



The Geospatial Covariate Datasets Manual

The Demographic and Health Surveys Program

First Edition

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The DHS Program assists countries worldwide in the collection and use of data to monitor and evaluate population, health, and nutrition programs. Information on The DHS Program may be obtained from ICF, 530 Gaither Road, Suite 500, Rockville MD, 20850, USA; telephone: 301-407-6500; fax: 301407-6501; e-mail: info@DHSprogram.com; website: www.DHSprogram.com.

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About

The DHS Program routinely collects GPS location data of surveyed clusters. These data are processed and made available upon request for download through The DHS Program website following the application of geospatial displacement on the GPS cluster data to protect the confidentiality of respondents.

The data are utilized by thousands in academia (students and researchers), government (researchers, decision makers and program planners, and implementing agencies) and the private sector. The nature of these requests made it apparent that The DHS Program's data are often analyzed in conjunction with geospatial covariates to determine the impact of location on health outcomes. However, these covariate data often come from multiple different sources at different levels of national coverage and with varying quality, making it difficult for researchers to link The DHS Program's data to these covariates and conduct analyses. To address this, The DHS Program Geospatial team endeavored to prepare and make freely available a set of standardized files of the most commonly used geospatial covariates which could easily be linked to DHS datasets without the need for the GPS data itself, increasing accessibility to those with little or no GIS experience.

Extraction Methods

Depending on the type of the input data, one of two extraction methods were used:

- Neighborhood calculations using raster data, and
- Distance calculations using vector data.

Neighborhood Calculations using Raster Data

The raster extraction method is based on work described in depth in the [DHS Spatial Analysis Report 8](#). The methods described there are dependent to some degree on how similar you

would expect neighboring pixels to be (autocorrelation) and the actual size of the pixels (spatial resolution).

First, the raster datasets were re-projected so they were in the same projection as the DHS points (WGS 1984). Following this, each point was sequentially processed. First, a circular buffer with a radius of 10 kilometers for rural points and 2 kilometers for urban points was created around the point. All raster cells with centroids falling within this buffer were used in the raster extraction calculation. Any raster cell whose centroid did not fall within these buffers were not used for the extraction calculation. The extraction calculation can include a number of summary statistics including sum, count, and average. For example, the average population density can be calculated by taking the average value of all raster cells from a population density dataset whose centroids fall within the buffer. This calculation was done using the *Zonal Statistics as Table* tool through ArcMap's Python package, ArcPy. The extracted value was then recorded in a table for that point. These steps were performed in sequence for all GPS points in the input DHS dataset.

Distance Calculations using Vector Data

The distance from DHS points to each of the closest borders, coasts/lakes, and protected areas was measured using the *Near* tool in ArcMap. This tool calculates the geodesic distance between each DHS point and the nearest boundary of a selected polygon feature class. The distance calculated was appended as an attribute to the DHS points' attribute table, which we then join with all measurements from the raster extraction activity. The approach takes into account both the geomasking procedure used by the DHS and some of the inherent uncertainty in the external spatial datasets.

Notes about the Data Description

- Covariates that are presented for different years (e.g. 2000, 2005, 2010, 2015) are referred to as YEAR instead of listing out the individual years; likewise covariates presented for different months are referred to as MONTH.
- If the data for a covariate is not available, its field will be "-9999".
- All calculations between angular units and distance units are performed at the equator with 1 decimal degree = 110.567 kilometers.

Data Description

Column Name: All Population Count YEAR

Derived Data Set: [WorldPop](#)

Derived Data Set Cell Size: 0.000833333 decimal degrees (~100 m)

Derived Data Set License: [Creative Commons Attribution 4.0 International](#)

Year: The closest national census to **2000, 2005, 2010, or 2015**

Units: Number of people

Description:

The average number of people in the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Gaughan, Andrea E., Forrest R. Stevens, Catherine Linard, Peng Jia, and Andrew J. Tatem. 2013. "High Resolution Population Distribution Maps for Southeast Asia in 2010 and 2015." *PLOS ONE* 8 (2):e55882. <http://doi.org/10.1371/journal.pone.0055882>.

Linard, Catherine, Marius Gilbert, Robert W. Snow, Abdisalan M. Noor, and Andrew J. Tatem. 2012. "Population Distribution, Settlement Patterns and Accessibility across Africa in 2010." *PLOS ONE* 7 (2):e31743. <http://doi.org/10.1371/journal.pone.0031743>.

Sorichetta, Alessandro, Graeme M. Hornby, Forrest R. Stevens, Andrea E. Gaughan, Catherine Linard, Andrew J. Tatem. 2015. "High-resolution gridded population datasets for Latin America and the Caribbean in 2010, 2015, and 2020" *Scientific Data* 2. <http://doi.org/10.1038/sdata.2015.45>

WorldPop. 2016. "Africa Continental Population Datasets (2000 - 2020)." Accessed August 21, 2017. <http://doi.org/10.5258/SOTON/WP00004>.

WorldPop. 2016. "Asia Continental Population Datasets (2000 – 2020)." Accessed August 21, 2017. <http://doi.org/10.5258/SOTON/WP00013>.

WorldPop. 2016. "Latin America and the Caribbean Continental Population Datasets (2000 - 2020)." Accessed August 21, 2017. <http://doi.org/10.5258/SOTON/WP00138>.

Column Name: All Population Density YEAR

Derived Data Set: [WorldPop](#)

Derived Data Set Cell Size: 0.0008333333 decimal degrees (~100 m)

Derived Data Set License: [Creative Commons Attribution 4.0 International](#)

Year: The closest national census to **2000, 2005, 2010, or 2015**

Units: Number of people per square kilometer

Description:

The average number of people in the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points). That average was then divided by the area of those cells.

Citation:

Gaughan, Andrea E., Forrest R. Stevens, Catherine Linard, Peng Jia, and Andrew J. Tatem. 2013. "High Resolution Population Distribution Maps for Southeast Asia in 2010 and 2015." *PLOS ONE* 8 (2):e55882. <http://doi.org/10.1371/journal.pone.0055882>.

Linard, Catherine, Marius Gilbert, Robert W. Snow, Abdisalan M. Noor, and Andrew J. Tatem. 2012. "Population Distribution, Settlement Patterns and Accessibility across Africa in 2010." *PLOS ONE* 7 (2):e31743. <http://doi.org/10.1371/journal.pone.0031743>.

Sorichetta, Alessandro, Graeme M. Hornby, Forrest R. Stevens, Andrea E. Gaughan, Catherine Linard, Andrew J. Tatem. 2015. "High-resolution gridded population datasets for Latin America and the Caribbean in 2010, 2015, and 2020" *Scientific Data* 2. <http://doi.org/10.1038/sdata.2015.45>

WorldPop. 2016. "Africa Continental Population Datasets (2000 - 2020)." Accessed August 21, 2017. <http://doi.org/10.5258/SOTON/WP00004>.

WorldPop. 2016. "Asia Continental Population Datasets (2000 – 2020)." Accessed August 21, 2017. <http://doi.org/10.5258/SOTON/WP00013>.

WorldPop. 2016. "Latin America and the Caribbean Continental Population Datasets (2000 - 2020)." Accessed August 21, 2017. <http://doi.org/10.5258/SOTON/WP00138>.

Column Name: Aridity

Derived Data Set: [CGIAR-CSI Global-Aridity and Global-PET Database](#)

Derived Data Set Cell Size: 30 arc seconds (~0.008333333 decimal degrees; ~1 km)

Derived Data Set License: Non-Standard Noncommercial License

Year: Based on 1960-1990 climate data

Units: Aridity Index between 0.01 (Hyper Arid) and 0.99 (Humid)

Description:

The average aridity index of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points). Aridity is calculated by dividing the actual evapotranspiration by the potential evapotranspiration. The closer the number is to 1.0, the more humid the environment. Both the actual and potential evapotranspiration values were calculated using the [WorldClim Global Climate Data](#).

Citation:

CGIAR-CSI. 2009. "Global Aridity – Annual." Accessed August 21, 2017. <http://www.cgiar-csi.org/data/global-aridity-and-pet-database>.

Zomer, Robert, Antonio Trabucco, Deborah Bossio, and Louis V. Verchot. 2008. "Climate Change Mitigation: A Spatial Analysis of Global Land Suitability for Clean Development Mechanism Afforestation and Reforestation." *Agriculture, Ecosystems and Environment* 126: 67–80.

Zomer, Robert, Deborah Bossio, Antonio Trabucco, Li Yuanjie, Diwan Gupta, and Virendra Singh. 2007. *Trees and Water: Smallholder Agroforestry on Irrigated Lands in Northern India*. Colombo, Sri Lanka: International Water Management Institute.

Column Name: BUILT Population YEAR

Derived Data Set: [GHS built-up grid, derived from Landsat, multitemporal \(1975, 1990, 2000, 2014\)](#)

Derived Data Set Cell Size: 1 km

Derived Data Set License: [European Commission Reuse and Copyright](#)

Year: 1990, 2000, or 2014

Units: Built-up index between 0.00 (extremely rural) and 1.00 (extremely urban)

Description:

The average built-up index of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Pesaresi, Martino, Daniele Ehrlich, Aneta Florczyk, Sergio Freire, Andreea Julea, Thomas Kemper, Pierre Soille, Vasileios Syrris. 2015. "GHS built-up grid, derived from Landsat, multitemporal (1975, 1990, 2000, 2014)." Accessed August 21, 2017. http://data.europa.eu/89h/jrc-ghsl-ghs_built_ldsmt_globe_r2015b.

Column Name: Drought Episodes

Derived Data Set: [Global Drought Hazard Frequency and Distribution, v1 \(1980–2000\)](#)

Derived Data Set Cell Size: 0.0417 decimal degrees (~5 km)

Derived Data Set License: Non-Standard Noncommercial License

Year: Based on 1980-2000 precipitation data

Units: Individual classes between 1 (Low Drought) and 10 (High Drought)

Description:

The average of the drought episodes indices of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Center for Hazards and Risk Research - Columbia University, Center for International Earth Science Information Network - Columbia University, and International Research Institute for Climate and Society - Columbia University. 2005. "Global Drought Hazard Frequency and Distribution." Accessed August 21, 2017. <http://dx.doi.org/10.7927/H4VX0DFT>.

Dilley, Maxx, Robert Chen, Uwe Deichmann, Arthur Lerner-Lam, Margaret Arnold, Jonathan Agwe, Piet Buys, Oddvar Kjekstad, Bradfield Lyon, and Gregory Yetman. 2005. *Natural Disaster Hotspots: A Global Risk Analysis*. Washington: The World Bank. <http://hdl.handle.net/10986/7376>.

Column Name: Enhanced Vegetation Index YEAR

Derived Data Set: [Vegetation Index and Phenology \(VIP\) Phenology EVI-2 Yearly Global 0.05Deg CMG V004](#)

Derived Data Set Cell Size: 0.05 decimal degrees (~5 km)

Derived Data Set License: Public Domain

Year: 1985, 1990, 1995, 2000, 2005, 2010, or 2015

Units: Vegetation index value between 0 (least vegetation) and 10000 (Most vegetation).

Description:

The enhanced vegetation index was calculated by measuring the density of green leaves in the near-infrared and visible bands.

The average enhanced vegetation index of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Kamel Didan. 2016. "NASA MEaSUREs Vegetation Index and Phenology (VIP) Phenology EVI2 Yearly Global 0.05Deg CMG". Accessed August 21, 2017.
https://doi.org/10.5067/measures/vip/vipphen_evi2.004.

Column Name: Global Human Footprint

Derived Data Set: [Global Human Footprint \(Geographic\), v2 \(1995–2004\)](#)

Derived Data Set Cell Size: 0.008333 decimal degrees (~1 km)

Derived Data Set License: Non-Standard Noncommercial License

Year: Based on 1995-2004 data

Units: Global human footprint index between 0 (extremely rural) and 100 (extremely urban)

Description:

The average global human footprint index of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Wildlife Conservation Society, and Center for International Earth Science Information Network - Columbia University. 2005. "Global Human Footprint Dataset." Accessed August 21, 2017. <http://dx.doi.org/10.7927/H4M61H5F>.

Column Name: Growing Season Length

Derived Data Set: [Length of Available Growing Period \(16 classes\)](#)

Derived Data Set Cell Size: 5 Arc Minute (~0.0833333 decimal degrees; ~10 km)

Derived Data Set License: None (All Rights Reserved)

Year: Based on data collected between 1961 and 1991

Units: Individual classes between 1 and 16. The values are listed below.

1: 0 days	9: 210 - 239 days
2: 1 - 29 days	10: 240 - 269 days
3: 30 - 59 days	11: 270 - 299 days
4: 60 - 89 days	12: 300 - 329 days
5: 90 - 119 days	13: 330 - 364 days
6: 120 - 149 days	14: < 365 days
7: 150 - 179 days	15: 365 days
8: 180 - 209 days	16: > 365 days

Description:

It is impossible to deep link to the dataset. Searching for “growing season” and limiting results to “World” datasets should bring “Length of Available Growing Period (16 classes)”.

Length of available growing period refers to the number of days within the period of temperatures above 5°C when moisture conditions are considered adequate. Under rain-fed conditions, the beginning of the growing period is linked to the start of the rainy season. The growing period for most crops continues beyond the rainy season and, to a greater or lesser extent, crops mature on moisture stored in the soil profile.

The mode of the growing season length indices of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Food and Agriculture Organization. 2007. "Length of Available Growing Period (16 classes)." Accessed August 21, 2017. <http://www.fao.org/geonetwork/srv/en/main.home>.

Column Name: ITN Coverage YEAR

Derived Data Set: [ITN coverage in Africa 2000-2015](#)

Derived Data Set Cell Size: ~5 km

Derived Data Set License: [Creative Commons Attribution 3.0 Unported](#)

Year: 2005, 2010, or 2015

Units: Number of people

Description:

The average number of people who slept under an insecticide treated net the night before they were surveyed within the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Data from the year 2000 were excluded from covariate extraction because all values were 0. 100% net coverage in certain areas in the 2015 data is a product of the underlying dataset and is not an error.

Citation:

Bhatt, S., D. J. Weiss, E. Cameron, D. Bisanzio, B. Mappin, U. Dalrymple, K. E. Battle, et al. 2015. "The effect of malaria control on *Plasmodium falciparum* in Africa between 2000 and 2015." *Nature* 526 (7572):207-211. <http://doi.org/10.1038/nature15535>.

Malaria Atlas Project. 2015. "Insecticide treated bednet coverage." Accessed August 21, 2017. <http://www.map.ox.ac.uk/>.

Column Name: Malaria YEAR

Derived Data Set: [ITN coverage in Africa 2000-2015](#)

Derived Data Set Cell Size: ~5 km

Derived Data Set License: [Creative Commons Attribution 3.0 Unported](#)

Year: 2000, 2005, 2010, or 2015

Units: Number of people per year

Description:

The average number of people per year who show clinical symptoms of *plasmodium falciparum* malaria within the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points). A clinical case is defined as a malaria-attributable febrile episode (body temperature in excess of 37.5 C), typically accompanied by headaches, nausea, excess sweating and/or fatigue, censored by a 30-day window (i.e., multiple bouts of symptoms occurring within the same 30-day period are counted as a single episode).

Citation:

Bhatt, S., D. J. Weiss, E. Cameron, D. Bisanzio, B. Mappin, U. Dalrymple, K. E. Battle, et al. 2015. "The effect of malaria control on *Plasmodium falciparum* in Africa between 2000 and 2015." *Nature* 526 (7572):207-211. <http://doi.org/10.1038/nature15535>.

Malaria Atlas Project. 2015. "Plasmodium falciparum incidence rate." Accessed August 21, 2017. <http://www.map.ox.ac.uk/>.

Column Name: Nightlights Composite

Derived Data Set: [Version 1 VIIRS Day/Night Band Nighttime Lights](#)

Derived Data Set Cell Size: 15 Arc Second (~0.00416667 decimal degrees; ~500 m)

Derived Data Set License: Public Domain

Year: 2015

Units: Composite cloud-free radiance values

Description:

The average radiance of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Mills, Stephen, Stephanie Weiss, and Calvin Liang. 2013. "VIIRS day/night band (DNB) stray light characterization and correction." *Proceedings of SPIE* 8866.

<http://dx.doi.org/10.1117/12.2023107>

National Centers for Environmental Information. 2015. "2015 VIIRS Nighttime Lights Annual Composite." Accessed August 21, 2017.

https://ngdc.noaa.gov/eog/viirs/download_dnb_composites.html.

Column Name: Potential Evapotranspiration

Derived Data Set: [CGIAR-CSI Global-Aridity and Global-PET Database](#)

Derived Data Set Cell Size: 30 arc seconds (~0.008333333 decimal degrees; ~1 km)

Derived Data Set License: Non-Standard Noncommercial License

Year: 2009

Units: Millimeters per year

Description:

The average potential evapotranspiration of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points). The potential evapotranspiration values were calculated using the [WorldClim Global Climate Data](#).

Citation:

CGIAR-CSI. 2009. "Global Aridity – Annual." Accessed August 21, 2017. <http://www.cgiar-csi.org/data/global-aridity-and-pet-database>.

Zomer, Robert, Antonio Trabucco, Deborah Bossio, and Louis V. Verchot. 2008. "Climate Change Mitigation: A Spatial Analysis of Global Land Suitability for Clean Development Mechanism Afforestation and Reforestation." *Agriculture, Ecosystems and Environment* 126: 67–80.

Zomer, Robert, Deborah Bossio, Antonio Trabucco, Li Yuanjie, Diwan Gupta, and Virendra Singh. 2007. *Trees and Water: Smallholder Agroforestry on Irrigated Lands in Northern India*. Colombo, Sri Lanka: International Water Management Institute.

Column Name: Proximity to National Borders

Derived Data Set: [Large-Scale International Boundaries \(LSIB\)](#)

Derived Data Set License: Public Domain

Year: 2014

Units: Meters

Description:

Straight-line distance to the nearest international border.

Citation:

Department of State's Office of the Geographer. 2014. "Department of State Large-Scale International Boundary (LSIB)." Via ESRI. Accessed August 21, 2017.
<http://www.arcgis.com/home/item.html?id=3e650cfe52b84bfbacb86d028f1f0514>.

Column Name: Proximity to Protected Areas

Derived Data Set: [The World Database on Protected Areas](#)

Derived Data Set License: [Non-Standard Noncommercial Attribution License](#)

Year: 2017

Units: Meters

Description:

Straight-line distance to the nearest protected area.

Citation:

UNEP-WCMC and IUCN. 2017. "Protected Planet: The World Database on Protected Areas (WDPA)" Accessed August 21, 2017. www.protectedplanet.net.

Column Name: Proximity to Water

Derived Data Set: [GSHHG \(Global Self-consistent, Hierarchical, High-resolution Geography Database\)](#)

Derived Data Set License: [GNU Lesser General Public License](#)

Year: 2017

Units: Meters

Description:

Straight-line distance to the nearest major water body. Based on the World Vector Shorelines, CIA World Data Bank II, and Atlas of the Cryosphere.

Citation:

Wessel, Paul, and Walter Smith. 1996. "A Global Self-consistent, Hierarchical, High-resolution Shoreline Database" *Journal of Geophysical Research* 101: 8741-8743.

Wessel, Paul, and Walter Smith. 2017. "A Global Self-consistent, Hierarchical, High-resolution Geography Database Version 2.3.7." Accessed August 21, 2017. <http://www.soest.hawaii.edu/pwessel/gshhg/>.

Column Name: Rainfall YEAR

Derived Data Set: [Climate Hazards Group InfraRed Precipitation with Station data 2.0](#)

Derived Data Set Cell Size: 0.05 decimal degrees (~5 km)

Derived Data Set License: Public Domain

Year: 1985, 1990, 1995, 2000, 2005, 2010, 2015

Units: Millimeters per year

Description:

The average rainfall of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Climate Hazards Group. 2017. "Climate Hazards Group InfraRed Precipitation with Station data 2.0." Accessed August 21, 2017. <http://chg.geog.ucsb.edu/data/chirps/index.html>.

Funk, Chris, Pete Peterson, Martin Landsfeld, Diego Pedreros, James Verdin, Shraddhanand Shukla, Gregory Husak, et al. 2015. "The climate hazards infrared precipitation with stations—a new environmental record for monitoring extremes". *Scientific Data* 2. <http://doi.org/10.1038/sdata.2015.66>.

Column Name: Slope

Derived Data Set: See Description

Derived Data Set Cell Size: 30 arc seconds (~0.008333333 decimal degrees; ~1 km)

Derived Data Set License: Public domain

Year: 1996

Units: Degree

Description:

The United States Geological Survey [GTOPO30](#) digital elevation model was processed into slope by using the *slope* tool in ArcMap 10.5.0. The reported values are the average slope of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Earth Resources Observation and Science Center. 1996. "Global 30 Arc-Second Elevation (GTOPO30)." Accessed August 21, 2017. <https://lta.cr.usgs.gov/GTOPO30>.

Column Name: SMOD Population YEAR

Derived Data Set: [GHS Settlement Model Grid](#)

Derived Data Set Cell Size: 1 km

Derived Data Set License: [European Commission Reuse and Copyright](#)

Year: 1990, 2000, or 2015

Units: Individual classes between 1 and 3. The values are listed below.

1: rural cells

2: urban clusters

3: urban centers

Description:

The mode of the Settlement Model (SMOD) indices of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Pesaresi, Martino and Sergio Freire. 2016. "GHS Settlement grid following the REGIO model 2014 in application to GHSL Landsat and CIESIN GPW v4-multitemporal (1975-1990-2000-2015)." Accessed August 21, 2017. http://data.europa.eu/89h/jrc-ghsl-ghs_smod_pop_globe_r2016a.

Column Name: Temperature MONTH

Derived Data Set: [WorldClim Version 2](#)

Derived Data Set Cell Size: 30 arc seconds (~0.008333333 decimal degrees; ~1 km)

Derived Data Set License: None (All Rights Reserved)

Year: 1970-2000

Units: Average temperature for months January to December in degrees Celsius

Description:

The average temperature of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Fick, Steve and Robert Hijmans. 2016. "Worldclim 2." Accessed August 21, 2017.
<http://worldclim.org/version2>

Fick, Steve and Robert Hijmans. 2017. "Worldclim 2: New 1-km spatial resolution climate surfaces for global land areas." *International Journal of Climatology*.
<http://doi.org/10.1002/joc.5086>.

Column Name: Travel Times

Derived Data Set: [Estimated travel time to the nearest city of 50,000 or more people in year 2000](#)

Derived Data Set Cell Size: 30 arc seconds (~0.008333333 decimal degrees; ~1 km)

Derived Data Set License: None (All Rights Reserved)

Year: 2000

Units: Hours

Description:

The amount of time it takes to reach a settlement of 50,000 or more people.

The average travel time of the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Nelson, Andrew. 2008. "Estimated travel time to the nearest city of 50,000 or more people in year 2000." Accessed August 21, 2017. <http://forobs.jrc.ec.europa.eu/products/gam/>.

Column Name: UN Population Count YEAR

Derived Data Set: [UN-Adjusted Population Count, v4 \(2000, 2005, 2010, 2015, 2020\)](#)

Derived Data Set Cell Size: 30 arc seconds (~0.008333333 decimal degrees; ~1 km)

Derived Data Set License: Non-Standard Noncommercial License

Year: 2000, 2005, 2010, or 2015

Units: Number of people

Description:

The average number of people in the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Center for International Earth Science Information Network - Columbia University. 2016. "Gridded Population of the World, Version 4 (GPWv4): Population Count Adjusted to Match 2015 Revision of UN WPP Country Totals." Accessed August 21, 2017. <http://dx.doi.org/10.7927/H4SF2T42>.

Column Name: UN Population Density YEAR

Derived Data Set: [UN-Adjusted Population Density, v4 \(2000, 2005, 2010, 2015, 2020\)](#)

Derived Data Set Cell Size: 30 arc seconds (~0.008333333 decimal degrees; ~1 km)

Derived Data Set License: Non-Standard Noncommercial License

Year: 2000, 2005, 2010, or 2015

Units: Number of people per square kilometer

Description:

The average population density in the cells whose centroid falls within a radius of 10 km (for rural points) or 2 km (for urban points).

Citation:

Center for International Earth Science Information Network - Columbia University. 2016.
“Gridded Population of the World, Version 4 (GPWv4): Population Density Adjusted to Match 2015 Revision UN WPP Country Totals.” Accessed August 21, 2017.
<http://dx.doi.org/10.7927/H4HX19NJ>.