff T., Tatem A., Sorichetta A.. The spatial distribution of population broken down by gender and age groupings in 2015-2030 at a resolution of 30 arc (approximately 1km at the equator) R2025A version v1. Global Demographic Data Project - Funded by The Bill and Melinda Gates Foundation (INV-045237). WorldPop - School of Geography and Environmental Science, University of Southampton. DOI:10.5258/SOTON/WP00846

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The authors followed rigorous procedures designed to ensure that the used data, the applied method and thus the results are appropriate and of reasonable quality. If users encounter apparent errors or misstatements, they should contact WorldPop at release@worldpop.org.

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