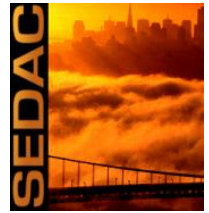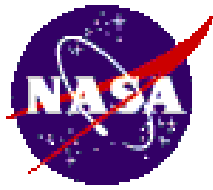# Ecology from Space: How Can NASA Remote Sensing Data Inform Your Research?

SEDAC Data and Applications

Dr. Pinki Mondal

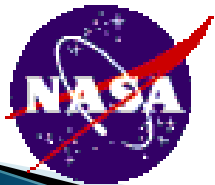*Senior Research Associate, Science Applications*

CIESIN, The Earth Institute, Columbia University

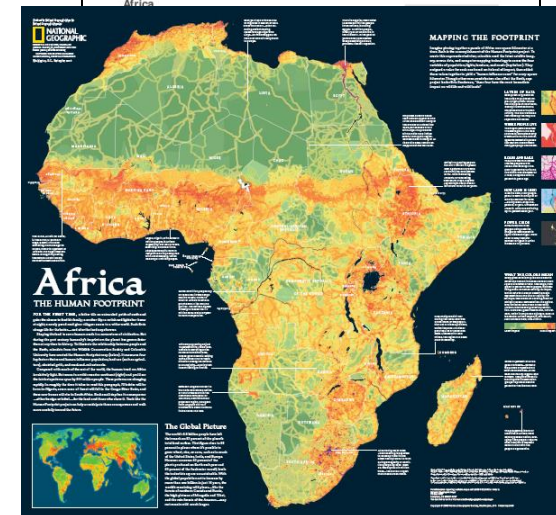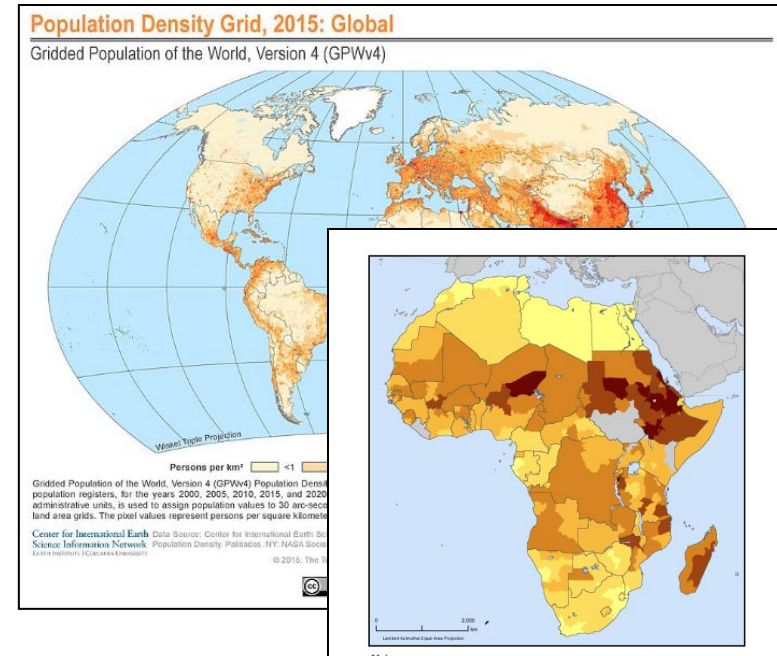Center for International Earth Science Information Network

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NASA Socioeconomic Data and Applications Center (SEDAC)

SEDAC's mission is

➢ to develop and operate applications that support the integration of socioeconomic and earth science data (esp. remote sensing)

➢ to serve as an "information gateway" between the earth and social sciences.

http://sedac.ciesin.columbia.edu/
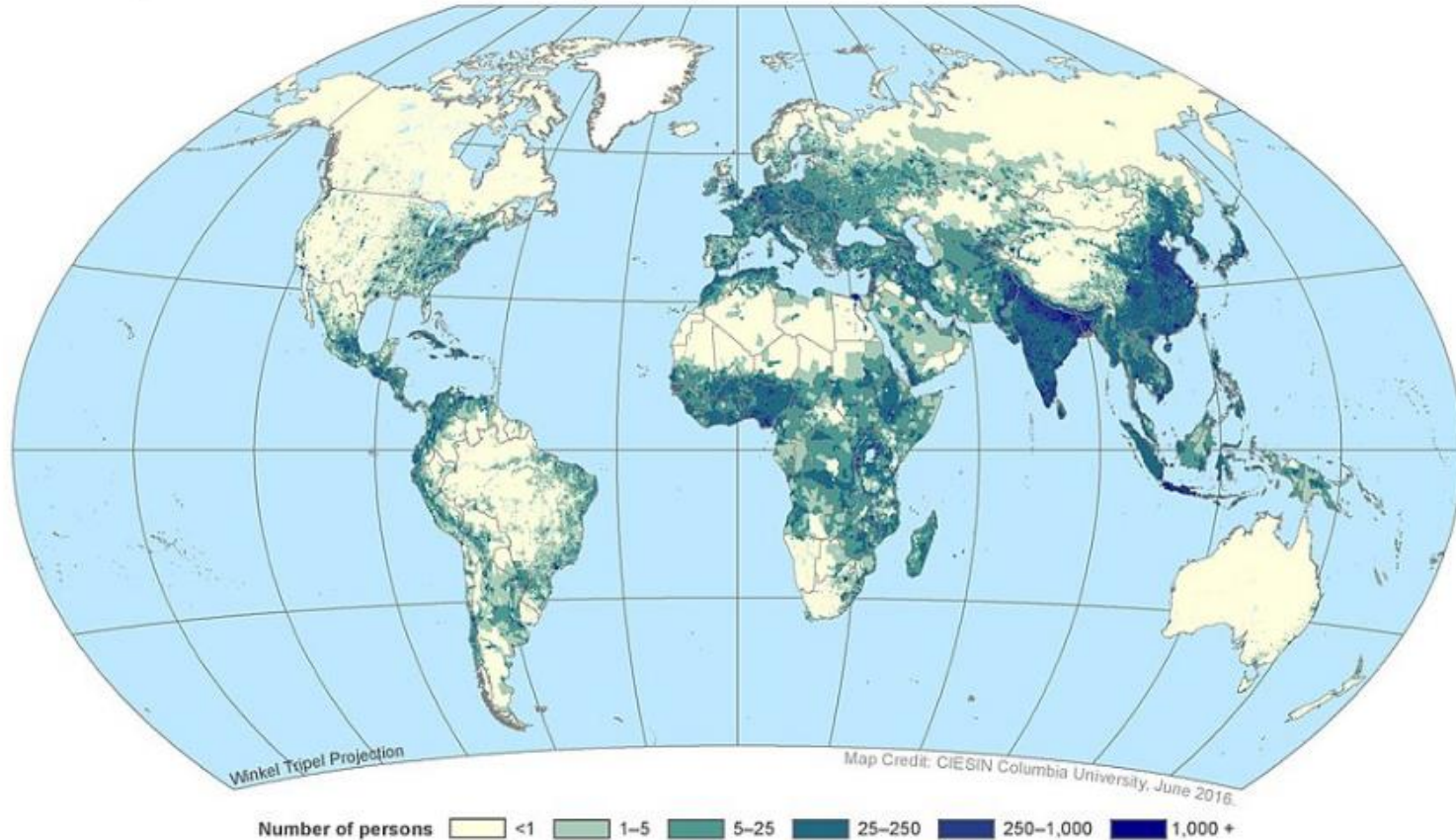
NASA Socioeconomic Data and Applications Center (SEDAC) – Key Datasets

- Population Grids
  - Gridded Population of the World, Version 4 (GPW)
  - Global Rural-Urban Mapping Project (GRUMP)
- Poverty Maps
  - Global Distribution of Poverty (Infant Mortality Rates)
  - Global Child Malnutrition
- Biodiversity
  - Global Species Grids
  - Global Mangroves Distribution
- Climate Related
  - Low Elevation Coastal Zone
  - Population, Landscape, And Climate Estimates (tabular)
  - Global Natural Disaster Hotspots
- Satellite-Derived Environmental Indicators
  - Anthropogenic Biomes (Anthromes)
  - Human Appropriation of Net Primary Productivity
  - Human Footprint/Last of the Wild
  - Global Particulate Matter (PM2.5) Grids
  - Global Urban Heat Island Data Set
- Infrastructure
  - Global Roads Open Access Data Set (gROADS)
  - Global Reservoirs and Dams (GRanD)
  - Nuclear Power Plants

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Population Count, 2015: Global

Gridded Population of the World, Version 4 (GPWv4)

Winkel Tripel Projection

Map Credit: CIESIN Columbia University, June 2016.

Number of persons	<1	1–5	5–25	25–250	250–1,000	1,000 +

Gridded Population of the World, Version 4 (GPWv4) Population Count consists of estimates of human population, consistent with national censuses and population registers, for the years 2000, 2005, 2010, 2015, and 2020. A proportional allocation gridding algorithm, utilizing approximately 12.5 million national and sub-national administrative units, is used to assign population values to 30 arc-second (~1 km) grid cells. The population count grids contain estimates of the number of persons per grid cell.

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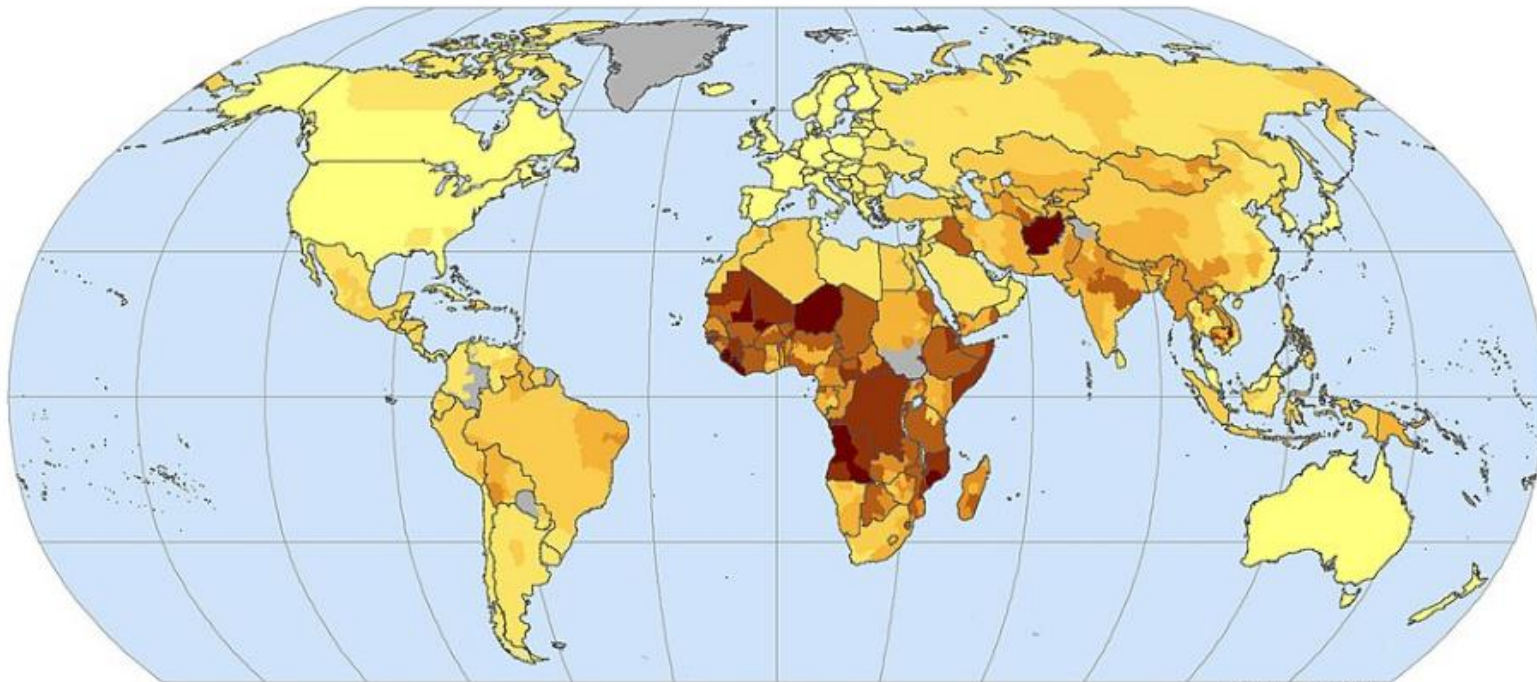EARTH INSTITUTE | COLUMBIA UNIVERSITY
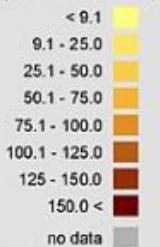
The World
By Subnational Administrative Level

Measures of Poverty
Infant Mortality Rates [IMR]

Subnational mortality rates are adjusted to 2000 using national trend data.
Original data for 96% of countries are from 1995 or later. All data are from 1990 or later.

Robinson Projection

Infant mortality rate, 2000
(deaths per 1000 live births)

< 9.1	
9.1 - 25.0	
25.1 - 50.0	
50.1 - 75.0	
75.1 - 100.0	
100.1 - 125.0	
125 - 150.0	
150.0 <	
no data	
National Boundary	—

Subnational boundaries have been
removed from countries for clarity.

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The Human Footprint ver. 2

Global
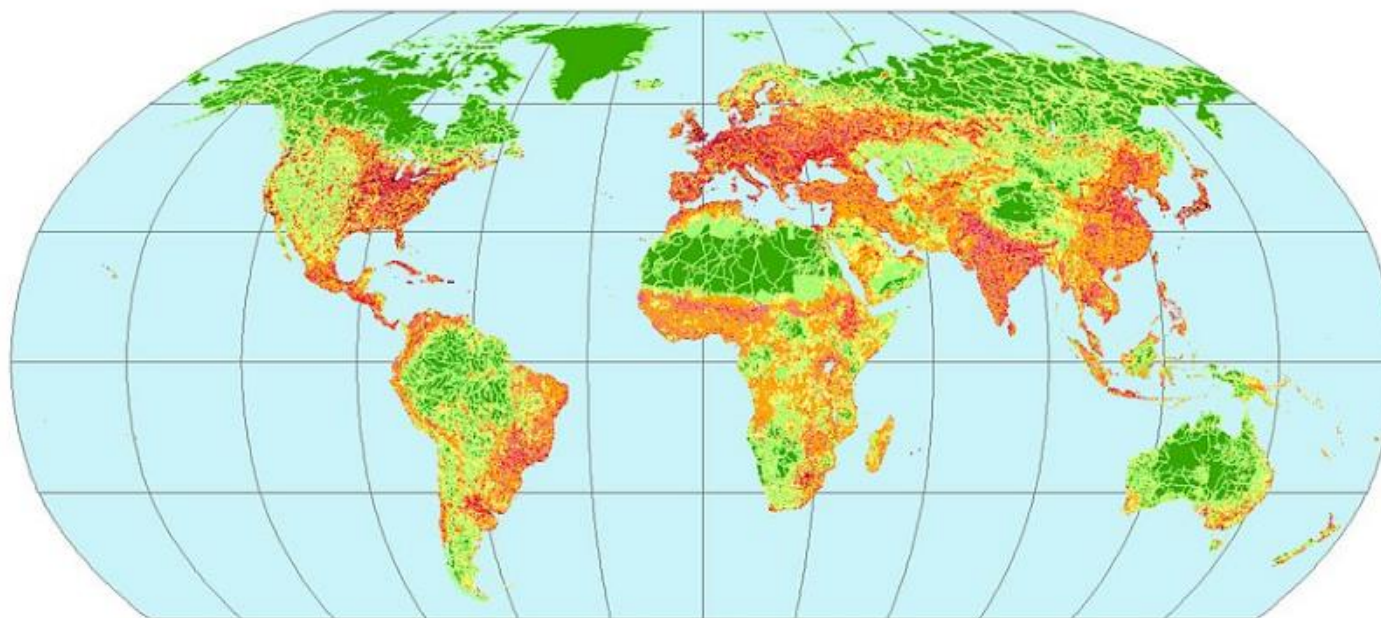
Robinson Projection

The Human Footprint Index

The Human Footprint Index (HF) expressses as a percentage the relative human influence in each terrestrial biome. HF values range from 0 to 100. A value of zero represents the least influenced - the "most wild" part of the biome with value of 100 representing the most influenced (least wild) part of the biome.
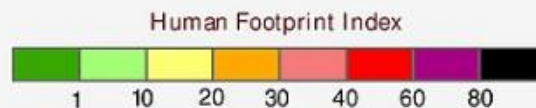
Human Footprint Index

1	10	20	30	40	60	80

Publish Date: 03/07/08

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Collection Overview

Global Fire Emissions Indicators, Grids, v1 (1997–2015)

Data Sets (7)

Global Fire Emissions Indicators, Grids, v1 (1997–2015)

⊕ Show All...

| Set Overview | Data Download | Documentation | Metadata |

Purpose:

To provide data that can be used to calculate trace gas and aerosol emissions, due to fires; monitor and assess national efforts to manage emissions.

The Global Fire Emissions Data Collection

➢ yearly aggregates of burned areas and carbon emissions

➢ Carbon emission raster: annual totals for each of the years and carbon totals from each of the six fire types

➢ tabular data: country tabulation of the total area burned (ha) and total carbon emission (tons) in each of the years (1997-2015)
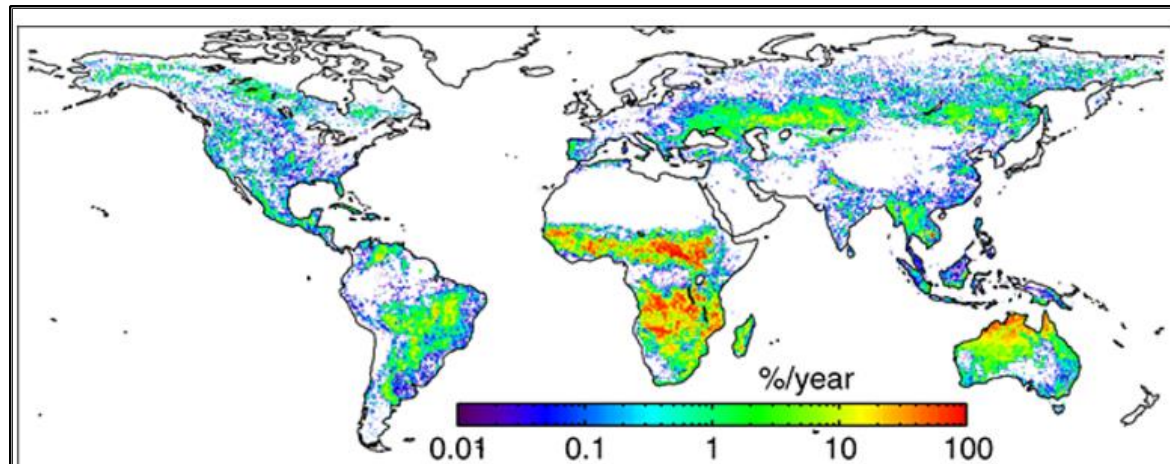
Mean annual area burned, expressed as the fraction of each grid cell that burns each year, derived from the July 1996 to August 2012 monthly GFED4 burned area time series.

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India Annual Winter Cropped Area, v1 (2001–2016)

Collection Overview

Data Sets (1)

India Annual Winter Cropped Area, v1 (2001–2016)

Map Gallery (2)

Set Overview | Data Download | Maps | Metadata

Purpose:

To provide data that can be used in land cover and land use change (LCLUC) studies, agricultural applications, and to assist with policy-making in regards to sustainable agricultural intensification.
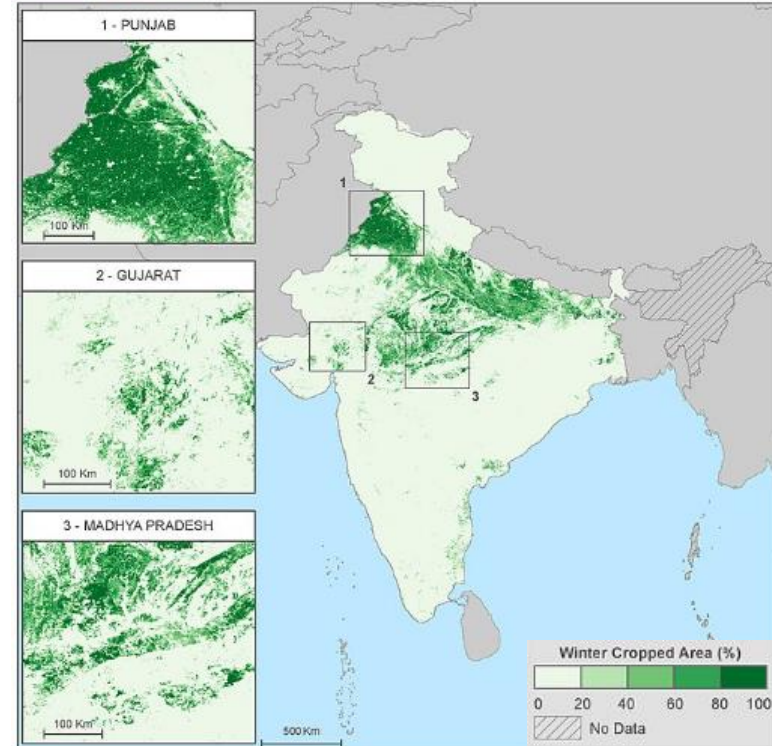
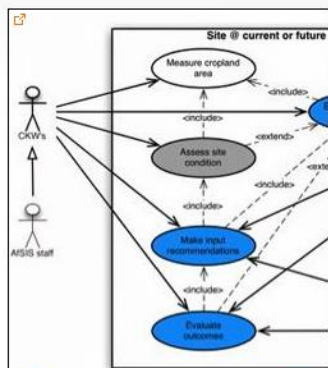## India Annual Winter Cropped Area
Data Collection

➤ extents of annual winter cropped area across India (except the north-eastern states)

➤ Temporal coverage: 2001 – 2016

➤ Spatial resolution: 1 km

➤ Raster data: % cropped area per grid cell

India Annual Winter Cropped Area, 2016
India Data Collection

1 - PUNJAB
2 - GUJARAT
3 - MADHYA PRADESH

Winter Cropped Area (%)
0 20 40 60 80 100
No Data

Map Credit: CIESIN Columbia University, July 2017.

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Africa Soil Information Service (AfSIS)
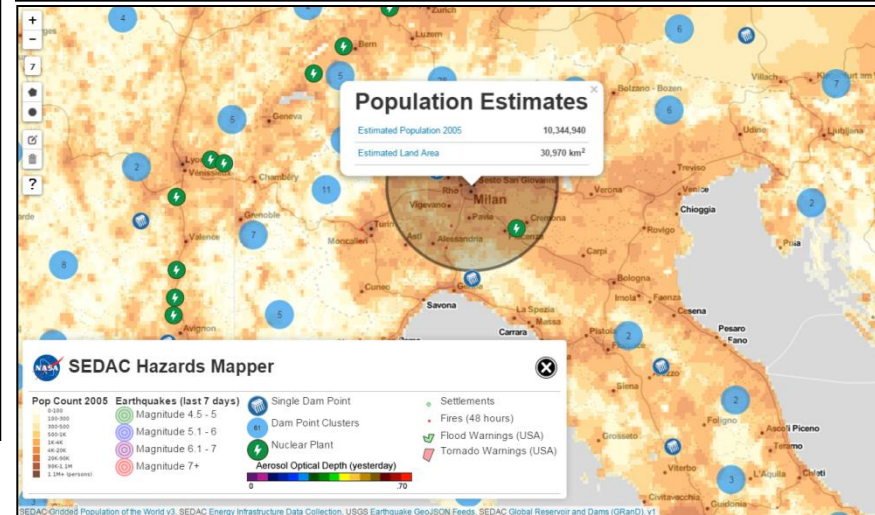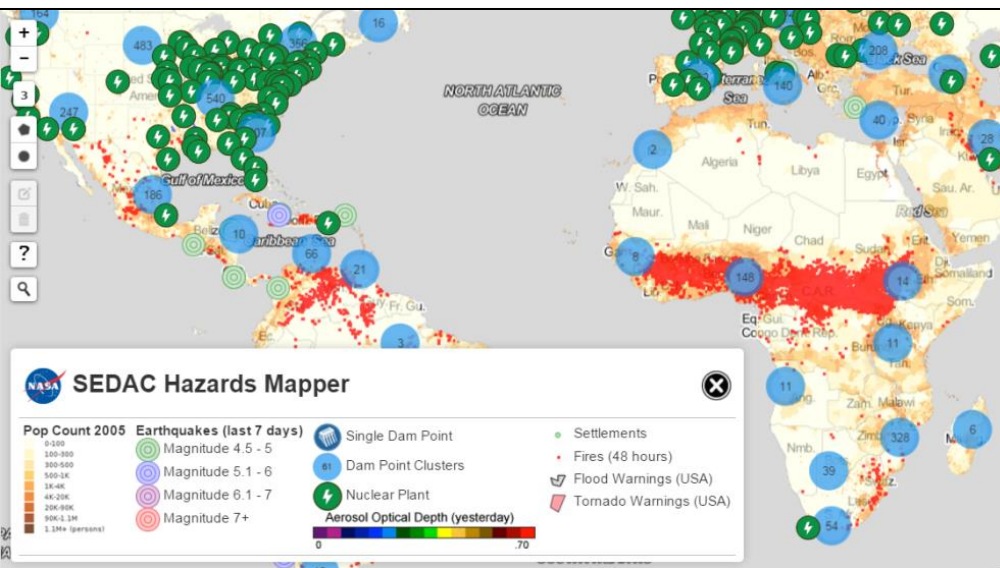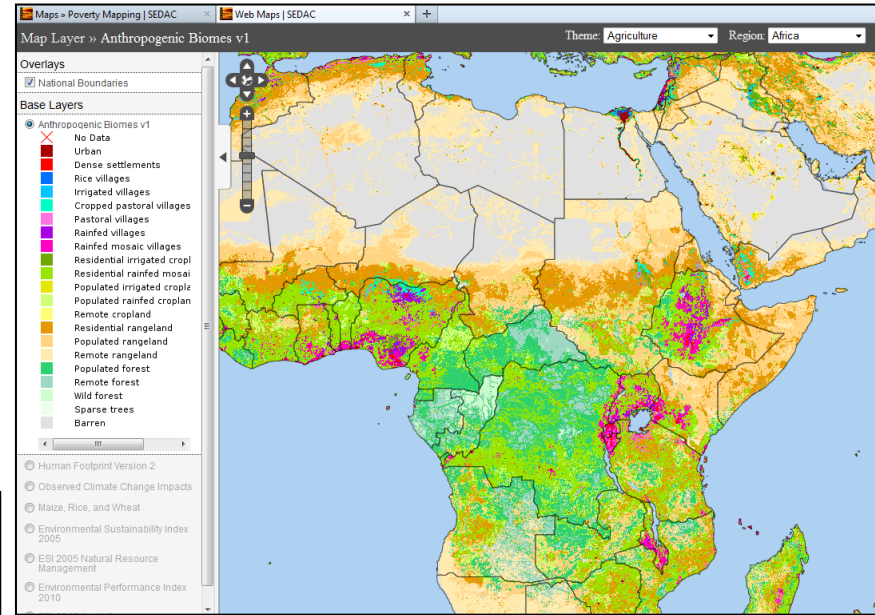

- Funded by Gates Foundation
- CIESIN provides remote sensing data sets as covariates with field data for soil mapping
- Currently conducting land cover mapping using Sentinel 1a SAR data for Ghana and Nigeria

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NASA Socioeconomic Data and Applications Center (SEDAC) – Map Clients

- SEDAC Map Client (http://sedac.ciesin.columbia.edu/maps/client)
- Population Estimation Service
- Natural Hazards Mapper (http://sedac.ciesin.columbia.edu/mapping/hazards/)

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NASA Earthdata Webinar Series:

NASA Earthdata

▶ Subscribe 1K
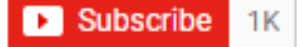
Explore NASA Socioeconomic Data using Web Mapping Services

https://www.youtube.com/watch?v=VxiisbR95w8

Discover NASA's Updated Gridded Population of the World Data

https://www.youtube.com/watch?v=h5HmbRICI9o

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Ecology from Space: How Can NASA Remote Sensing Data Inform Your Research?

SEDAC Data and Applications

Live Demo