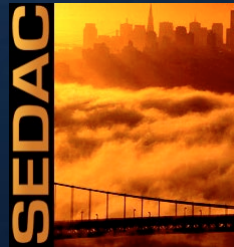

SEDAC: Bridging Earth & Social Sciences



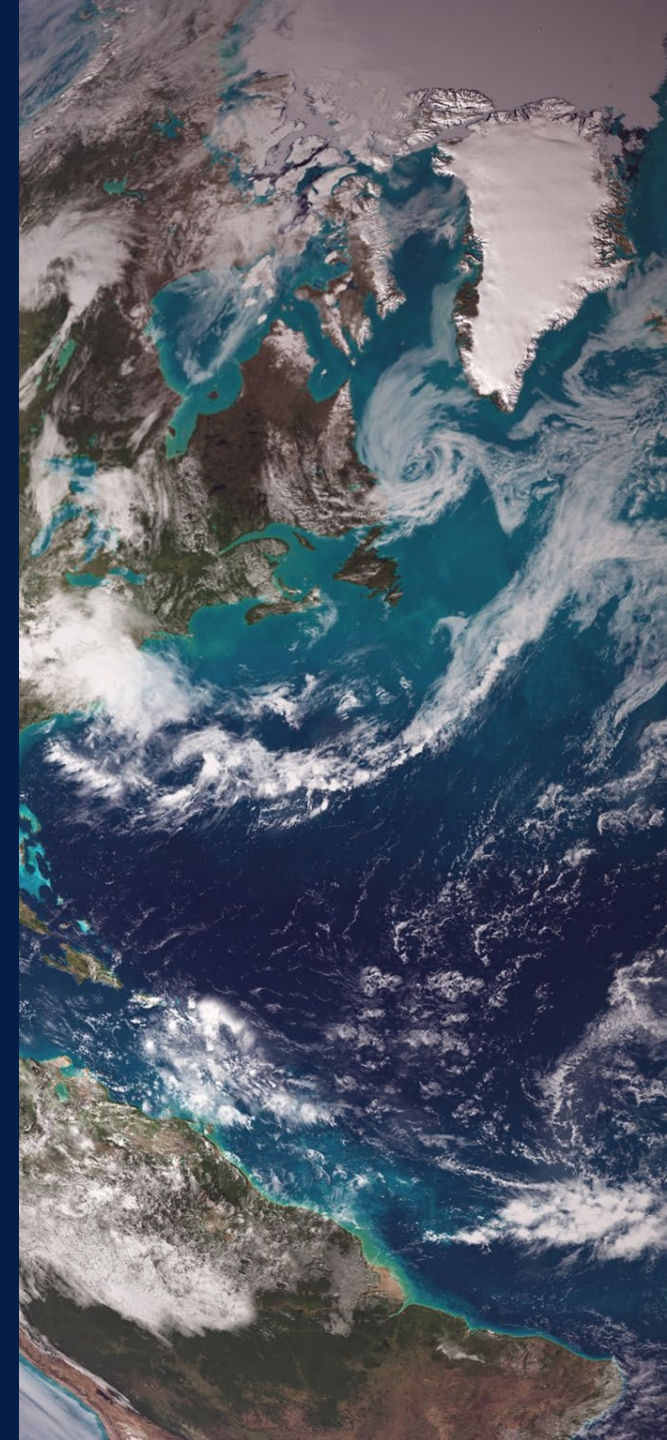
SESAC Symposium – 5 March 2026

Alex de Sherbinin, PhD
CIESIN Director
Former SEDAC DAAC Manager



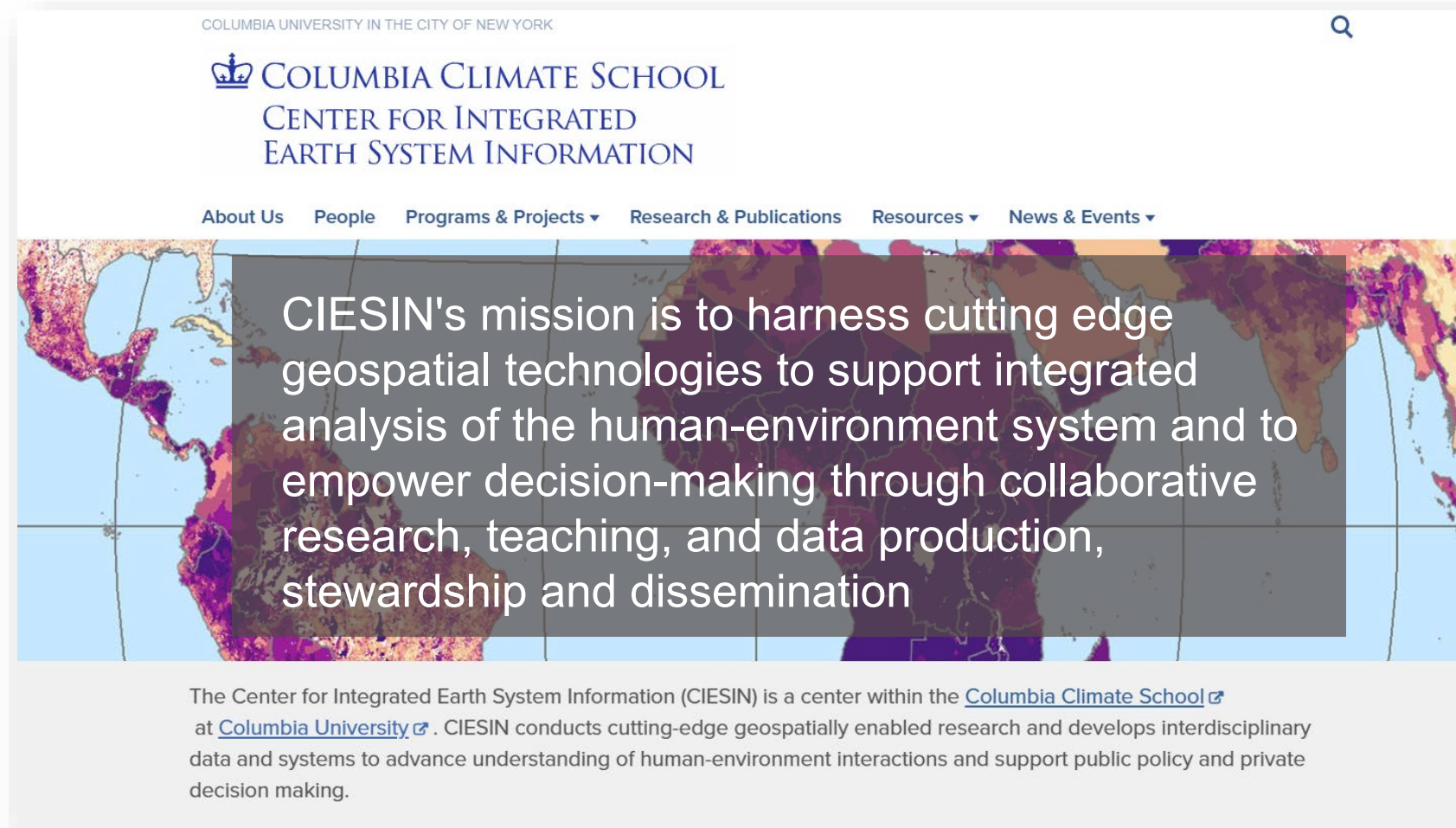
Table of Contents

1. CIESIN Mission
2. SEDAC History & Rationale Within NASA
3. Sample Data Products and Applications
4. Remote Sensing Use by Social Scientists




CIESIN history and mission

- Established in 1989 in Saginaw, Michigan as a Consortium of universities
- Joined Columbia University's Earth Institute in 1998



COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

 COLUMBIA CLIMATE SCHOOL
CENTER FOR INTEGRATED
EARTH SYSTEM INFORMATION

[About Us](#) [People](#) [Programs & Projects](#) [Research & Publications](#) [Resources](#) [News & Events](#)

CIESIN's mission is to harness cutting edge geospatial technologies to support integrated analysis of the human-environment system and to empower decision-making through collaborative research, teaching, and data production, stewardship and dissemination

The Center for Integrated Earth System Information (CIESIN) is a center within the [Columbia Climate School](#) at [Columbia University](#). CIESIN conducts cutting-edge geospatially enabled research and develops interdisciplinary data and systems to advance understanding of human-environment interactions and support public policy and private decision making.

NASA Socioeconomic Data and Applications Center (SEDAC) – 1998-2025

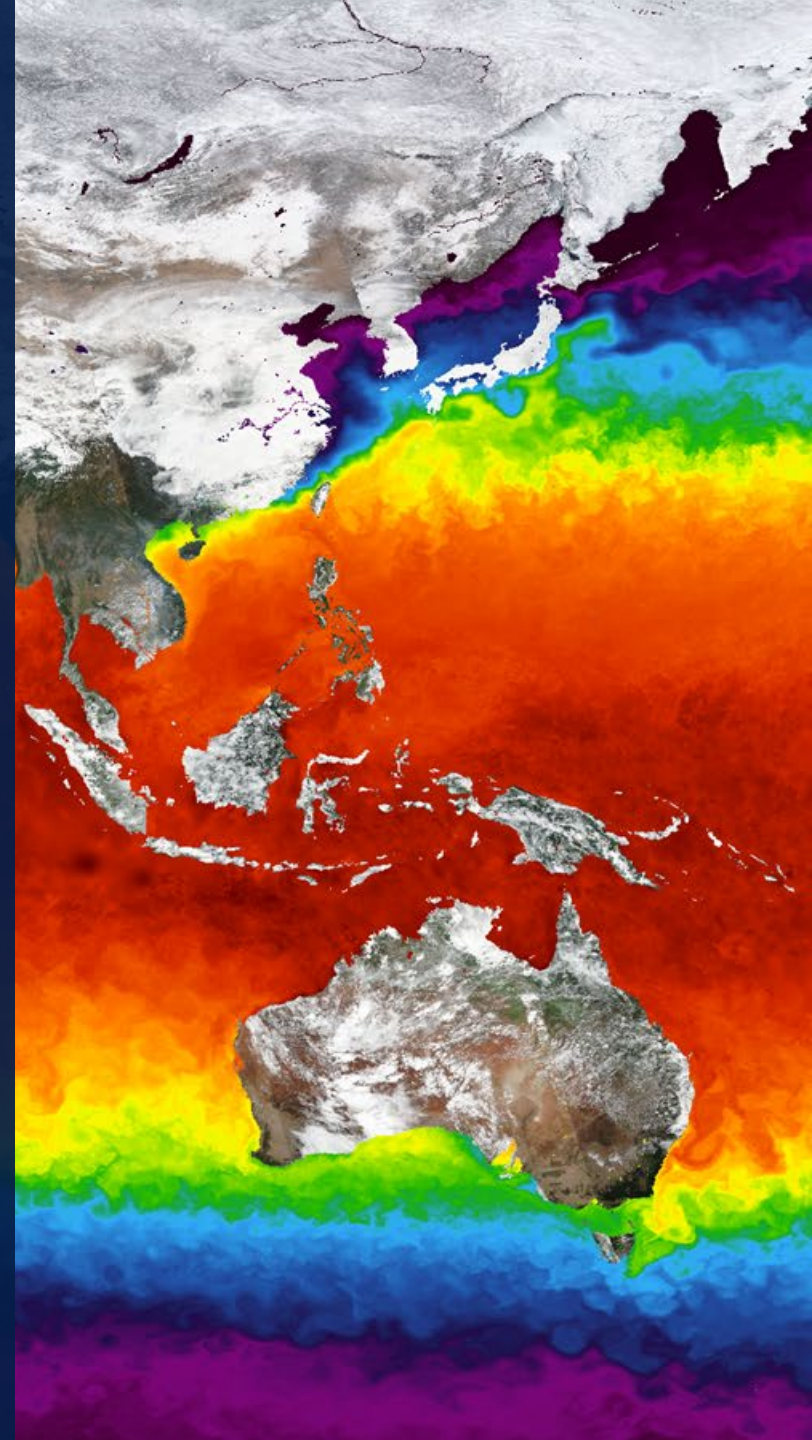
- Set up by NASA with the express purpose of bridging earth and social sciences
- >300 data sets comprising many >60k granules, 6 TB total archive size
- Approximately 800 citations of SEDAC data per year in the peer reviewed literature, including 38 in the *Nature* family of journals, 6 in *Global Change Biology*, 4 in *PNAS*, and 6 papers published in *Science* or *Science Advances*.
- A large use by applied users in disasters, humanitarian, development, planning and other fields

Project Summary

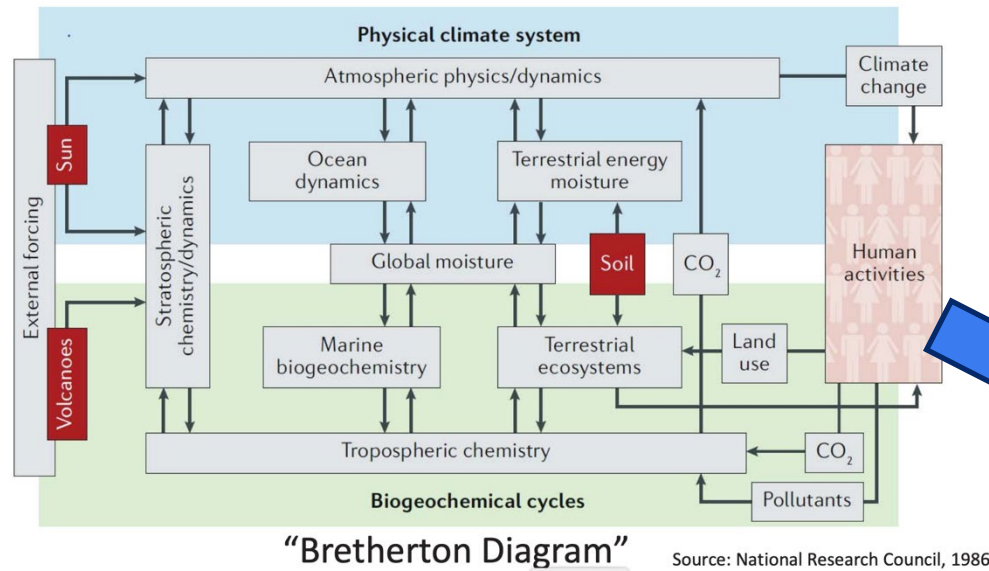
The SEDAC was a \$30m 5-year contract to run a data center that is part of the Earth Observation System Data and Information System (EOSDIS). SEDAC provides the data that put “people” in the pixel.



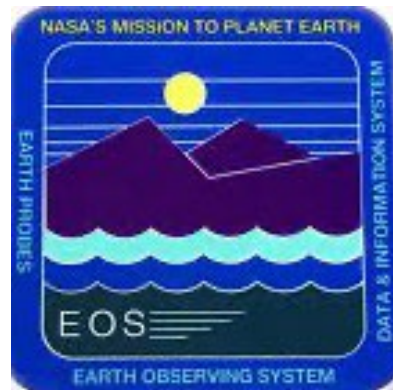
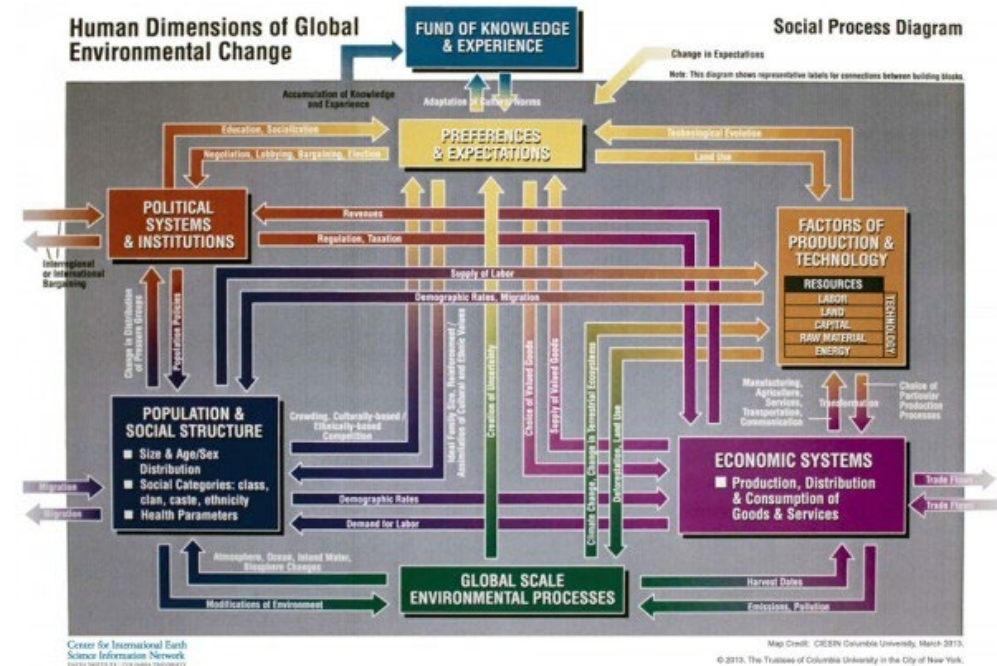
SEDAC History & Rationale Within NASA



Mission to Planet Earth (MTPE) built on early thinking about Earth System Science and the importance of the human dimensions of global change



“The “Bretherton Report” was the crucible for both the interdisciplinary field of Earth System Science and NASA’s Earth Observing System.” – G. Williams, 2009



Missions planned or operational in the 1990s:

- Landsat 7
- TRMM
- Terra & Aqua (MODIS, MISR, CERES, MOPITT, and ASTER)
- SeaWiFS

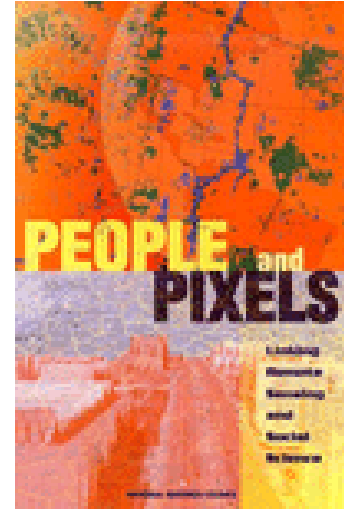
<https://news.climate.columbia.edu/2013/03/04/a-road-map-towards-better-understanding-of-global-environmental-change/>

NASA recognized the need for integration of Earth science and socioeconomic data and information to support applications and decision making

Research on Human Dimensions

The human dimensions of environmental change are important elements in understanding the Earth as a system. Social science research is primarily conducted by other Federal agencies, such as the National Science Foundation, the Environmental Protection Agency, and the Department of Health and Human Services. The Enterprise works directly with these agencies to develop the data and information from NASA's observatories and decision support systems for their applications. Additionally, the results of this important research that are relevant to global change and Earth system science are distributed through the Socioeconomic Data Archive Center (SEDAC), located at Columbia University. As part of the integrated NASA Earth science data and information system, SEDAC provides geospatial data and information vital to understanding the Earth as a system and represents a focal point for interaction between scientific efforts at NASA and those at other agencies, as well as communication with the public and social science communities.

- ▶ The 1998 NRC report, *People and Pixels*, had a strong influence on the importance of data integration and on SEDAC's mission and focus
- ▶ *SEDAC Statement of Work, June 1998*
 - The mission of SEDAC as an institutional element with EOSDIS encompasses two areas of equal priority:
 - Development and consequent operation of applications which support the user community
 - Improvement of the exchange of data and information between Earth scientists and socioeconomic data users



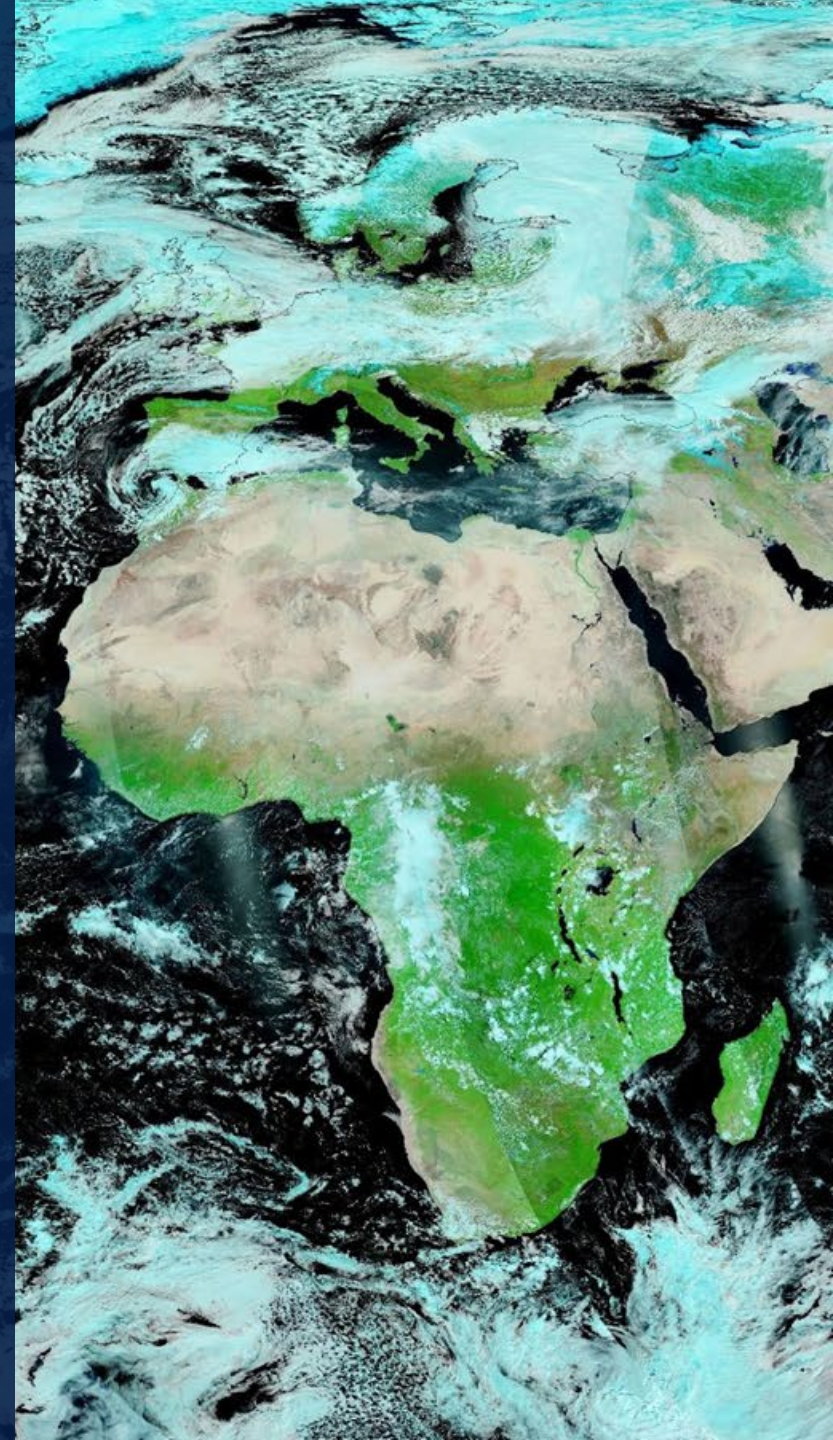
<https://doi.org/10.17226/5963>

Box on Human Dimensions Research from the *Earth Science Enterprise Strategy* (NASA, 2003, p. 8).



Ronald Rindfuss
SEDAC UWG Chair, 1998-2001

Sample Data Products and Applications

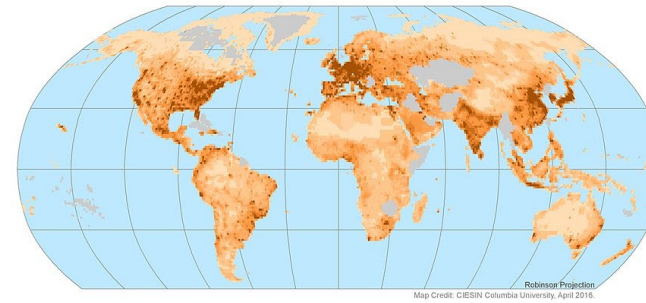


SEDAC distributed many different data sets across a range of topics and application areas

Current SEDAC Mission Areas

- ▶ Population Land-Use and Emissions (PLUE)
- ▶ Mitigation, Vulnerability and Adaptation (MVA)
- ▶ Hazard Vulnerability Assessment (HVA)
- ▶ Poverty and Food Security (PFS)
- ▶ Environment and Sustainable Development (ESD)

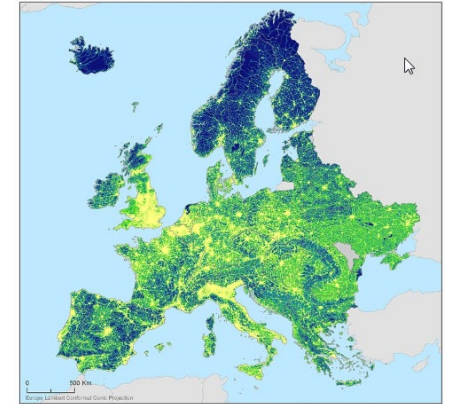
Global Gridded Geographically Based Economic Data (G-Econ), Version 4, GDP in PPP (2005)
Spatial Economic Data



The Global Gridded Geographically Based Economic Data (G-Econ), Version 4 is part of the Spatial Economic Data Collection. The data derived from the Yale G-Econ project provides gridded economic data of Gross Domestic Product (GDP) in Purchasing Power Parity (PPP) at a spatial resolution of one degree for the years 1990, 1995, 2000, and 2005. The PPP is the exchange rate between a country's currency and U.S. dollars adjusted to reflect the actual cost in U.S. dollars of purchasing a standardized market basket of goods in that country using the country's currency. This map displays GDP in PPP where each grid cell represents billions of U.S. dollars for the year 2005.

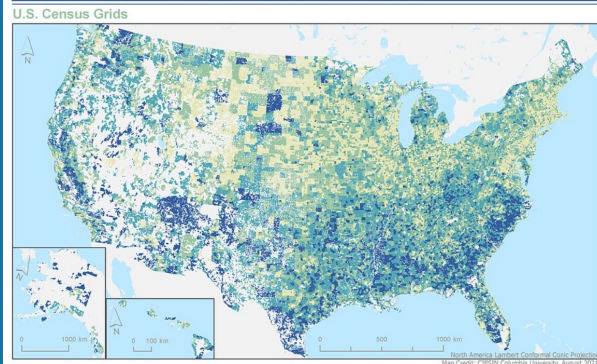
U.S. Dollars (Billions)		
No Data	0.156-0.469	4.693-9.387
< 0.016	0.469-0.939	9.387-15.644
0.016-0.023	0.939-1.564	15.644-1,564.419
0.023-0.156	1.564-4.693	

2009 Human Footprint, 2018 Release: Europe
Last of the Wild Project, Version 3 (LWP-3)

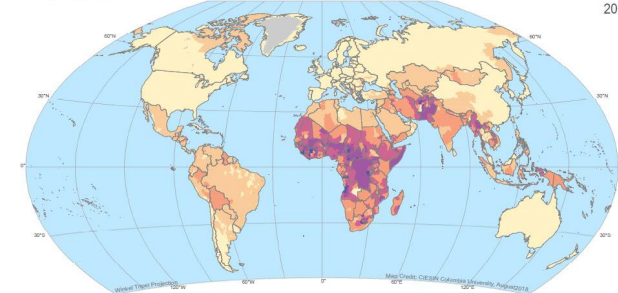


The 2009 Human Footprint, 2018 Release is part of the Last of the Wild Project, Version 3 (LWP-3) collection. This map displays cumulative human pressure on the environment for the year 2009, in Europe, at a spatial resolution of 1 km. Pressure is measured using eight variables including building environments, population density, electric power infrastructure, crop lands, pasture lands, roads, railways, and navigable waterways.

U.S. Social Vulnerability Index Grids (2018): Overall Score



Global Subnational Infant Mortality Rates, Version 2
Poverty Mapping



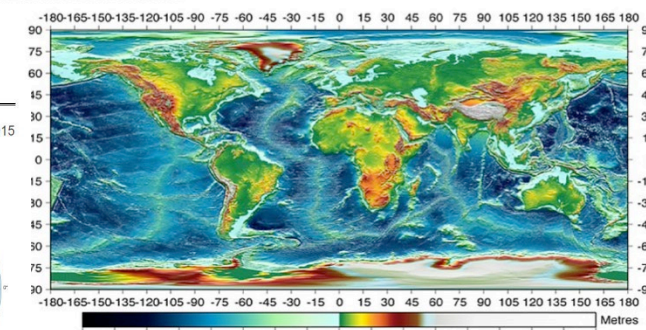
Global Subnational Infant Mortality Rates, Version 2 is part of the Poverty Mapping collection. This map displays infant mortality rate (IMR) estimates for 234 countries and territories, 143 of which include subnational units, at a spatial resolution of 30 arc-seconds (1 km) for the year 2015.

Infant Mortality Rate (deaths per 1000 live births)				
< 10	11-25	26-50	51-75	76-100
> 100	No Data/No Population/Uninhabited			

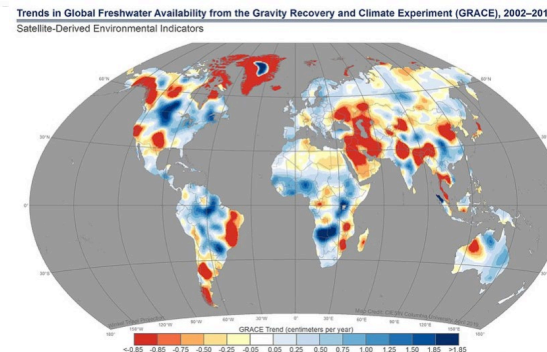
Data Source: Center for International Earth Science Information Network - CIESIN - Columbia University, 2016. Global Subnational Infant Mortality Rates, Version 2. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC).
https://doi.org/10.7927/H4PNSJ3J
© 2016. The Trustees of Columbia University in the City of New York.

Altimeter Corrected Elevations (ACE2), (1994-2005)

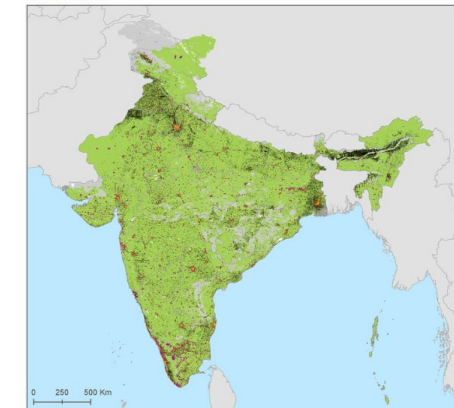
Digital Elevation Data Collection



Trends in Global Freshwater Availability from the Gravity Recovery and Climate Experiment (GRACE), 2002-2016
Satellite-Derived Environmental Indicators



Spatial Data from the 2011 India Census: Urban Census Classes and GHSL 1% Built-Up Land



The Spatial Data from the 2011 India Census, part of the India Data Collection, contains gridded estimates of India population at a resolution of 1 kilometer along with two spatial renderings of urban areas, one based on the official tabulations of population and settlement type (statutory towns, census towns, and the second, remotely-sensed measures of built-up land derived from the Global Human Settlement Layers. This data set includes a constructed hybrid representation of the urban settlement continuum by cross-classifying the census and remotely-sensed data, which this map displays with a 1% built-up land threshold.

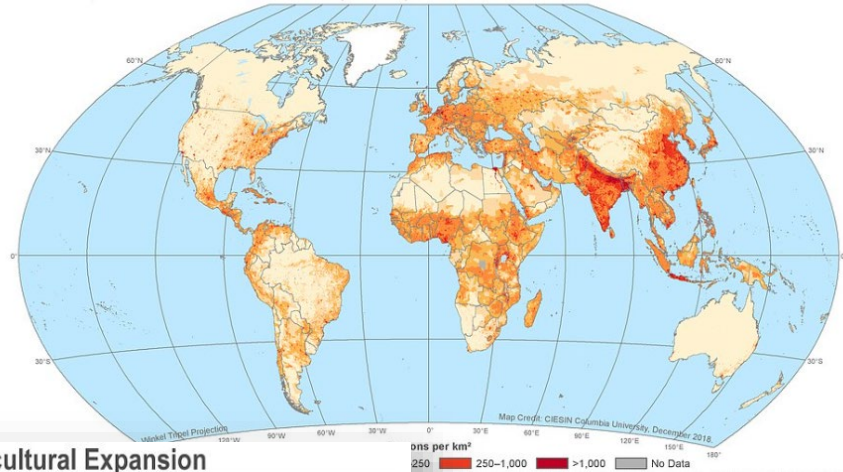
Urban Census Classes and GHSL 1% Built-Up Land	
Urban	Rural
Urban Agreement	Urban People Only
Built-up Land Only	Uninhabited
No Data	No Data

PLUE

Population, Land Use and Emissions

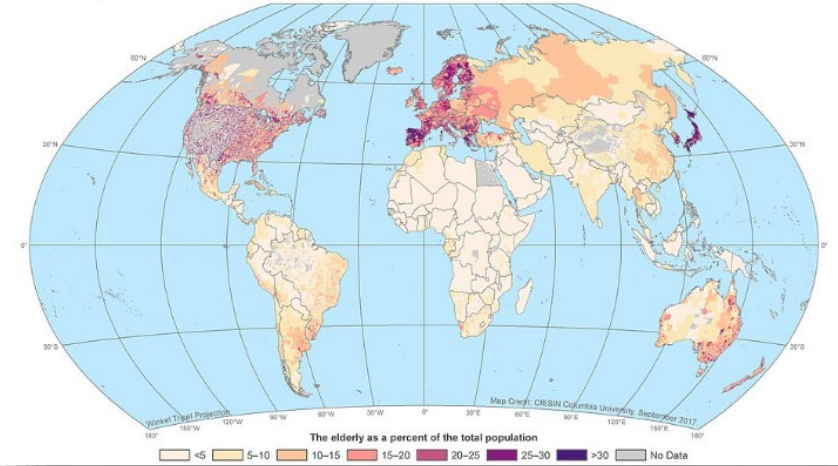
UN WPP-Adjusted Population Density, v4.11, 2020

Gridded Population of the World, Version 4 (GPWv4)



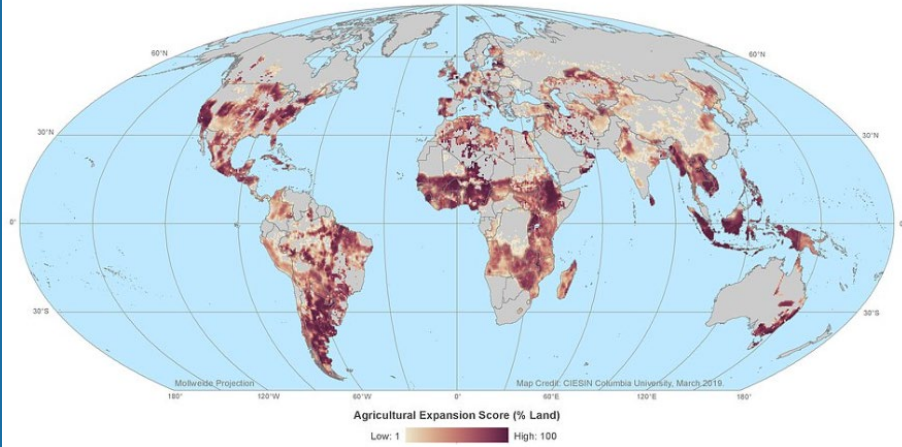
Basic Demographic Characteristics, v4.10, 2010: The Elderly (Ages 65 and Older)

Gridded Population of the World, Version 4 (GPWv4)



Development Threat Index, v1 (2015): Agricultural Expansion

Land Use Land Cover

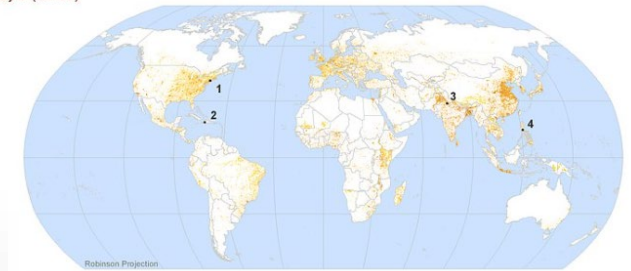


Global Human Settlement Population Grid (GHS-POP), 2015

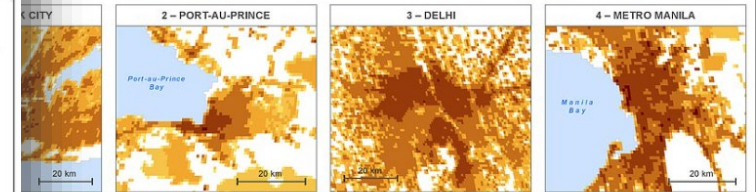
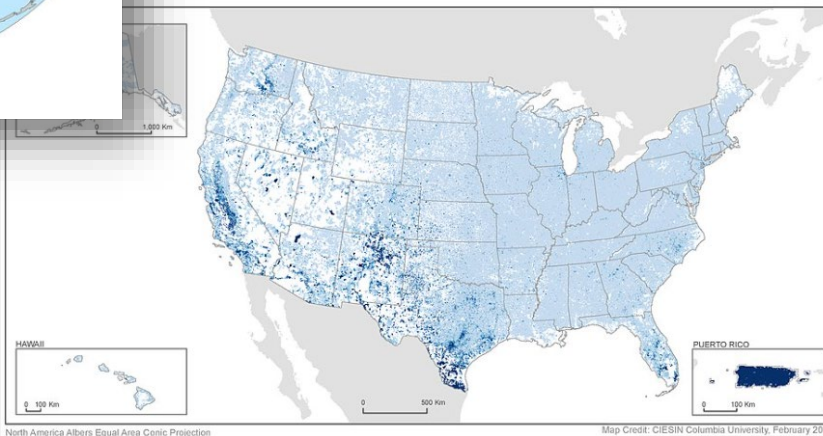
Global Human Settlement Layer (GHSL)

Number of People Per Grid Cell

- <1
- 1 - 10
- >10 - 100
- >100 - 1,000
- >1,000 - 10,000



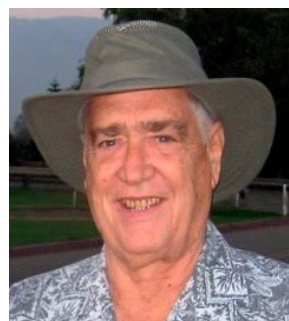
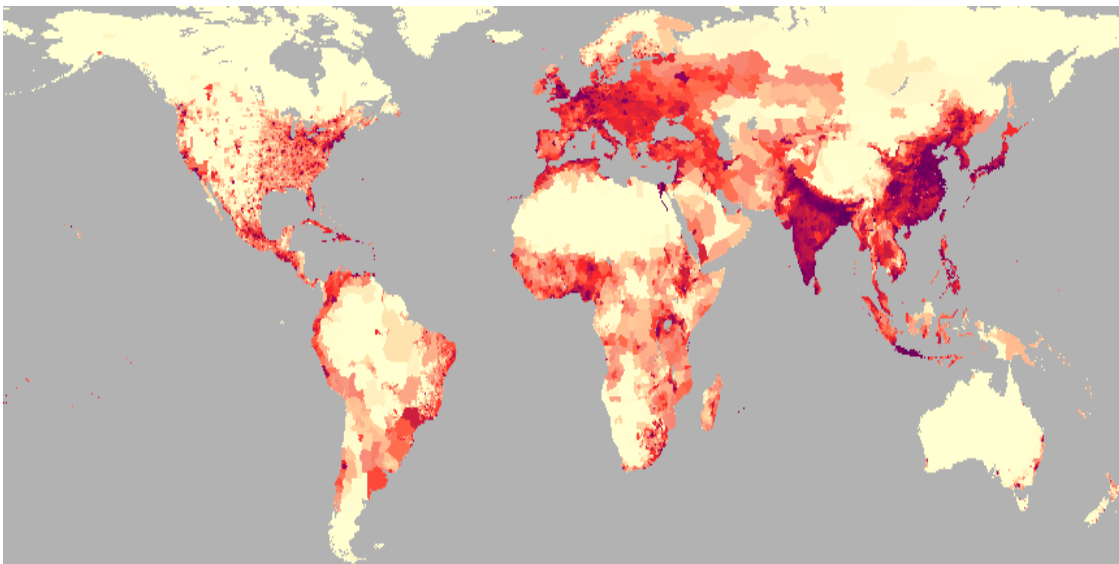
10: Hispanic (%)



Settlement Layer: Population and Built-Up Estimates, and Degree of Urbanization Settlement Model Grid data set is part of the Global Human Settlement Layer (GHSL) collection. This map displays the GHS-POP 2015 raster layer, which provides data on the spatial distribution of population expressed as the number of people per grid cell for the year 2015.

SEDAC's flagship data product, Gridded Population of the World, has evolved significantly since 1995, building on improved data and tools

- ▶ GPWv1: total population on a 5 arc-minute grid, 19,000 admin units
- ▶ GPWv4: total pop, age, sex on a 30 arc-second grid, >12 million admin units
- ▶ GPWv5: under development

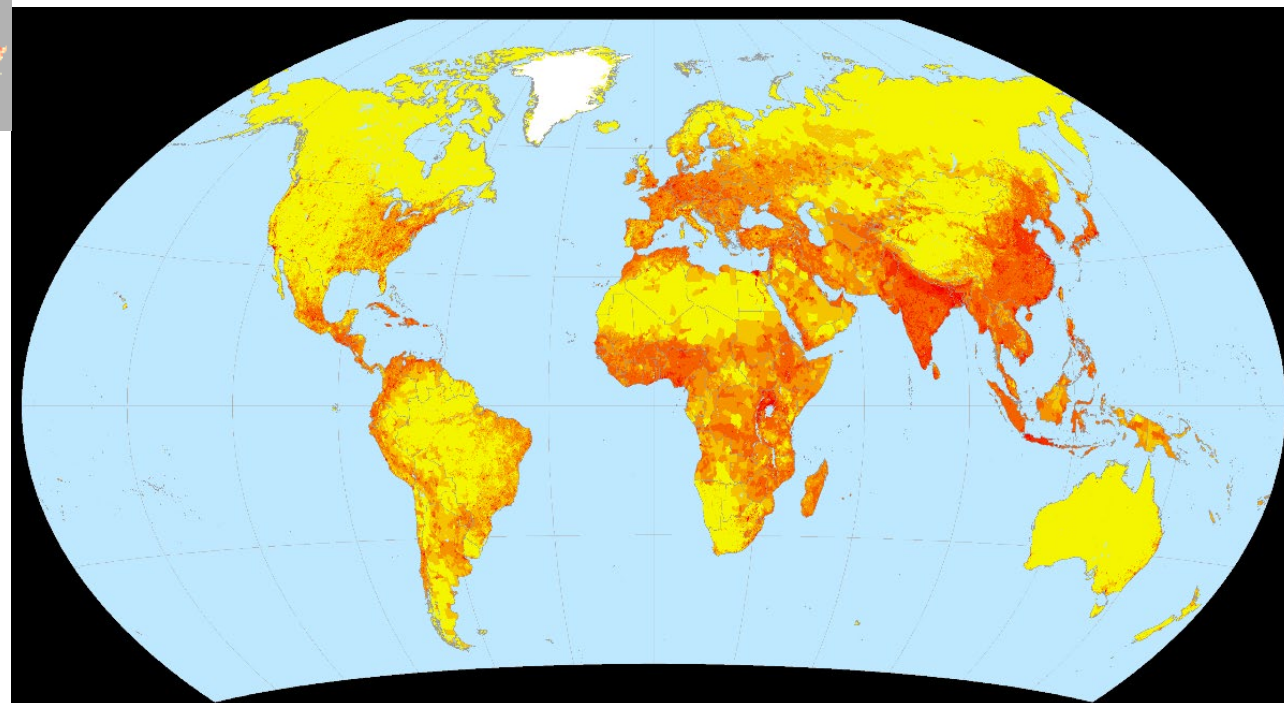
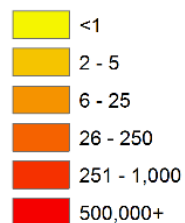


Waldo Tobler
(deceased)



Uwe Deichmann

Persons



Global Urban Points and Polygons Dataset (GUPPD), v1

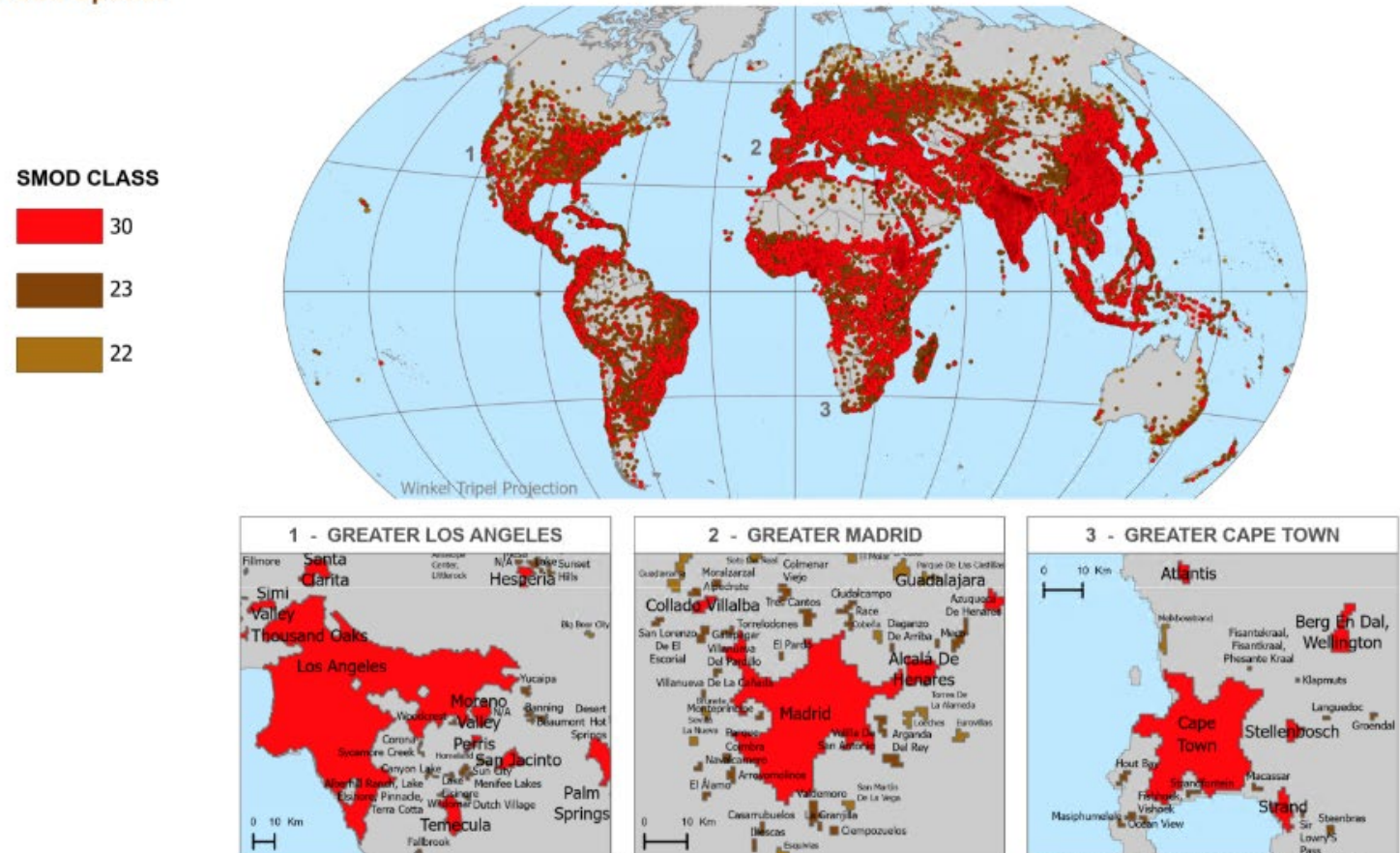
<https://doi.org/10.7927/brq1-xc29>

A global dataset of ~124k urban settlements with place names and population for the years 1975-2030 in five year increments. It includes a hierarchy of settlements, from **urban center**, **dense urban cluster**, to **semi-dense urban cluster**. GUPPD uses open data sources and automated algorithms to assign city names to polygons.

- Key inputs: GHS-SMOD, Global Urban Centres Database, GHS-POP R2023

Global Urban Polygons and Points Dataset (GUPPD), Version 1

Urban Spatial



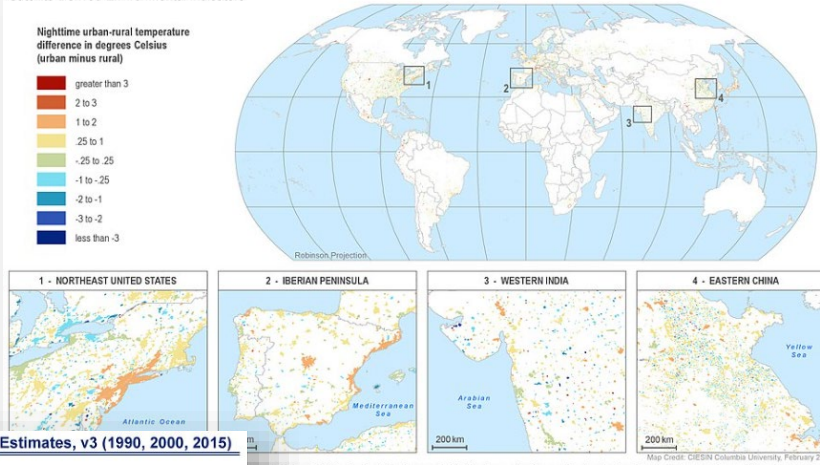
Map Credit: CIESIN Columbia University, May 2024.

MVA

Mitigation,
Vulnerability, and
Adaptation

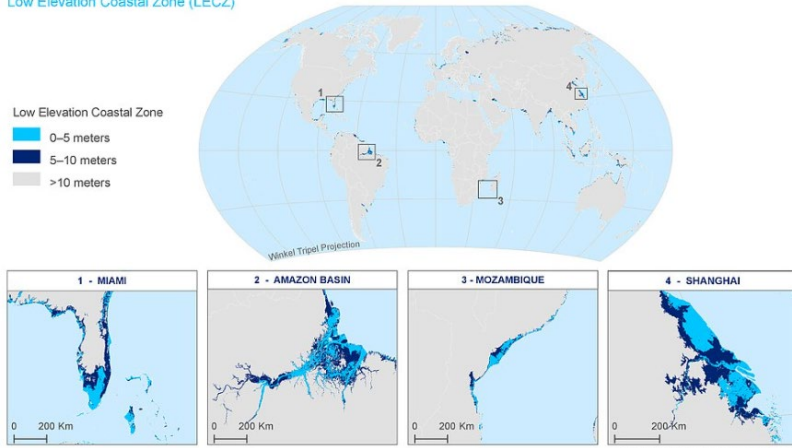
Global Urban Heat Island (UHI) Data Set, 2013: Summer Nighttime Urban-Rural Temperature Difference

Satellite-Derived Environmental Indicators



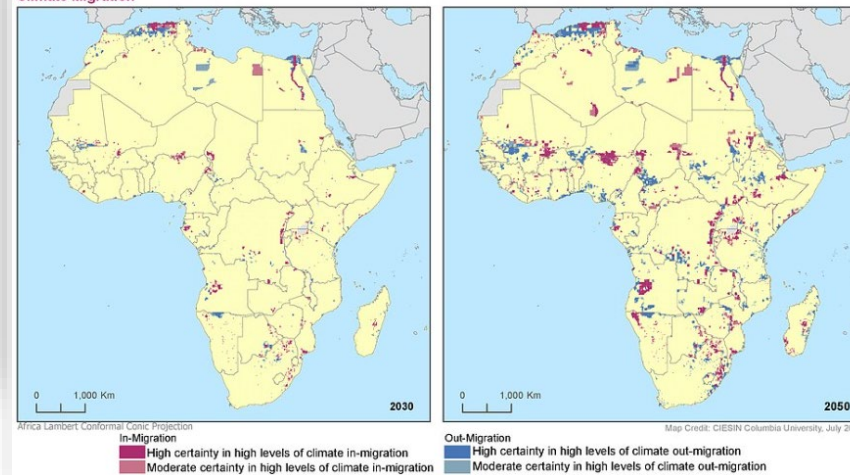
Low Elevation Coastal Zone (LE CZ) Urban-Rural Population and Land Area Estimates, v3 (1990, 2000, 2015)

Low Elevation Coastal Zone (LE CZ)



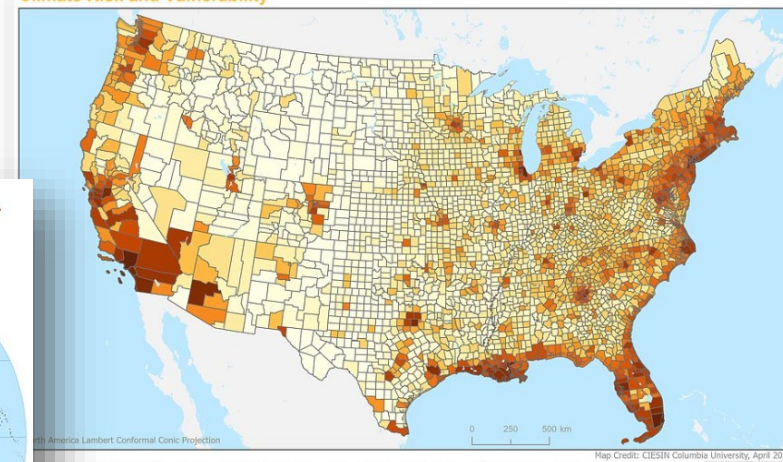
Groundswell Spatial Population and Migration Projections at 1/8th Degree According to SSPs and RCPs, (2030, 2050): Africa

Climate Migration

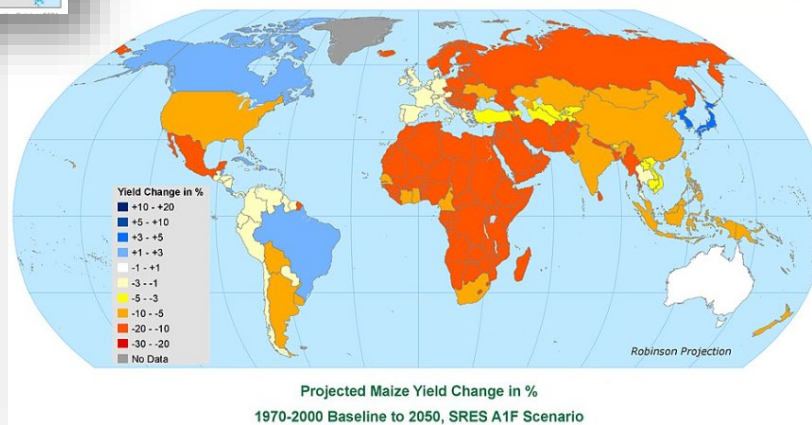


U.S. Climate Risk Projections by County, 2040-2049: Composite Index

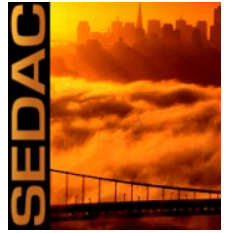
Climate Risk and Vulnerability



Effects of Climate Change on Global Food Production



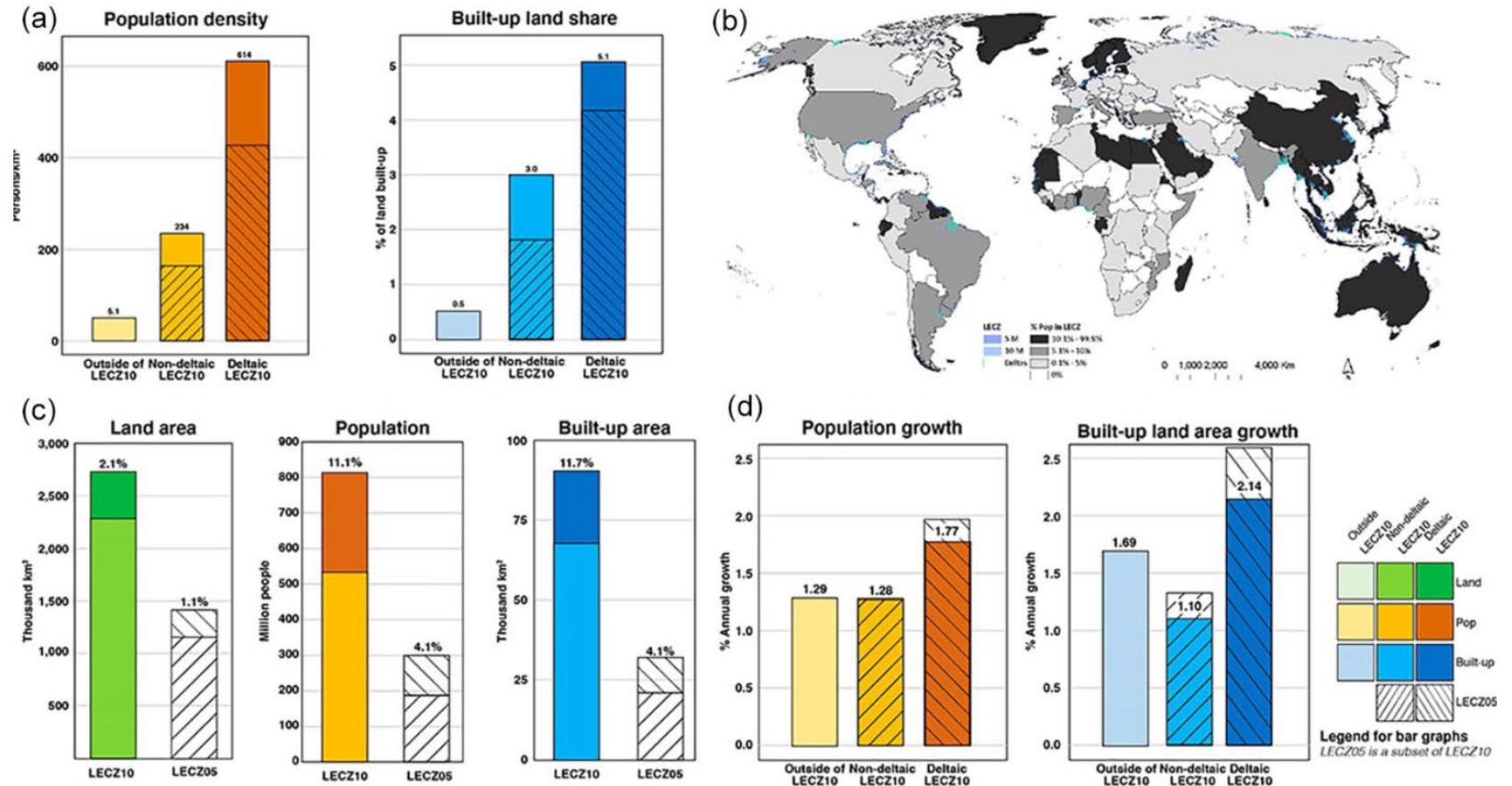
The Low Elevation Coastal Zone (LECZ) Delta Population and Land Area Estimates, v1 (1990, 2000, 2014, 2015)



<https://doi.org/10.7927/4hgr-db70>

The Low Elevation Coastal Zone (LECZ) Global Delta Urban-Rural Population and Land Area Estimates, Version 1 data set provides country-level estimates of urban, quasi-urban, rural, and total population (count), land area (square kilometers), and built-up areas in river delta- and non-delta contexts.

- Key inputs: MERIT-DEM, SRTM, LECZv3, Delta Boundaries



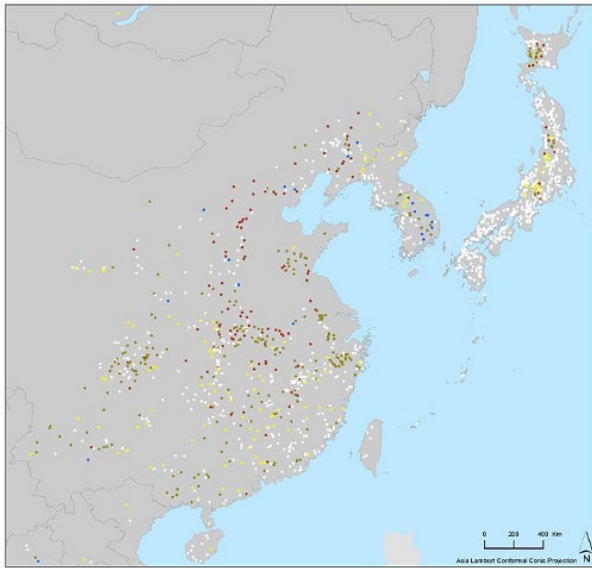
a. Global densities of population and built-up area, outside LECZ10 and in and out of deltaic areas of LECZ10 (and LECZ05), 2015; b. Countries of the world shown by the percentage of the population in the Low Elevation Coastal Zone (LECZ10), overlaid with land area of the LECZ10 and deltas; c. Global quantities of land, population and built-up area, in and out of deltaic areas of LECZ10 (and LECZ05), 2015. Percentages above columns are of LECZ quantities as a % of total quantity (i.e. including outside the relevant LECZ); d. Global annual growth rates of population and built-up area, outside LECZ10 and in and out of deltaic areas of LECZ10 (and LECZ05), 1990–2015

HVA

Hazard Vulnerability Assessment

East Asia: Dams

Global Reservoir and Dam Database, Version 1 (GRanDv1), Revision 01

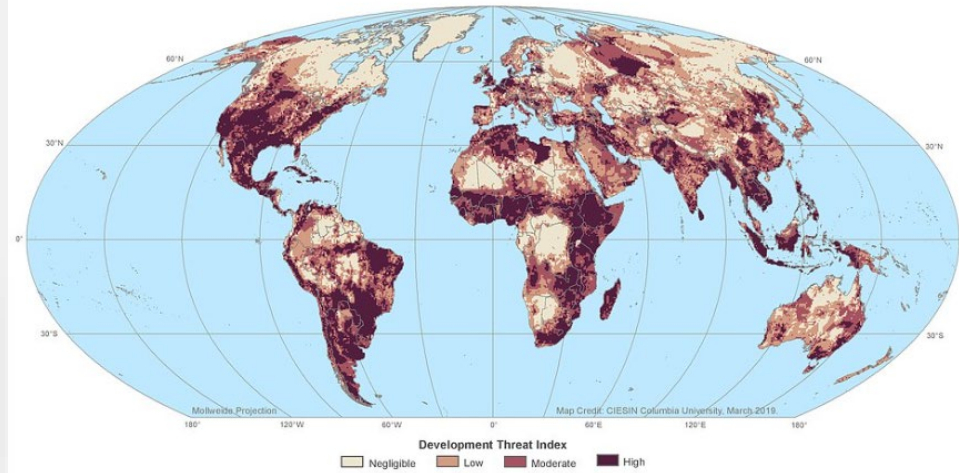


The Global Reservoir and Dam Database, Version 1 (Revision 01) contains 6,862 records of reservoirs and their associated dams with a cumulative storage capacity of 6,197 cubic km. The dams were geospatially referenced and assigned to polygons depicting reservoir outlines at high spatial resolution. While the main focus was to include all dams associated with reservoirs that have a storage capacity of more than 0.1 cubic kilometers, many smaller dams and reservoirs were added where data were available.

- Dam Main Use**
- Fisheries
 - Flood control
 - Irrigation
 - Navigation
 - Not classified
 - Other
 - Recreation
 - Water supply

Development Threat Index, v1 (2015)

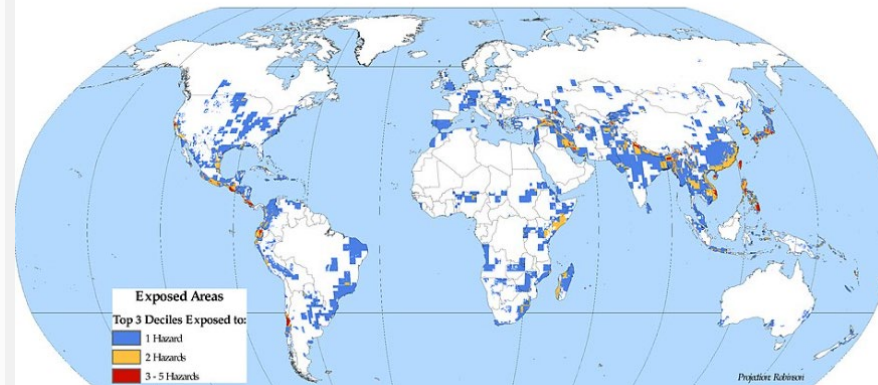
Land Use Land Cover



Development Threat Index

- ◻ Negligible
- ◻ Low
- ◻ Moderate
- ◻ High

Global Distribution of Significant Exposure to Hazards, by Number of Hazards



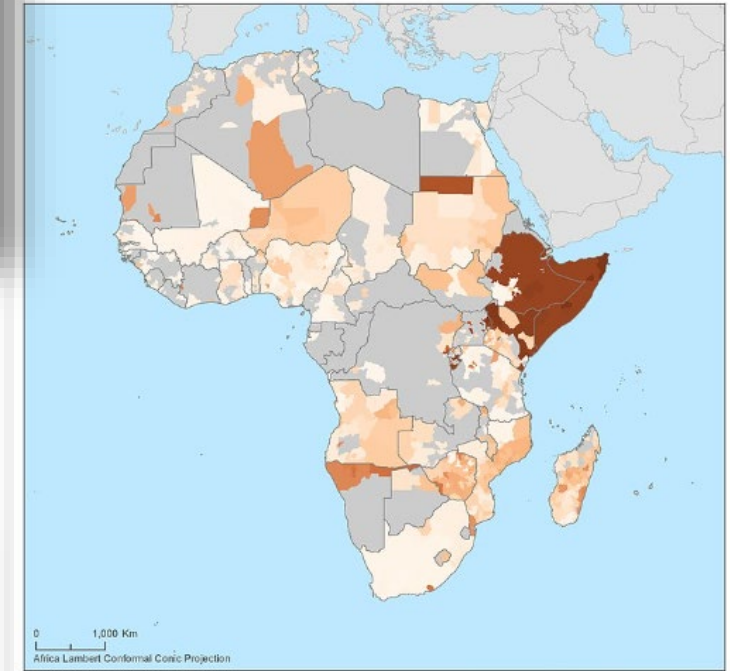
Exposed Areas

Top 3 Deciles Exposed to:

- 1 Hazard
- 2 Hazards
- 3-5 Hazards

Geocoded Disasters (GDIS) Dataset: Africa Death Rate 2009–2018

Natural Disasters

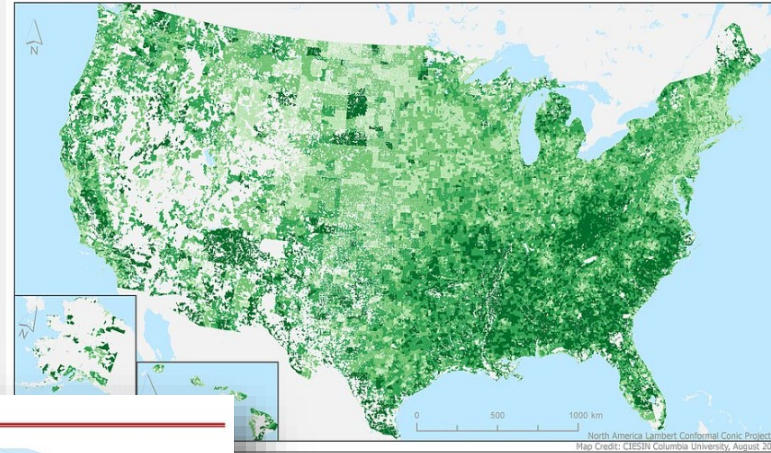


PFS

Poverty and Food Security

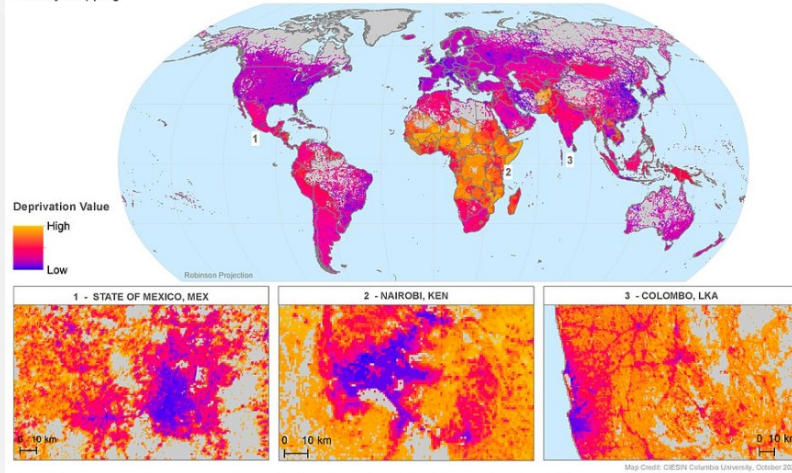
U.S. Social Vulnerability Index Grids (2018): Socioeconomic Status Score

U.S. Census Grids



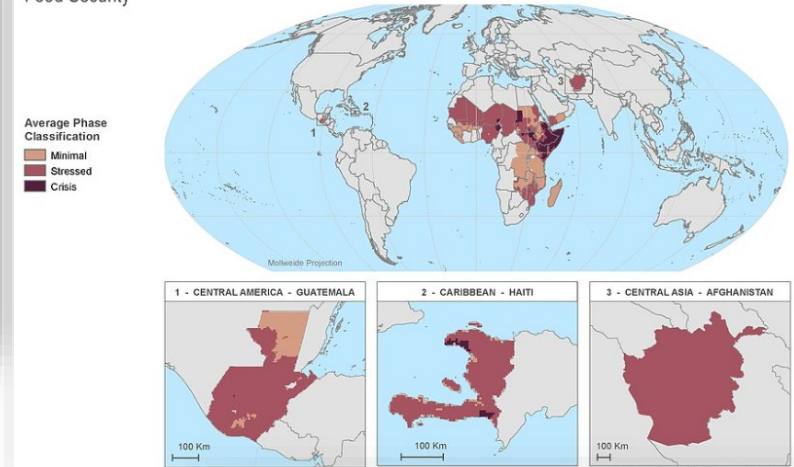
Gridded Relative Deprivation Index (GRDI), Version 1

Poverty Mapping



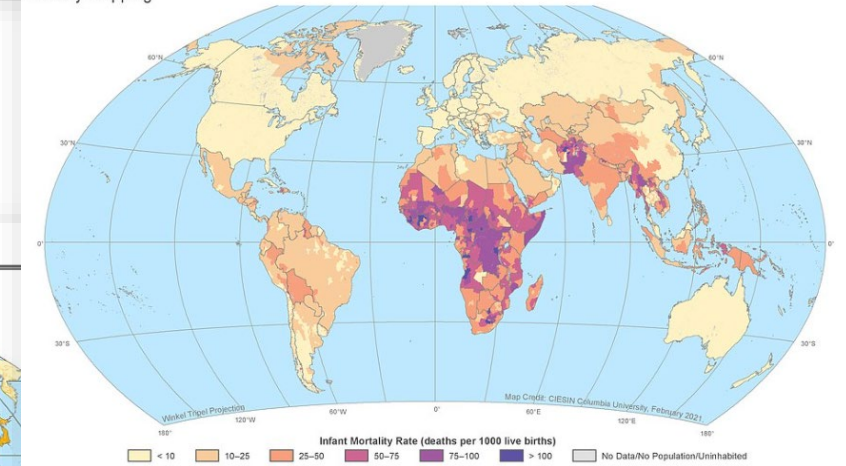
Food Insecurity Hotspots Data Set, v1 (2009-2019)

Food Security



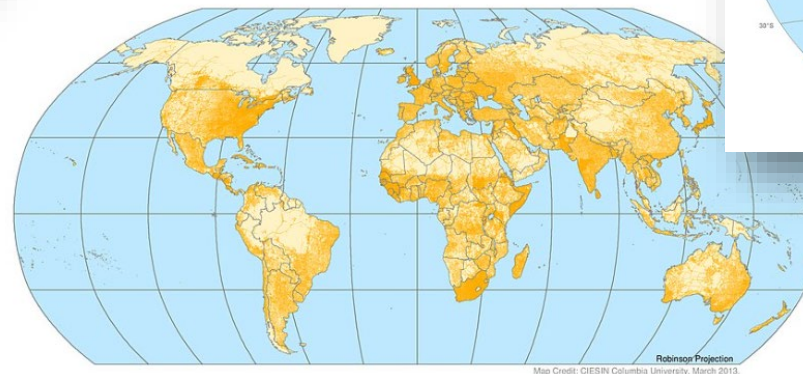
Global Subnational Infant Mortality Rates, Version 2.01 (2015)

Poverty Mapping



Global Roads Open Access Data Set, Version 1 (gROADSv1)

Global Roads

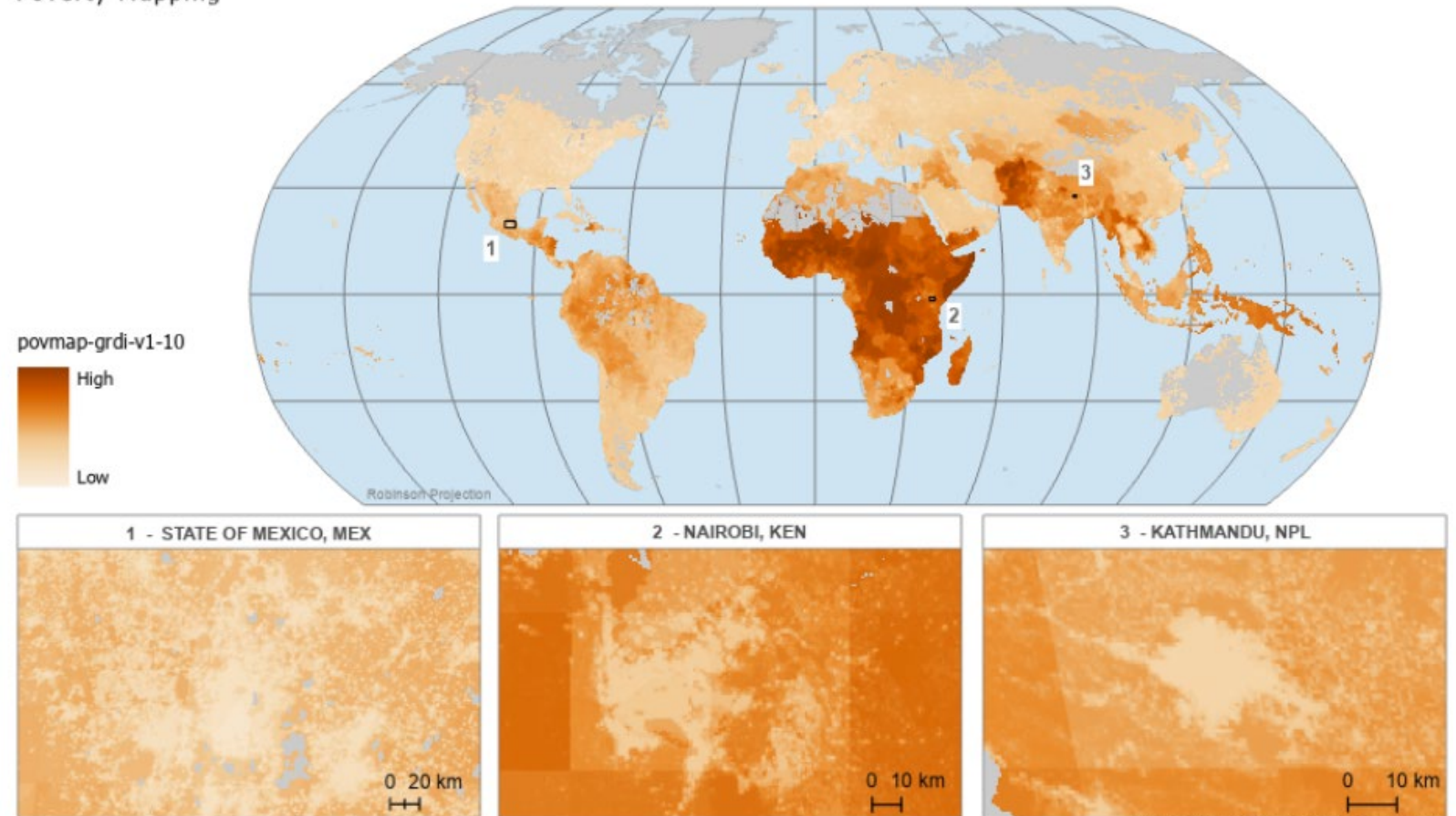


Global Relative Deprivation Index v1.10

- **Child Dependency Ratio (CDR):** Higher CDR implies higher dependency on working population.
- **Infant Mortality Rate (IMR):** Common indicator of poverty at the low end of the development spectrum.
- **Subnational Human Development Index (SHDI):** Assesses human well-being through education levels, life expectancy, and GDP
- **Ratio of built-up area (BUILT):** We assume rural populations are more likely to experience higher degrees of multidimensional poverty compared to urban populations
- **Nighttime Lights (VNL 2020):** Stable night lights are closely associated with anthropogenic activities, economic output, and infrastructure development.

Gridded Relative Deprivation Index (GRDI), Version 1.10

Poverty Mapping



Map Credit: CIESIN Columbia University, March 2025.

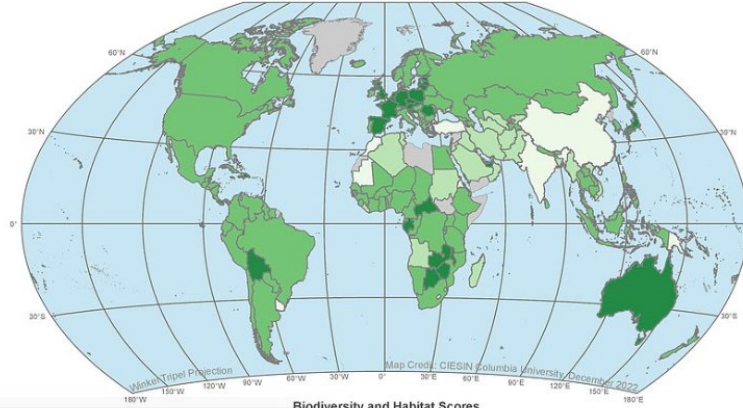
The Global Gridded Relative Deprivation Index (GRDI), Version 1.10 (GRDI v1.10) data set characterizes relative levels of multidimensional deprivation and poverty at 30-seconds spatial resolution (~1 km at the equator) ranging from 0 (lowest) to 100 (highest). GRDI v1.10 is built from sociodemographic and satellite data inputs from five global spatial layers that were spatially harmonized, indexed, and aggregated into an index. These include subnational Human Development Index (SHDI) and infant mortality rate (IMR) data, gridded child dependency ratios (CDR), nighttime lights intensity, and proportion of the grid cell that is built up.

ESD

Environment and Sustainable Development

2022 EPI: Ecosystem Vitality Policy Objective - Biodiversity and Habitat

Environmental Performance Index (EPI)

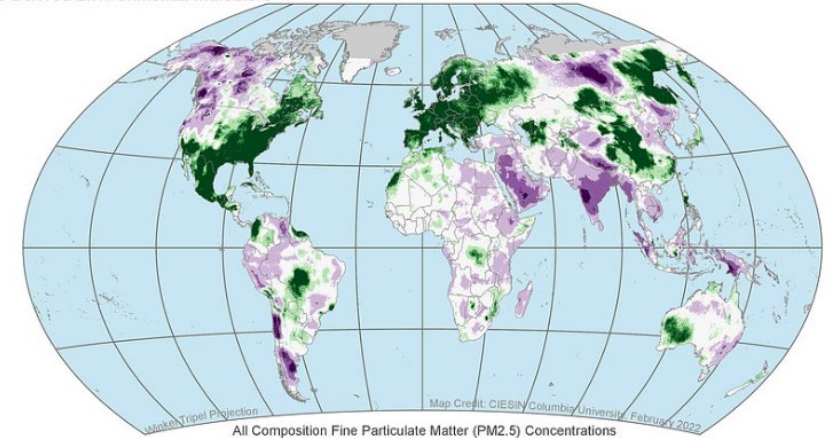


Biodiversity and Habitat Scores

- 40.0-60.0
- 60.0-80.0
- 80.0-91.9
- No Data

Global Annual PM2.5 Grids from MODIS, MISR and SeaWiFS Aerosol Optical Depth (AOD), V4.GL.03 (1998-2019): All Composition PM2.5 Percent Change, 5-Year Averages

Satellite-Derived Environmental Indicators

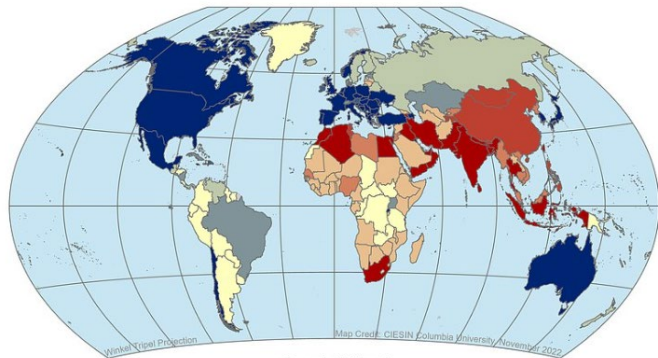


All Composition Fine Particulate Matter (PM2.5) Concentrations
Percent Change from 1998 to 2019 using 5-Year Averages

- < -25
- 25 to -20
- 20 to -10
- 10 to 10
- 10 to 40
- 40 to 80
- > 80

Country Trends in Major Air Pollutants: Change in Sulfur Dioxide (SO2)

Air Quality Data for Health-Related Applications

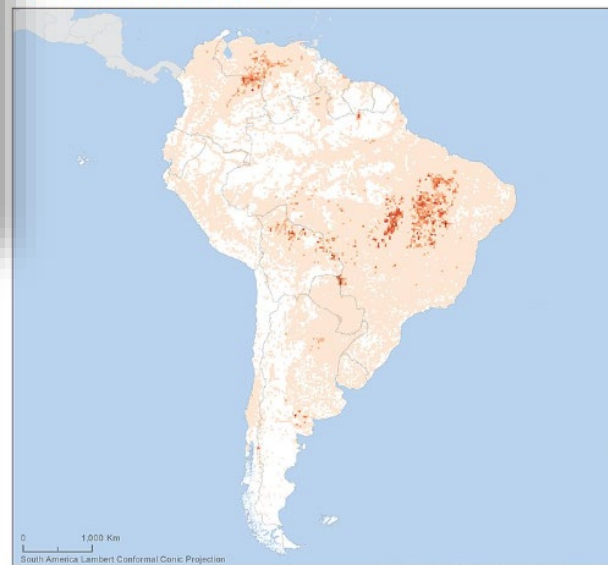


Change in SO2 (ppm)
Average SO2 (2003, 2004, 2005) to Average SO2 (2016, 2017, 2018)

- <-0.004
- 0.004 to -0.003
- 0.003 to -0.002
- 0.002 to -0.001
- 0.001 to 0.000
- 0.000 to 0.001
- 0.001 to 0.002
- 0.002 to 0.003
- >0.003

Total Area Burned for All Fire Types, 2015: South America

Satellite-Derived Environmental Indicators

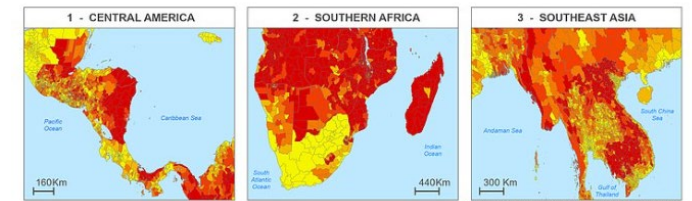
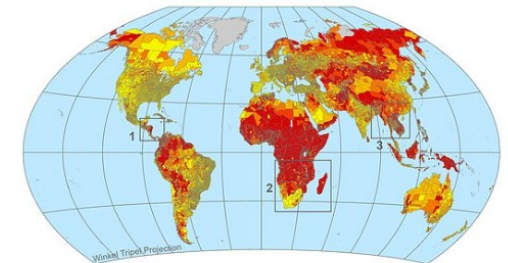


SDG Indicator 7.1.1: Access to Electricity, 2023 Release (Subnational)

Sustainable Development Goal Indicators (SDGI)

Percent of Population with Access to Electricity (%)

- 0-20
- 20-40
- 40-60
- 60-80
- 80-100
- NA



Data available at:

<https://www.earthdata.nasa.gov/topics/human-dimensions/data-access-tools>

&

<https://dataverse.harvard.edu/dataverse/SEDAC>



Things Fall Apart: Lessons from a Defunded Data Repository

ESSAY

ALEX DE SHERBININ

Journal of Ubiquity Press

Chinua Achebe's award winning novel, *Things Fall Apart* (1958), chronicles the cultural disintegration that occurred during the early phases of the British colonization of Nigeria. Any moment of abrupt cultural change is unsettling, and its results are unpredictable. The same can be said of the current moment in which belief systems that were foundational in the new era of digital data preservation are being shaken to the core. Since the start of the second Trump administration, we have seen a progressive removal of climate, environmental, and socioeconomic data from federal websites, with further threats to dismantle data infrastructure looming.¹ This essay represents a short personal account of the data rescue efforts of the NASA Socioeconomic Data and Applications Center (SEDAC), which was run by Columbia University's Integrated Earth System Information (CIESIN) since the late 1990s, and for which I served as deputy manager and then manager for nearly 20 years. I share this account to offer lessons for other data repositories and to underscore the importance of solidarity in the data community in the face of shrinking resources and foundering political support.

SEDAC was established in the 1990s, as part of NASA's Mission to Planet Earth, to serve as a bridge between the Earth and social science research communities. It provided data complementary to NASA's satellite remote sensing assets—such as gridded data representing population distribution, economic activity, poverty and social vulnerability, as well as infrastructure and sustainability data sets—all with the goal of serving the human dimensions of global change research community. SEDAC's flagship data product, the Gridded Population of the World (GPW), was the first raster representation of global population, setting the stage for increasingly sophisticated modeled population distributions such as Landscan, WorldPop, and GHS-POP. The American Geophysical Union (AGU) recently recognized GPW as an 'impactful dataset,' defined as one that supports the broad spectrum of research, analysis, and decision-making. SEDAC data were also widely used by practitioners such as urban planners and humanitarian and development organizations. **DOI: 10.5334/dsj-2026-009**

For SEDAC, the rambles in Washington DC began just days after the inauguration in late January 2025, when we were notified by NASA that terms related to environmental justice, diversity, equity, and inclusion needed to be scrubbed from all its data center websites. These sad but required changes became more impactful for SEDAC when, on March 7th, SEDAC received a stop work order from NASA, part of a larger set of orders that were issued to all Columbia University principal investigators of federally funded projects. Although concerning, we hoped that this could be reversed through negotiations, and indeed eventually, most of the federal funding was restored to Columbia as part of a settlement agreement. However, by late March, we learned that SEDAC was on a list of the Department of Government Efficiency

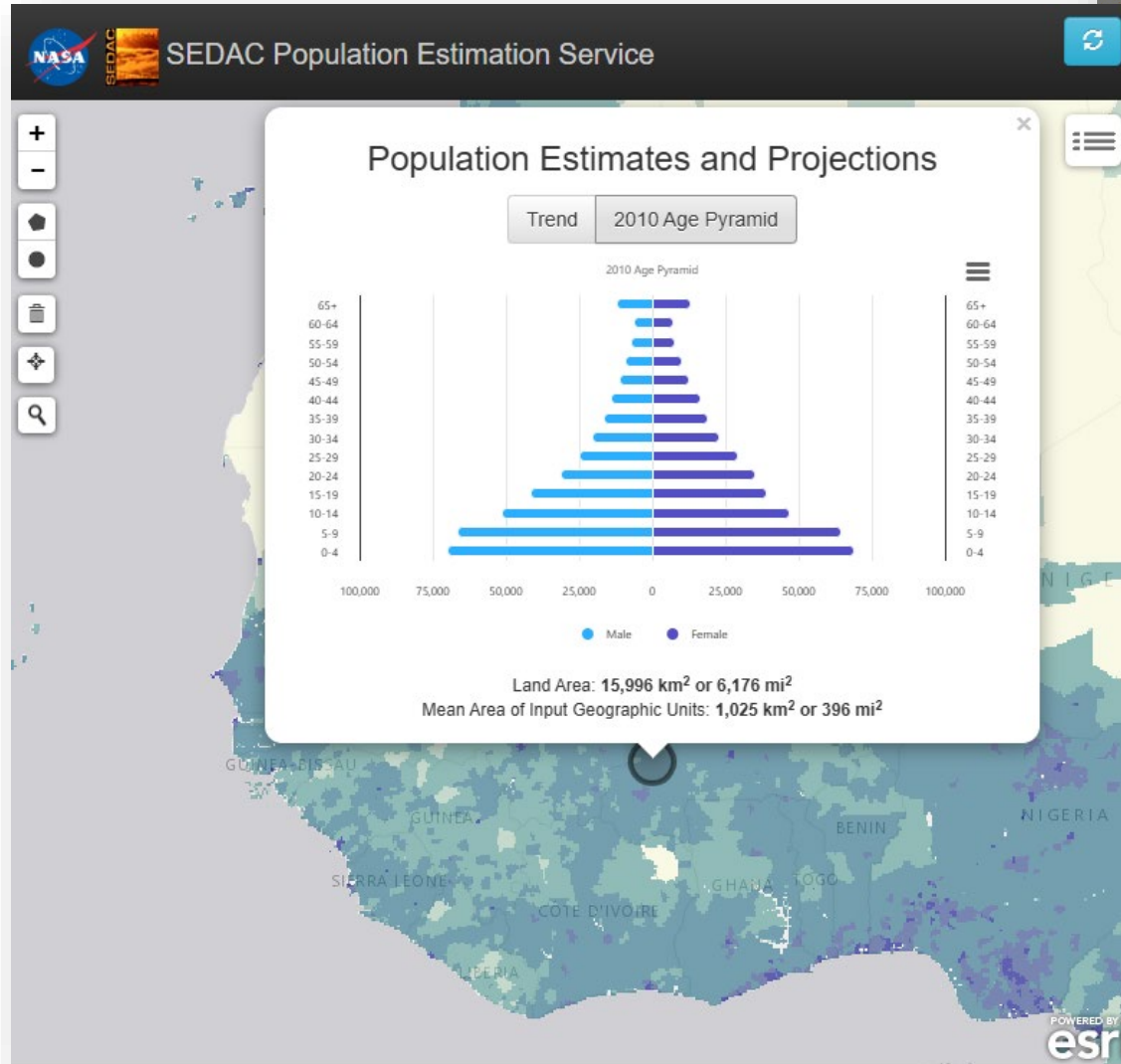
CORRESPONDING AUTHOR:
Alex de Sherbinin, PhD
Center for Integrated Earth
System Information (CIESIN),
Columbia Climate School, US
amd155@columbia.edu

KEYWORDS:
data repositories; data
preservation

TO CITE THIS ARTICLE:
de Sherbinin, A 2026 Things
Fall Apart: Lessons from a

Applications

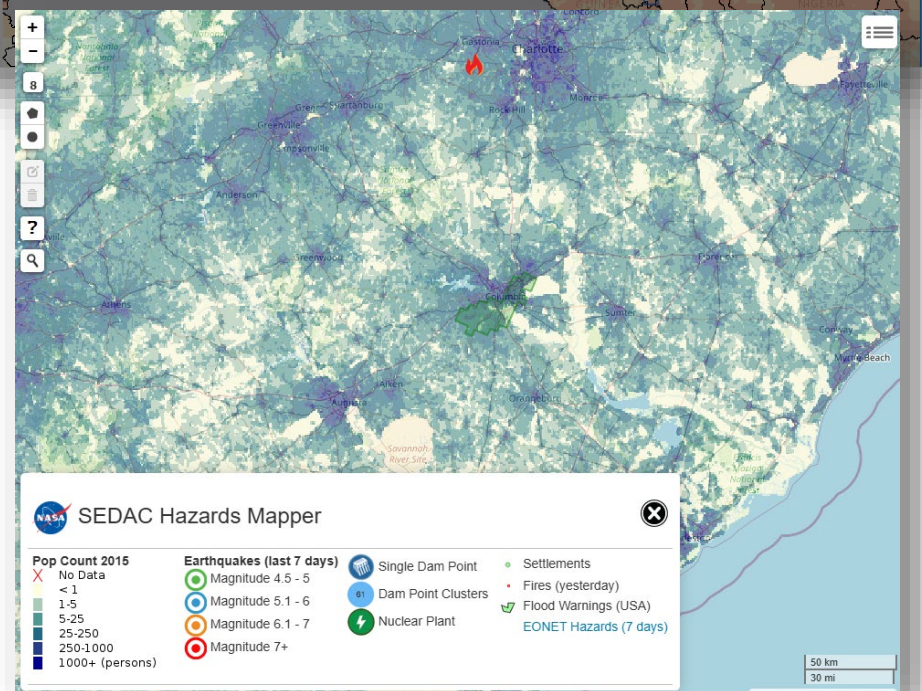
Population Estimation Service (PES)



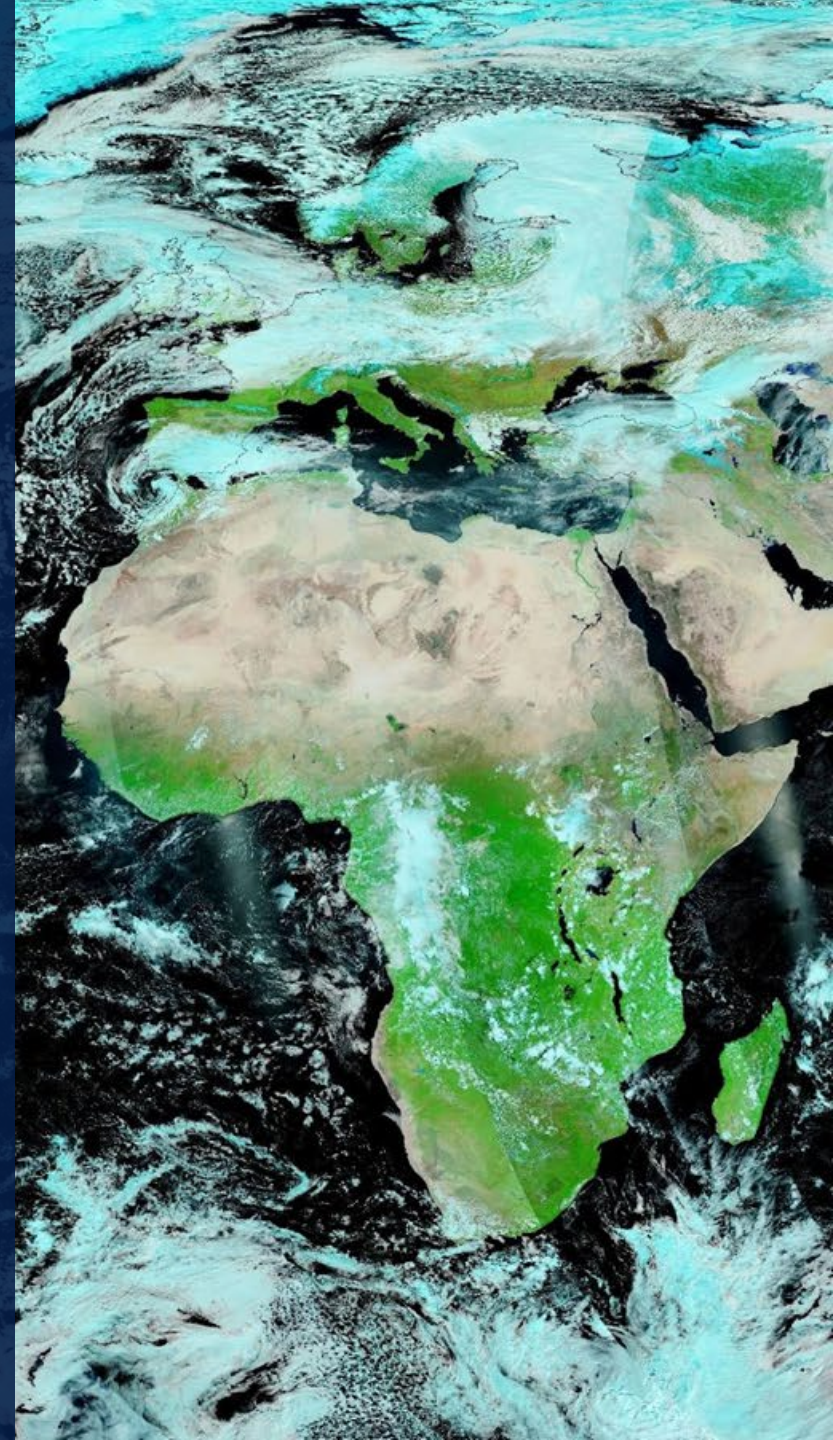
POPGRID Viewer



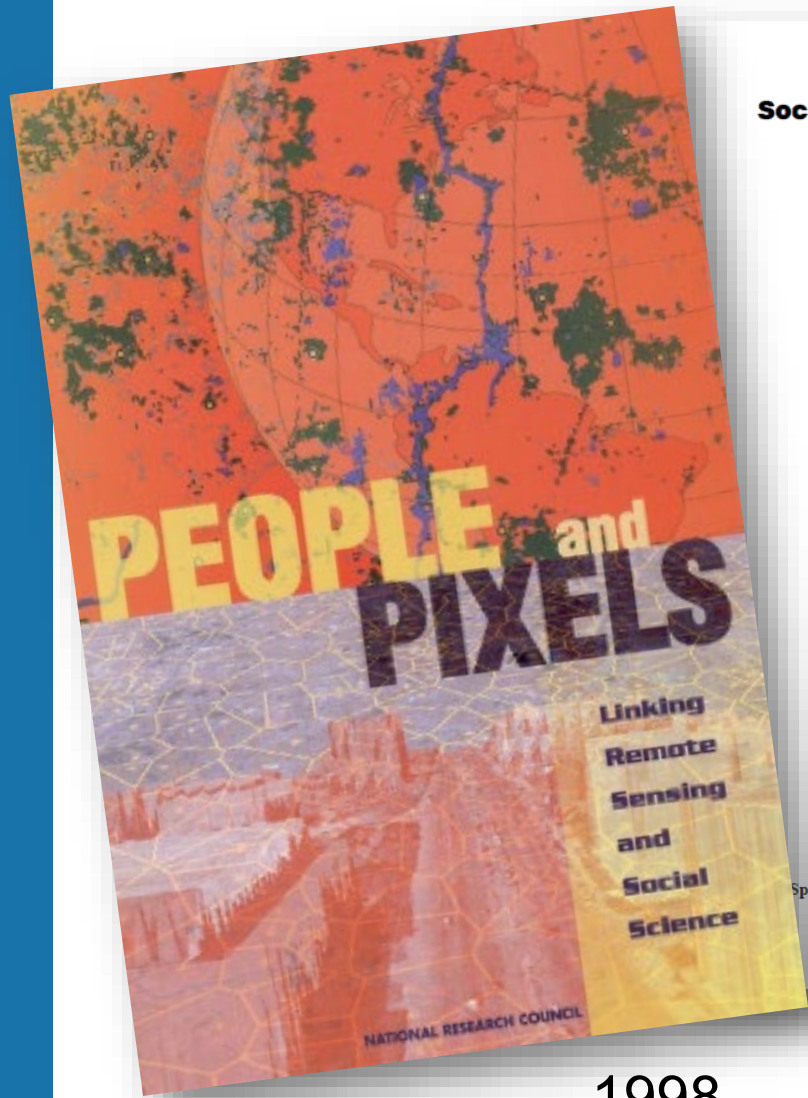
SEDAC Hazards Mapper



Analysis of SEDAC data citations



SEDAC sought to support social scientists in the use of EO data...



1998

A CIESIN Thematic Guide to Social Science Applications of Remote Sensing

Alex de Sherbinin¹
Deborah Balk
Karina Yager
Malanding Jaiteh
Francesca Pozzi
Chandra Giri
Antoinette Wannebo

13

Remote Sensing and Socioeconomic Data Integration: Lessons from the NASA Socioeconomic Data and Applications Center

Alex de Sherbinin



Sponsored by the Socioeconomic Data and Applications Center (SEDAC) of the U.S. National Aeronautics and Space Administration, Goddard Space Flight Center under contract NAS5-98162

2002

Population and Environment
<https://doi.org/10.1007/s11111-019-00326-5>

ORIGINAL PAPER

People and Pixels 20 years later: the current data landscape and research trends blending population and environmental data



Tracy A. Kugler¹ · Kathryn Grace² · David J. Wrathall³ · Alex de Sherbinin⁴ · Engstrom⁸ · Carolynne Hultquist⁷ · Catherine Linard¹⁰ · Emilio Moran¹¹ · Forrest Stevens⁹ · Tellman¹³ · Jamon Van Den Hoek³

2016



Cyberseminars

February 2018: People and Pixels Revisited: 20 years of progress and new tools for population-...

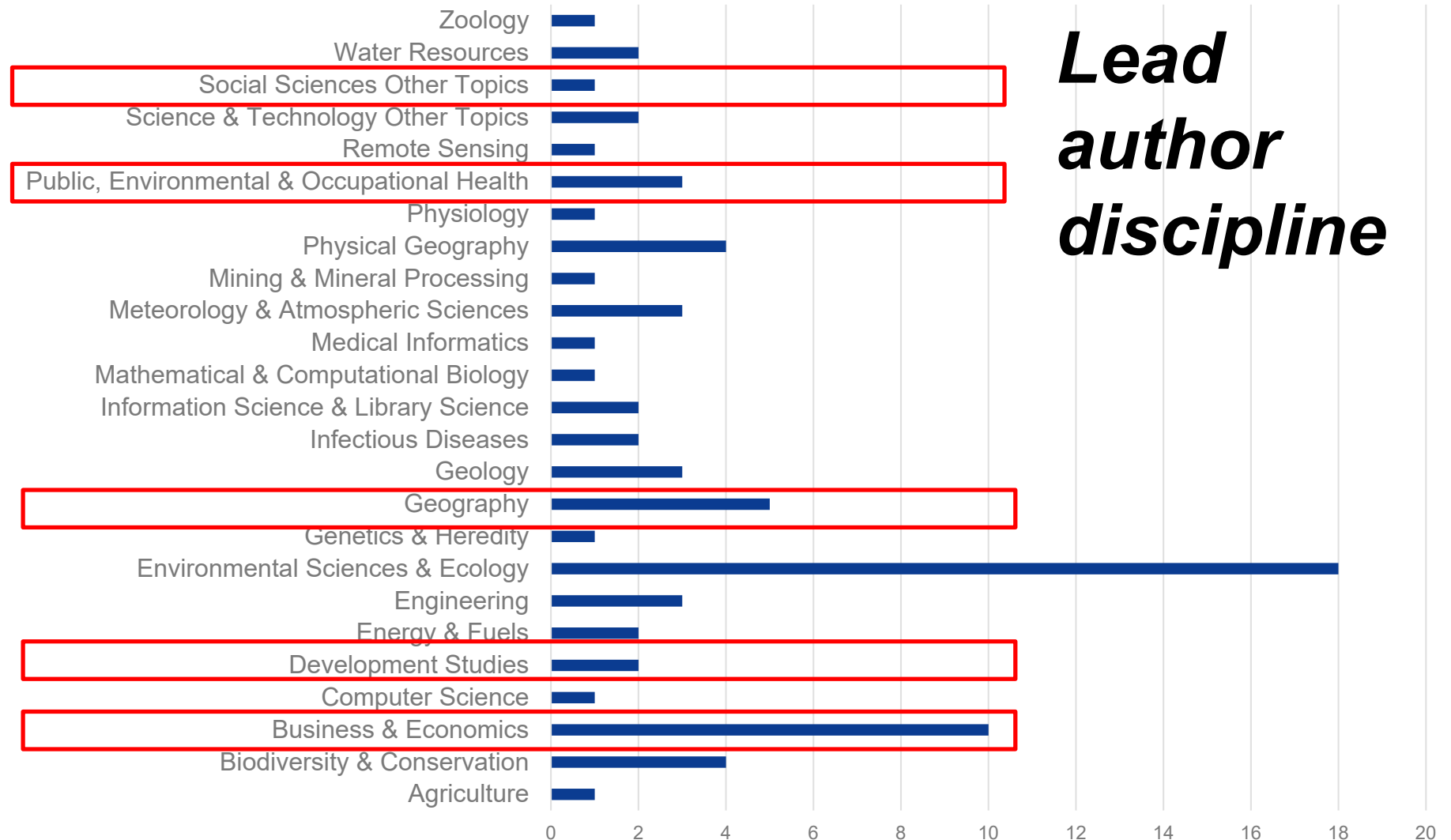
People and Pixels Revisited: 20 years of progress and new tools for population-environment research
20 February 2018 to 27 February 2018

2018

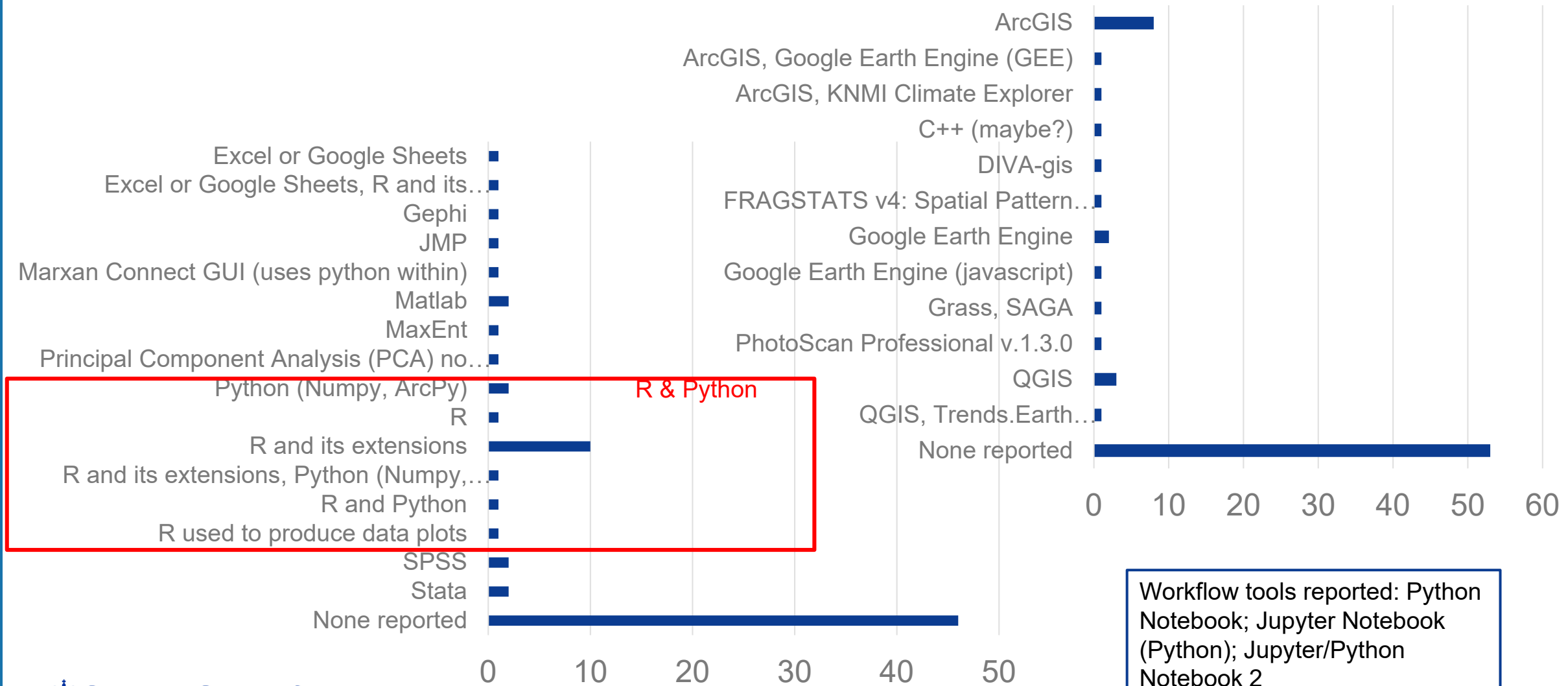
Analysis of 75 peer-reviewed articles that cited SEDAC data (2021-2022)

Randomly selected 75 articles of 1,434 that cited SEDAC data during 2021-2022

We were interested in **characteristics** of current SEDAC data users, **data integration** and **scientific tools and workflows**



Commonly used tools for analysis



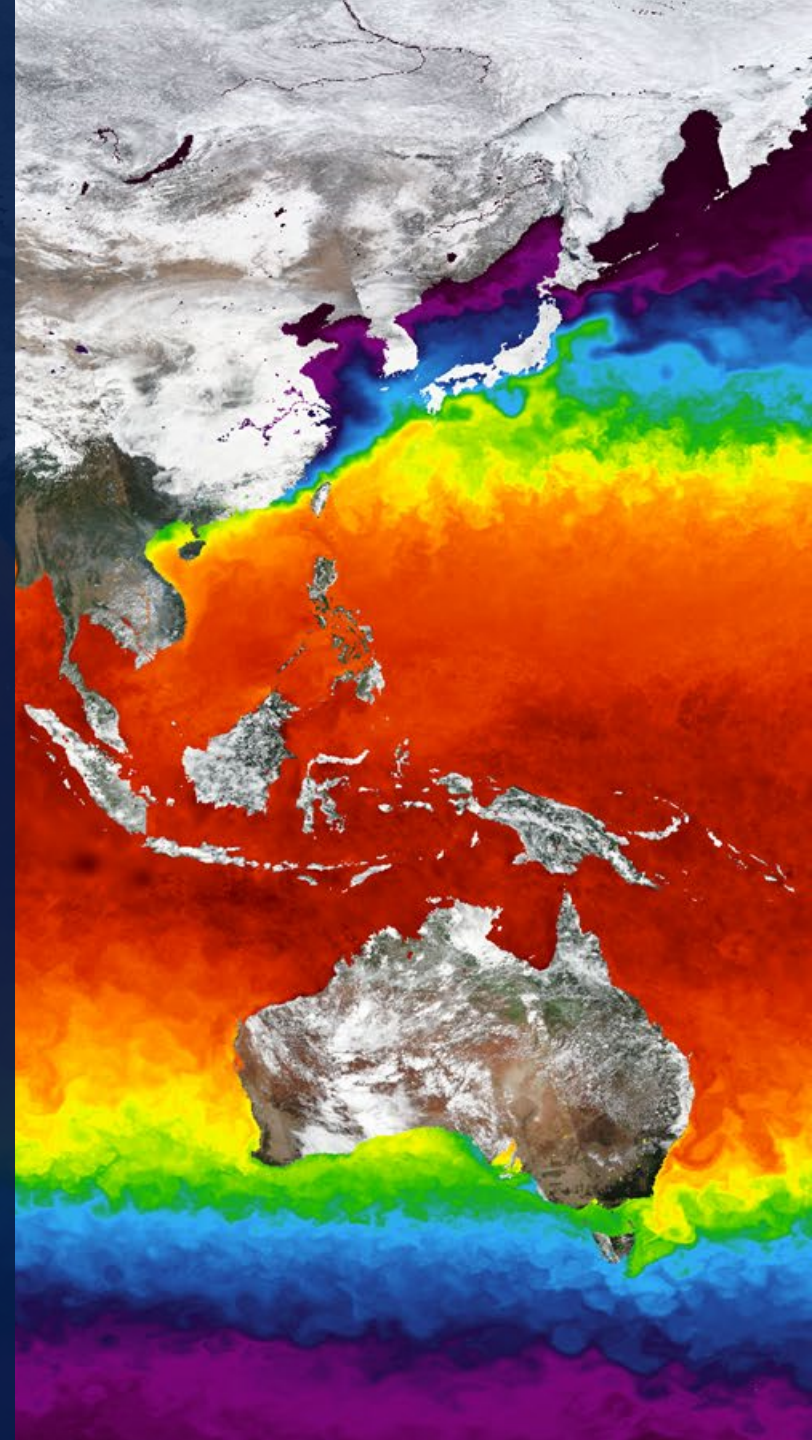
SEDAC Open Science Workshop, 9 January 2024

Sixty participants convened to address applications **cloud-based** and **open data** and **code** to human-environment research



<https://zenodo.org/records/10636022>

Examples of EO- Socioeconomic Data Integration



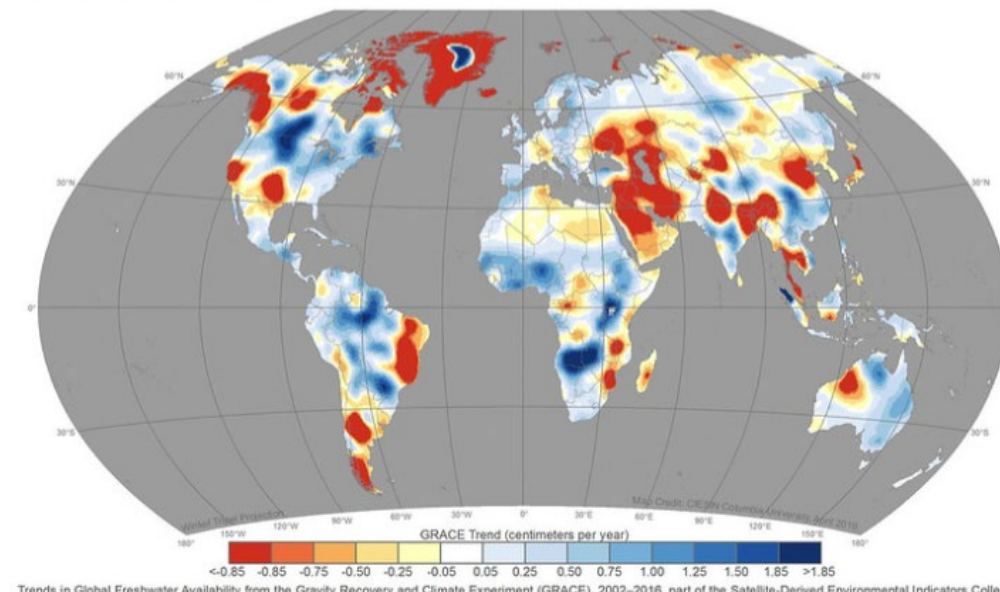
The Satellite Derived Indicators Collection



- Based on a NASA ROSES research grant SEDAC developed a collection of easily interpreted EO-derived data sets describing environmental changes

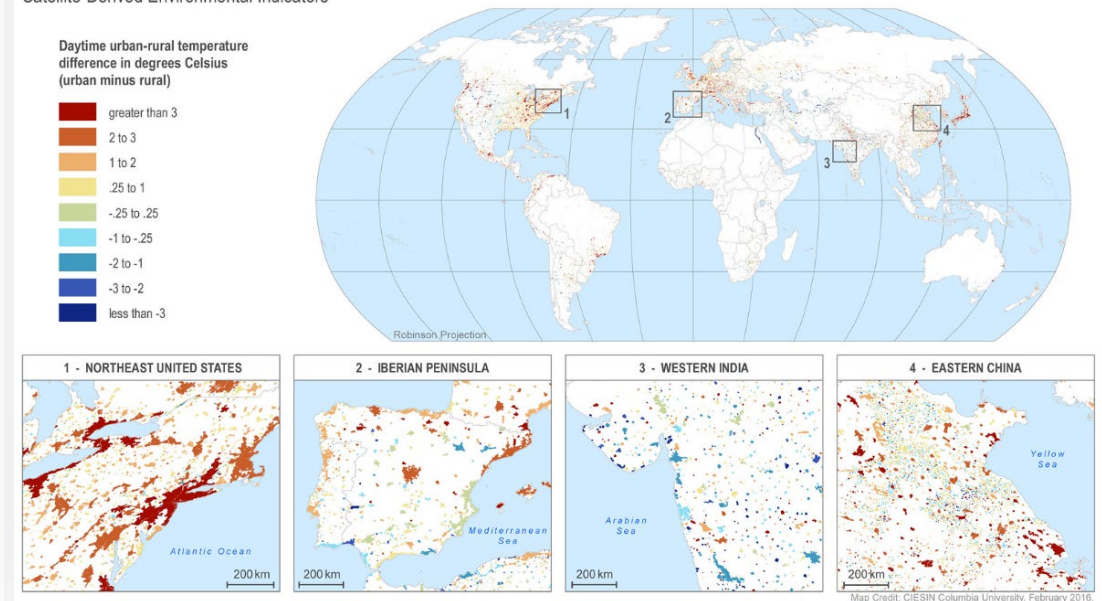
Global Changes in Freshwater Availability based on GRACE

Trends in Global Freshwater Availability from the Gravity Recovery and Climate Experiment (GRACE), 2002–2016
Satellite-Derived Environmental Indicators



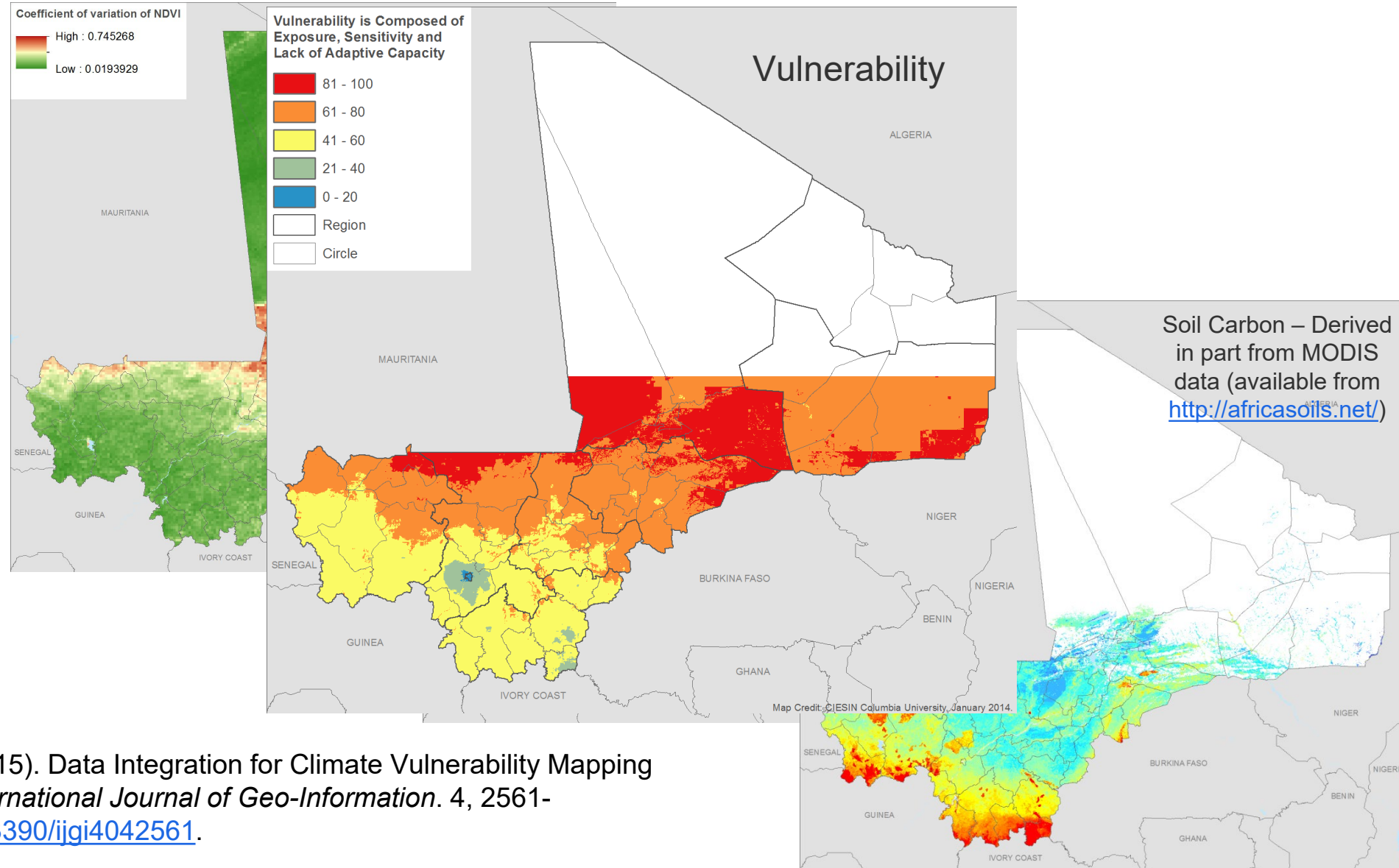
Global Urban Heat Island Data Set combining MODIS LST & GRUMP

Global Urban Heat Island (UHI) Data Set, 2013: Summer Daytime Urban-Rural Temperature Difference
Satellite-Derived Environmental Indicators



Decision support: Mali climate vulnerability mapping using EO and socioeconomic data

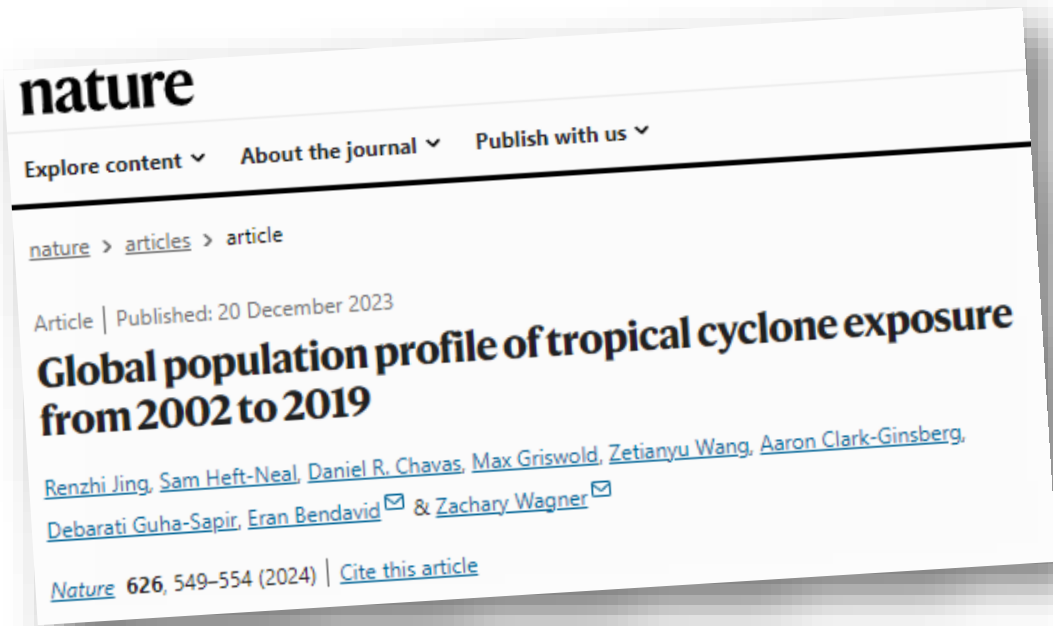
For USAID, CIESIN compiled spatial indicators across the three dimensions of vulnerability – exposure, sensitivity, and adaptive capacity – including EO and spatially explicit data on poverty and related indicators



de Sherbinin, A., et al. (2015). Data Integration for Climate Vulnerability Mapping in West Africa. *ISPRS International Journal of Geo-Information*. 4, 2561-2582. <http://dx.doi.org/10.3390/ijgi4042561>.

Data Citations: GRDIv1

Global Gridded Relative Deprivation Index v1 (GRDIv1)

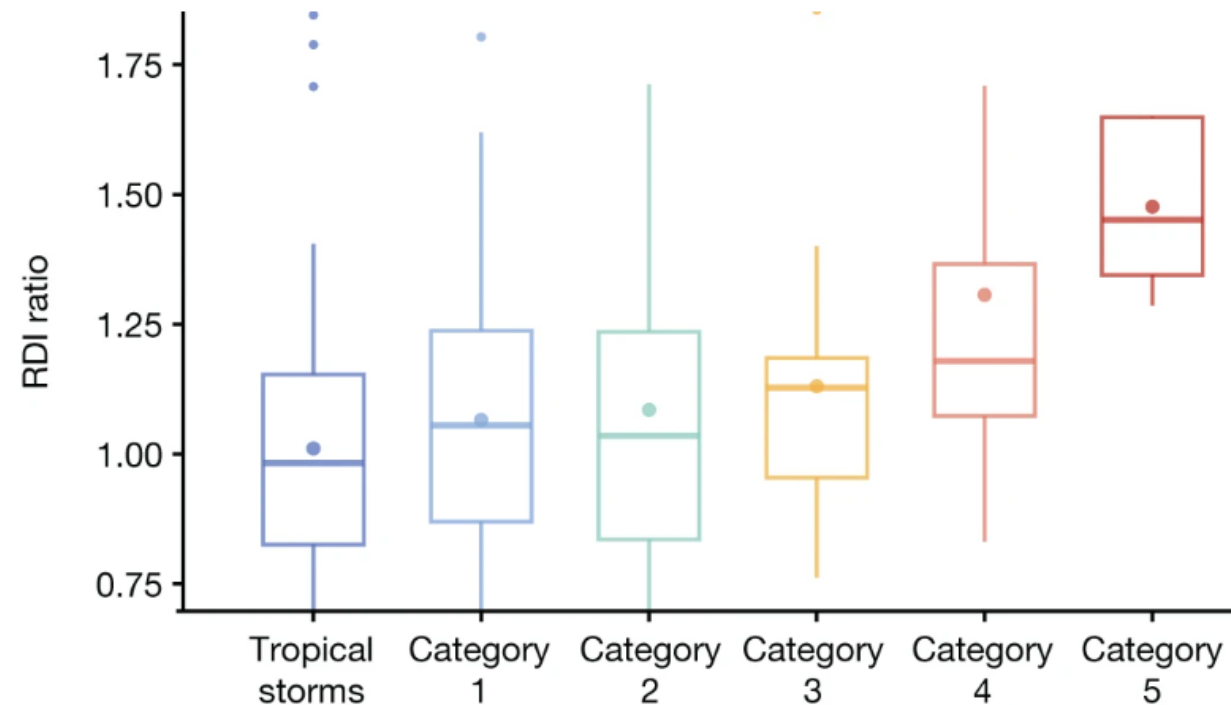


<https://doi.org/10.1038/s41586-023-06963-z>

Impact Factor: 64.8

Fig. 5: The relative deprivation is accentuated with increasing storm severity.

From: [Global population profile of tropical cyclone exposure from 2002 to 2019](#)



Data Citations : Remote Sensing Integration

Gridded Population of the World (GPW), v4.11, Global Human Settlement Layer-Population (GHS-POP), High Resolution Settlement Layer (HRSL), DMSP-OLS (Defense Meteorological Satellite Program Operational Linescan System) and VIIRS-DNB (Visible Infrared Imaging Radiometer Suite Day/Night Band)

Joule

CellPress

Article

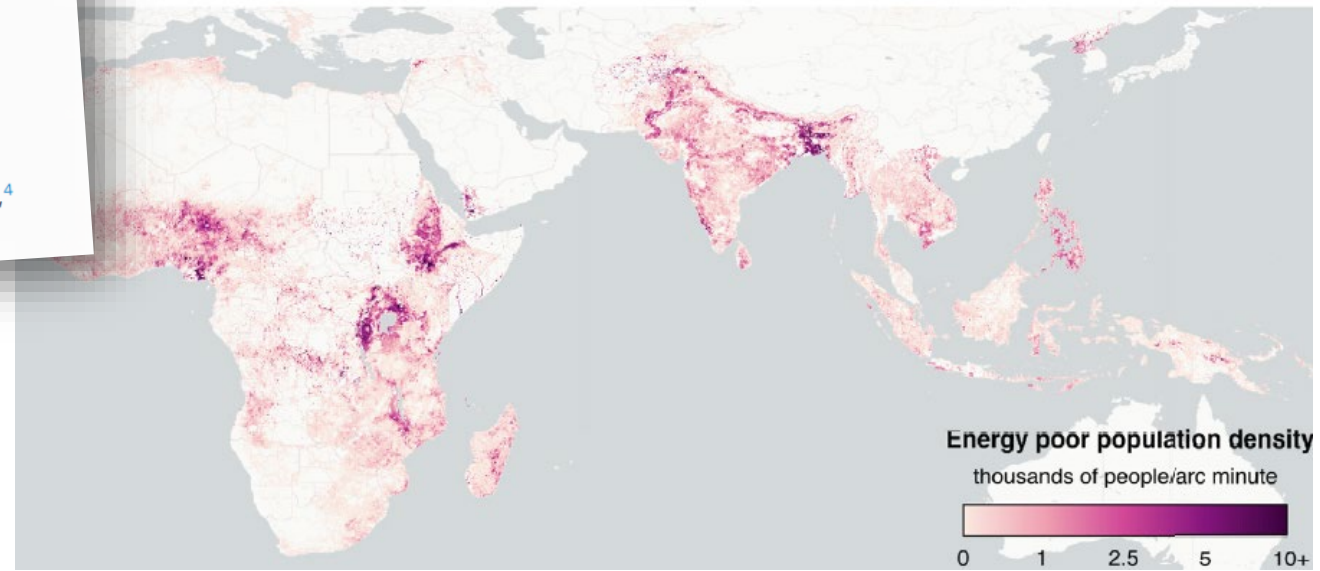
Lost in the dark: A survey of energy poverty from space

Brian Min,^{1,8,*} Zachary P. O’Keeffe,¹ Babatunde Abidoye,² Kwawu Mensan Gaba,³ Trevor Monroe,⁴ Benjamin P. Stewart,⁴ Kimberly Baugh,^{5,6} and Bruno Sánchez-Andrade Nuño⁷

<https://doi.org/10.1016/j.joule.2024.05.001>

Impact Factor: 39.8

1.18 billion are energy poor, 2020



Data Citations: Remote Sensing Integration

Gridded Population of the World (GPW), v4.11, NASA Gravity Recovery and Climate Experiment (GRACE), and Global Land Data Assimilation System (GLDAS)

Fig. 1.b: Surface water deficits and the groundwater required to meet them.

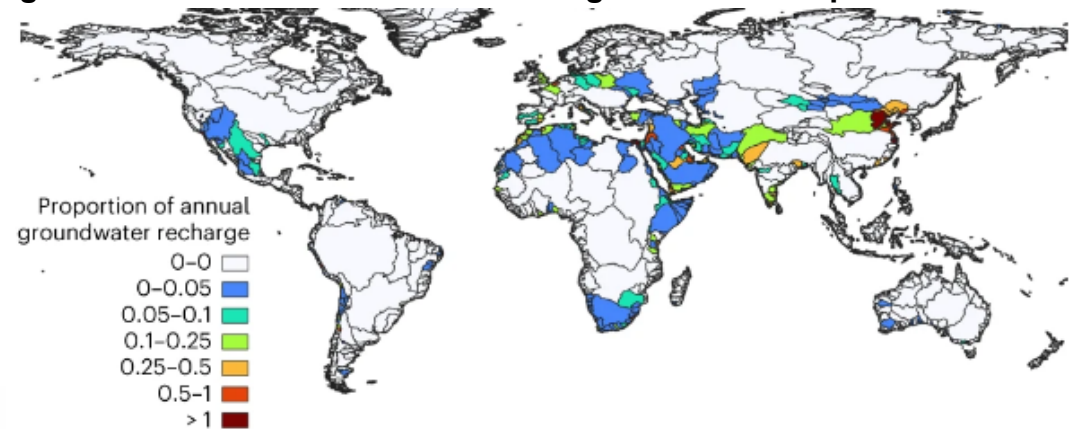
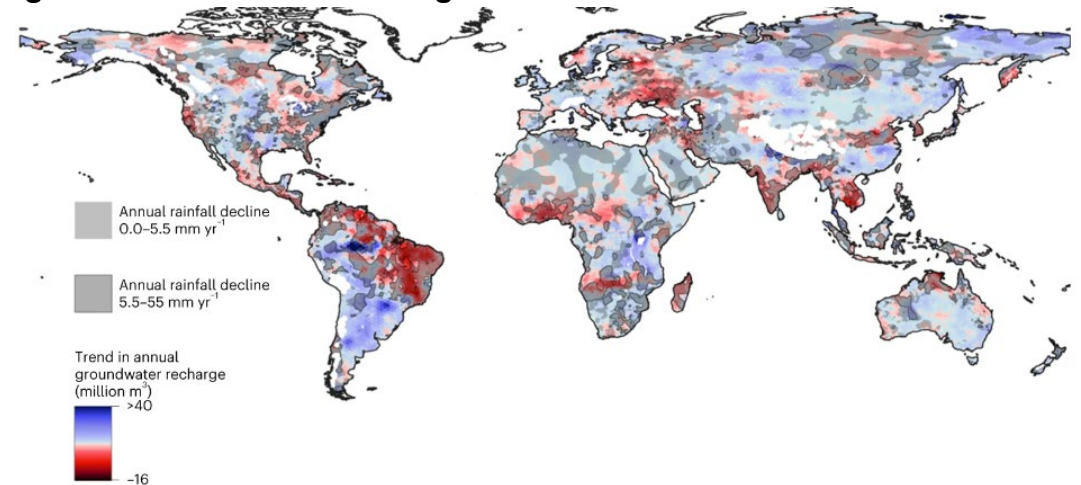


Fig. 2.b: Groundwater recharge and trends.



<https://doi.org/10.1038/s41893-023-01247-w>

Impact Factor: 27.2

Data Citations: Remote Sensing Integration

Gridded Population of the World (GPW), v4.11 and NASA Moderate Resolution Imaging Spectroradiometer (MODIS)



<https://doi.org/10.1021/acs.est.3c06421>

Impact Factor: 11.4

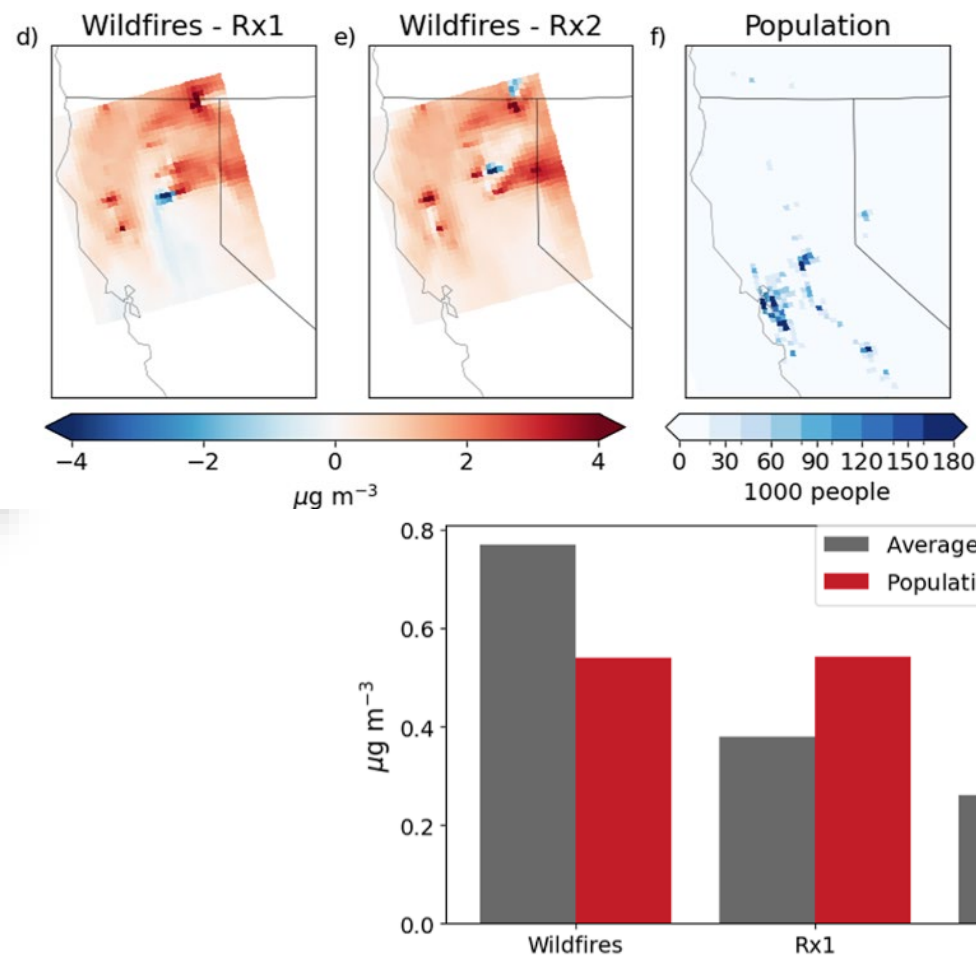


Figure 5. Modeled annual average surface fire-derived PM_{2.5} concentrations and population-weighted PM_{2.5} across the study area under the wildfire and Rx1 and Rx2 scenarios.

Integration of Data and Services for Disaster Response



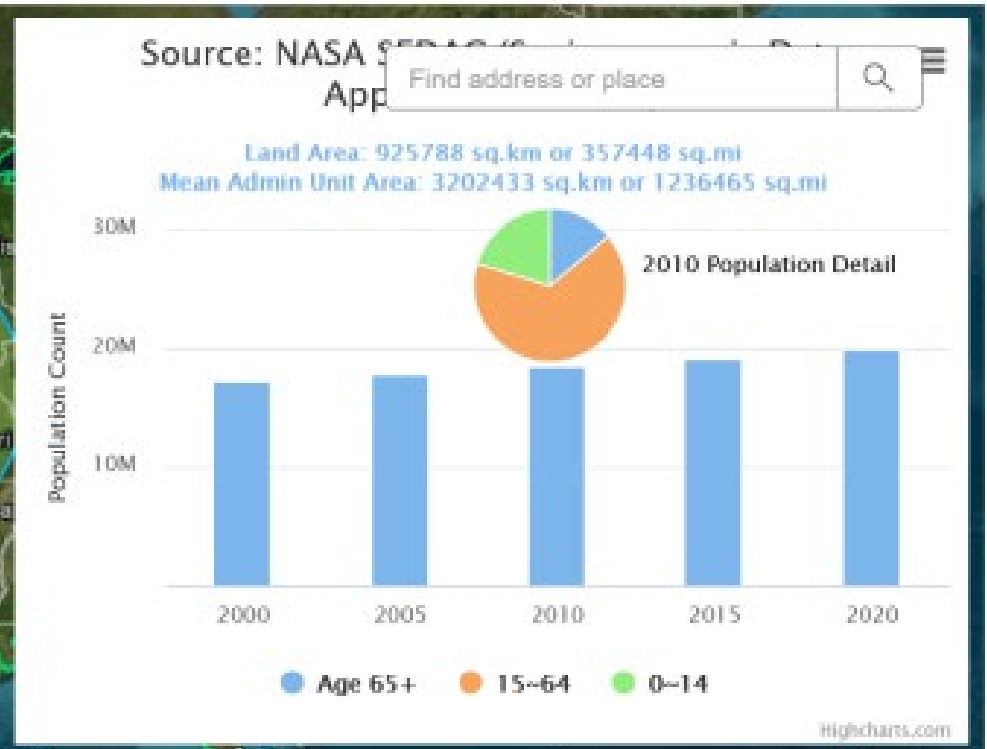
Layer List

- Active Tropical-NWS...
- Significant River...
- Excessive Rainfal...
- Status Green
- US Boundaries-NOA...
- NWS 24Hr Rainfall ...
- NWS Warnings
- Storm Rpts past 7...
- Graphical TropWxO...
- NWS Radar
- 7-Day NHC Outlook...
- Atlantic Storm 1

Legend

Animation Control

Other Functions



Real-Time Trusted Data Dashboard

Sensitive Information Sharing Environment (SISE)

Switch Basemap

Esri, HERE, Garmin | Earthstar Geographics | NOAA/NWS/NHC

POWERED BY **esri**

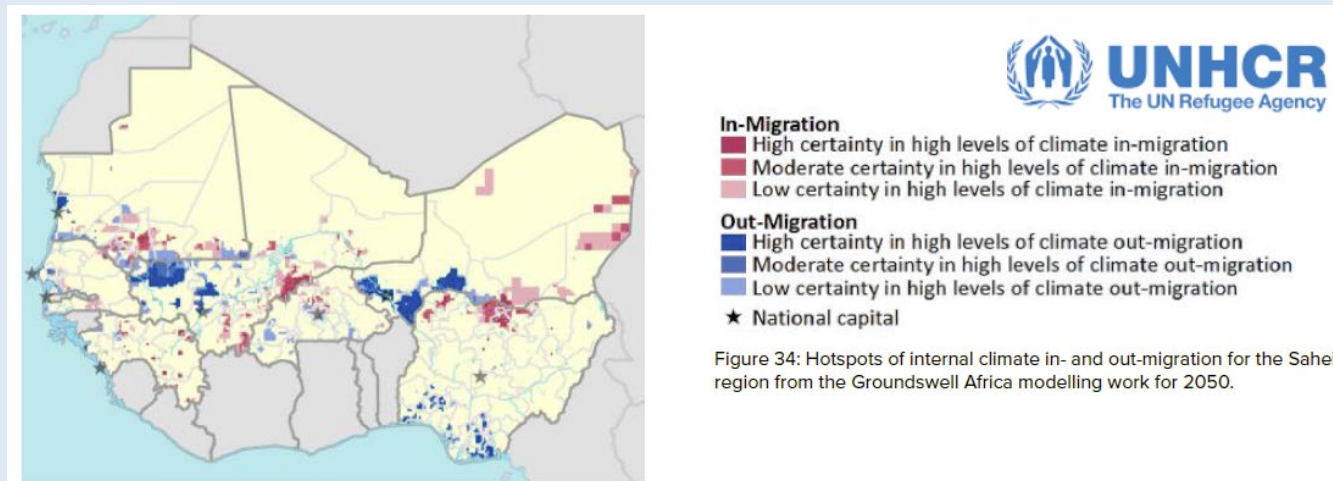
Collaboration with StormCenter Communications, Inc.



Example SEDAC data use: Predictive analytics

Moving from Reaction to Action Anticipating Vulnerability Hotspots in the Sahel

A Synthesis Report from the Sahel Predictive Analytics Project in Support of the United Nations Integrated Strategy for the Sahel



Geraldine Henningsen and David Wells of UNHCR's predictive analytics team reported to SEDAC that they use SEDAC's gridded population data and Global Urban Polygons and Points Dataset (GUPPD) in a project seeking to predict the risk of forced displacement at the grid cell level across Africa, with a special focus on climate change. The data help to overcome challenges related to the paucity of up-to-date population data for Africa.



COLUMBIA CLIMATE SCHOOL
CENTER FOR INTEGRATED
EARTH SYSTEM INFORMATION

Thanks!

Contact: Alex de Sherbinin, adesherbinin@ciesin.Columbia.edu