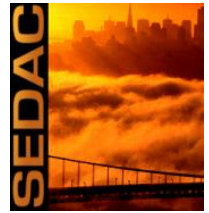
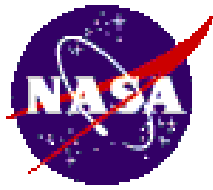


Ecology from Space: How Can NASA Remote Sensing Data Inform Your Research?



SEDAC Data and Applications

Dr. Pinki Mondal

Senior Research Associate, Science Applications

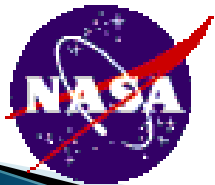
CIESIN, The Earth Institute, Columbia University

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.**

The screenshot displays the SEDAC website interface. At the top, there is a navigation bar with links for 'Data Discovery', 'DAACs', 'Community', and 'Science Disciplines'. The main header features the NASA logo and the text 'SOCIOECONOMIC DATA AND APPLICATIONS CENTER (SEDAC)'. Below this, a search bar and a 'Data' button are visible. The main content area includes a 'DATA' menu, a 'Maps' section with a satellite image of Earth at night, and a 'Featured Data Sets' section. Two featured data sets are highlighted: 'Global Estimated Net Migration Grids By Decade, v1 (1970-2000)' and 'Global Grid of Probabilities of Urban Expansion to 2030, v1 (2000-2030)'. A 'News' section on the right lists recent updates, including 'Environmental Change and Migration Explored at World Bank Workshop' and 'Experts Gather in Geneva to Plan Remote Sensing Applications'.



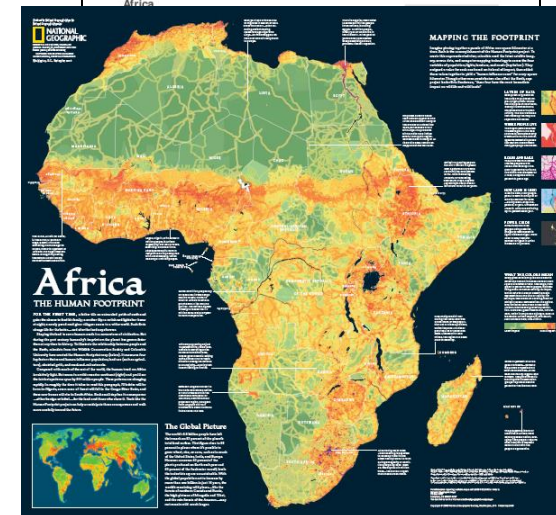
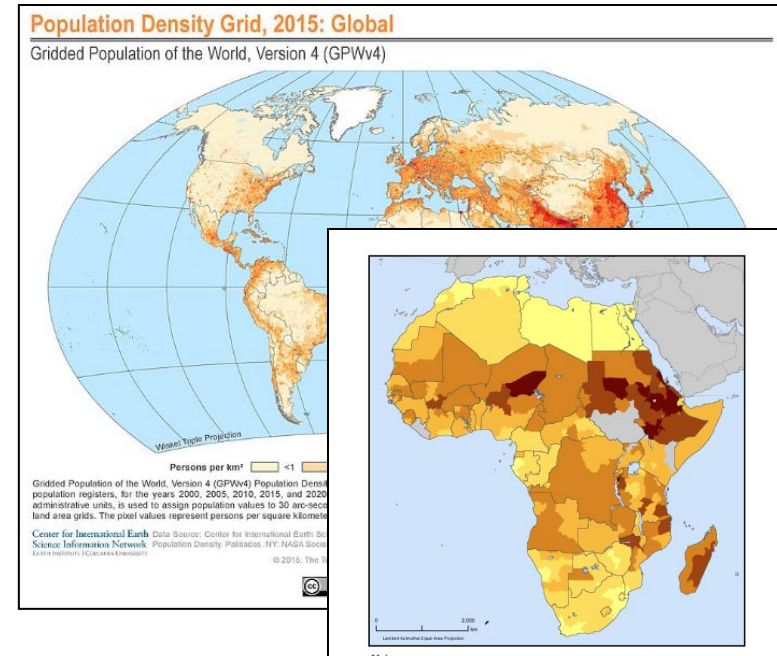
<http://sedac.ciesin.columbia.edu/>

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NASA Socioeconomic Data and Applications Center (SEDAC)

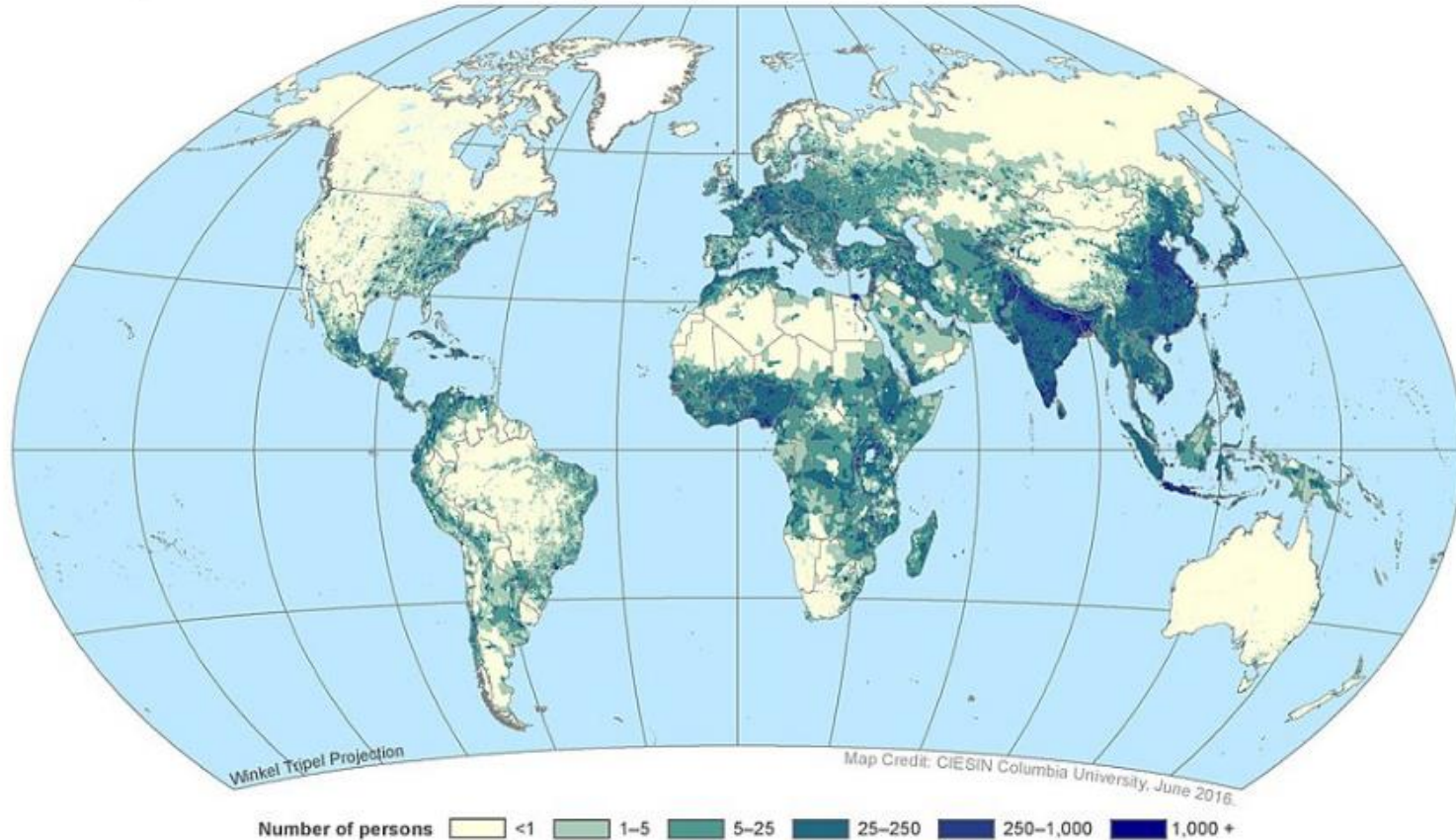
– Key Datasets

- ▶ **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



Population Count, 2015: Global

Gridded Population of the World, Version 4 (GPWv4)



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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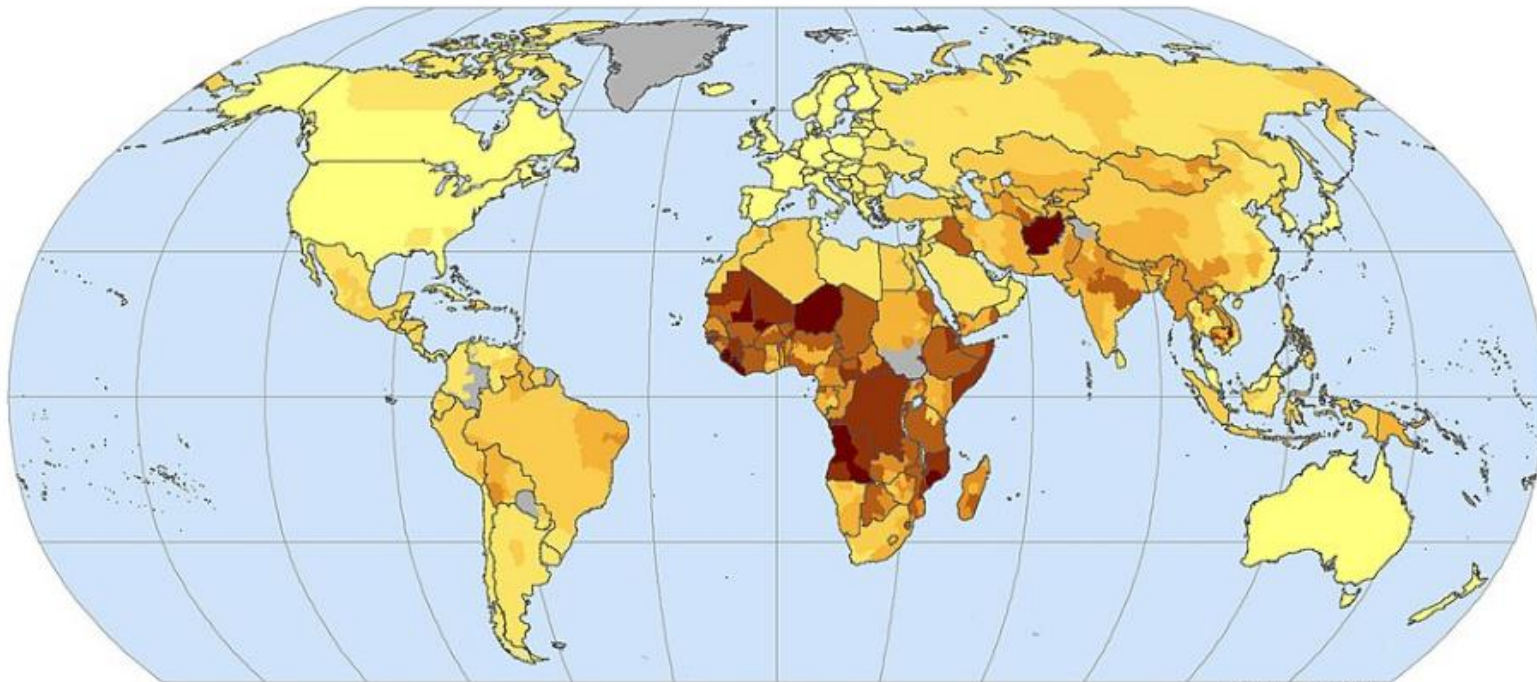
Data Source: Center for International Earth Science Information Network - CIESIN - Columbia University, 2016. Gridded Population of the World, Version 4 (GPWv4): Population Count, Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). <http://dx.doi.org/10.7927/H4X63JVC>.

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Robinson Projection

The World

By Subnational Administrative Level

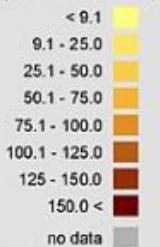
Measures of Poverty

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.

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



National Boundary —

Subnational boundaries have been removed from countries for clarity.



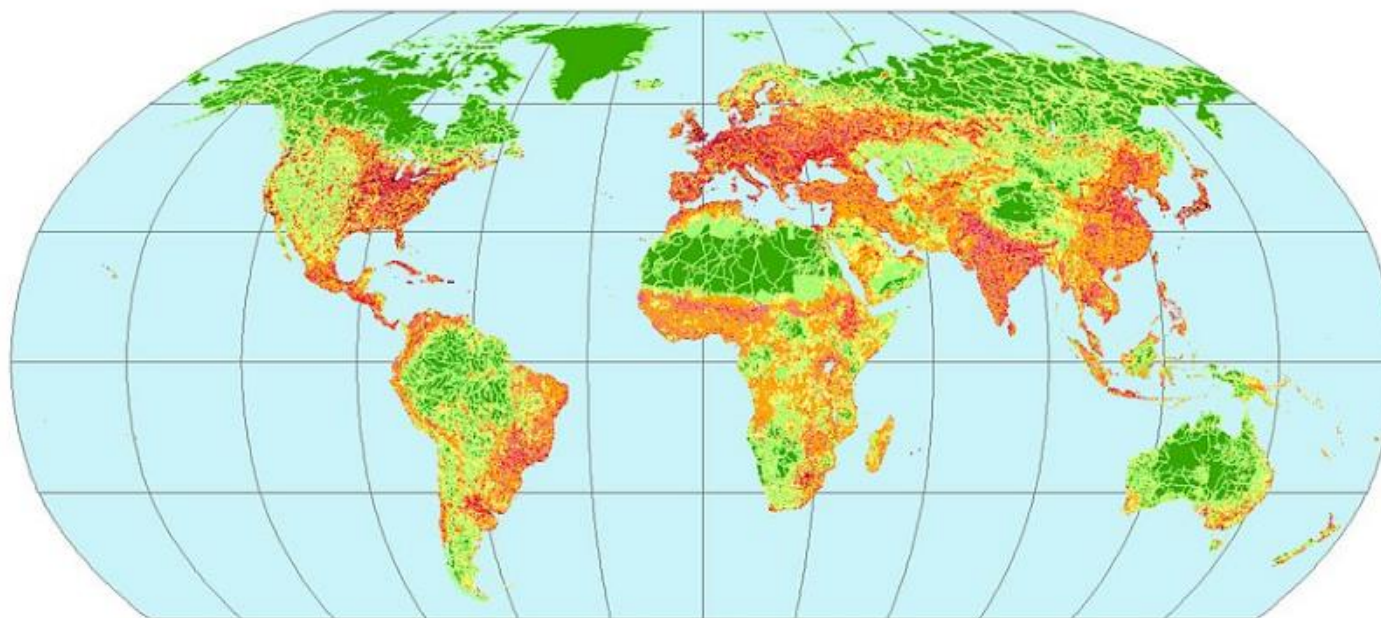
Copyright 2005, The Trustees of Columbia University in the City of New York.
Source: Center for International Earth Science Information Network (CIESIN),
Columbia University. Global subnational infant mortality rates; maps and
further documentation available at: <http://www.ciesin.columbia.edu/povmap>



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The Human Footprint ver. 2

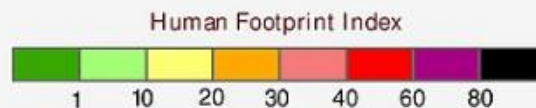
Global



Robinson Projection

The Human Footprint Index

The Human Footprint Index (HF) expresses 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.



Copyright 2008, The Trustees of Columbia University in the City of New York. Source: Center for International Earth Science Information Network (CIESIN), Columbia University and Wildlife Conservation Society, the Bronx Zoo, New York. The Last of the Wild Data set. Available at <http://www.sedac.ciesin.columbia.edu/wildareas>

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

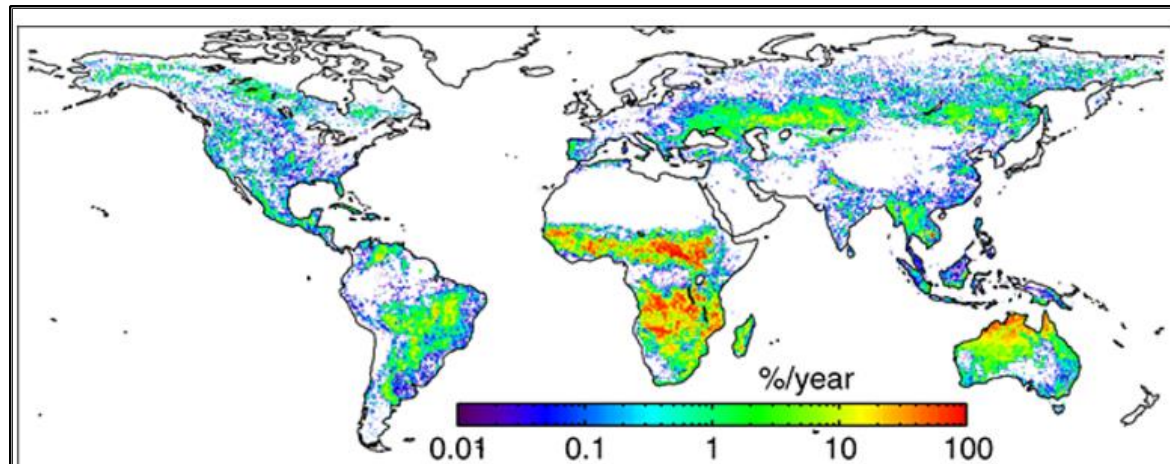
Metadata

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.

Collection Overview

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

Data Sets (1)

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

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.

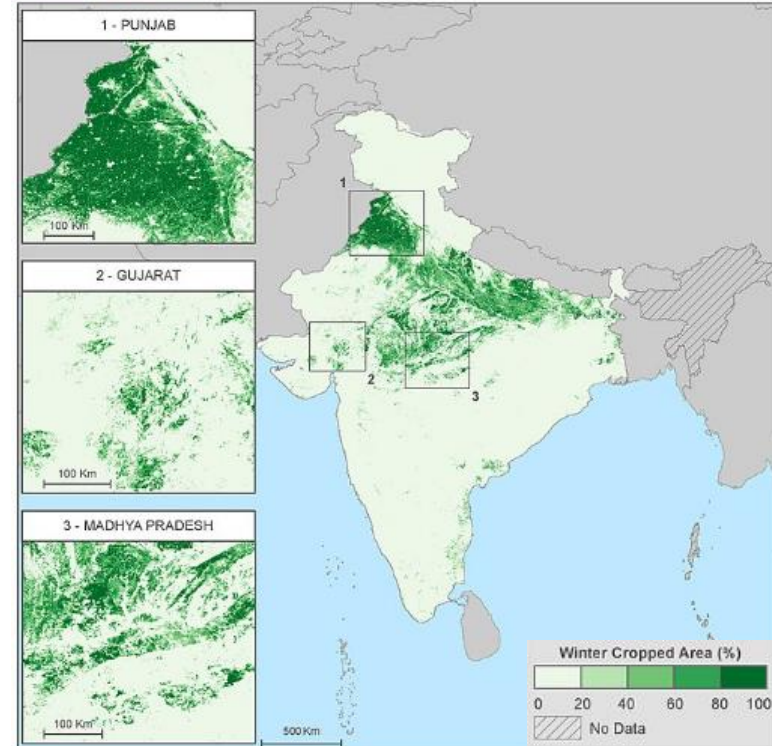
Map Gallery (2)

India Annual Winter Cropped Area Data Collection

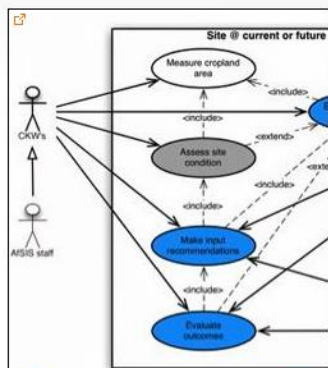
- extents of annual winter cropped area across India (except the north-eastern states)
- Temporal coverage: 2001 – 2016
- Spatial resolution: 1 km
- Raster data: % cropped area per grid cell

India Annual Winter Cropped Area, 2016

India Data Collection



Africa Soil Information Service (AfSIS)



Use case: "Make agro-input recommendations"

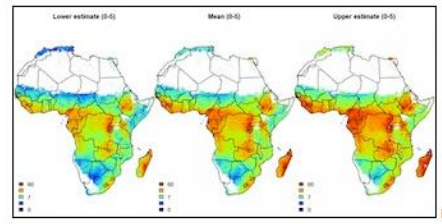
The document describes the steps for recommending agro-inputs (e.g., seed, fertilizers, lime and organic matter) in smallholder farming systems, based on site, cropping system and time specific information and decision analyses.

[more](#)

Data and Map Portal

Map products and tools, methods, and data for digital soil mapping and soil spectral analysis

New Release: Soil Property Maps of Africa at 1 km



Remote Sensing Soil Covariates

- o AfricaGrids.net Data Sets
- o SRTM Data

Soil Profile Databases

- o ICRAF-ISRIC Soil Spectral Library
- o Africa Soil Profile Database - 12000+ records

Field Data Collection

- o New Release: Diagnostic Field Trial Database
- o Land Degradation Surveillance Framework

Video

Why is soil important?



The CEO of the ATA talks with...



[See our other videos here >>](#)

In the Spotlight

Are "large-scale, commercial agricultural" expansions possible in Nigeria?

News and Updates

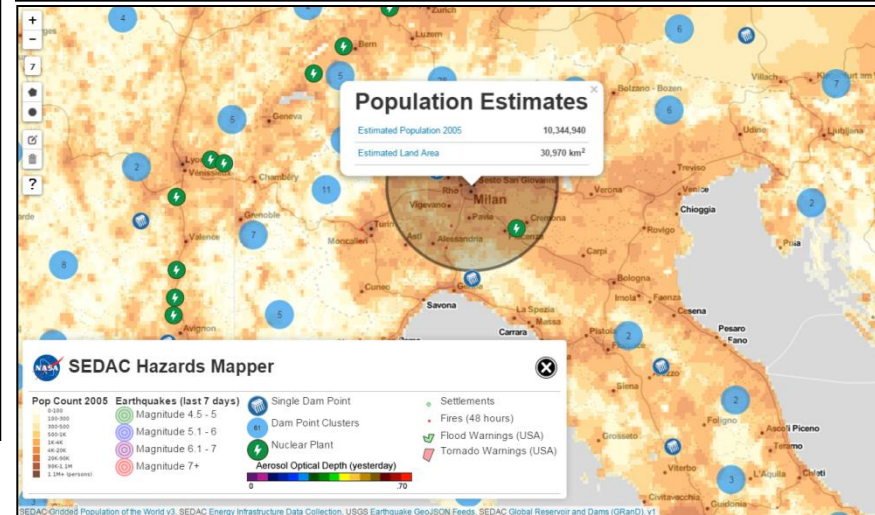
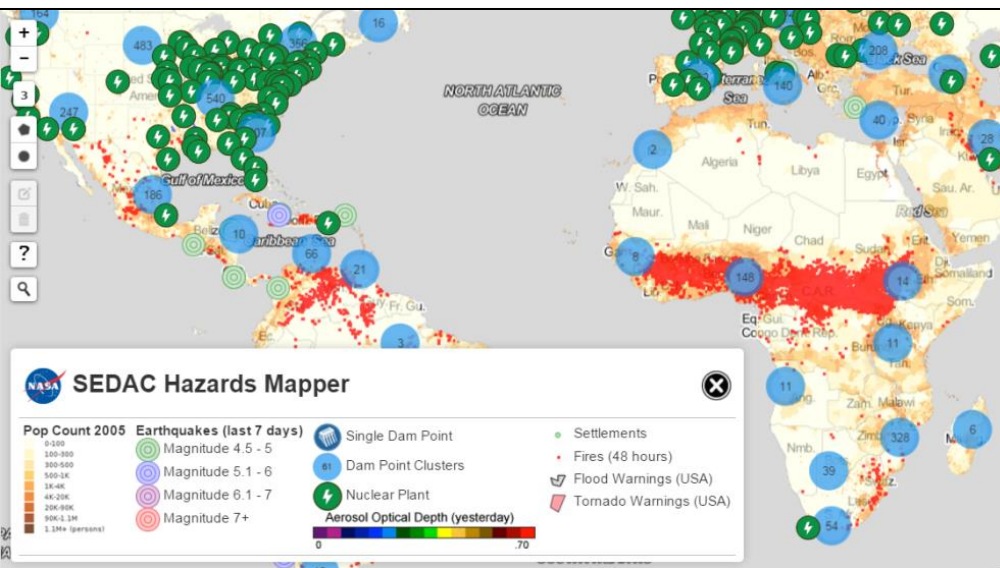
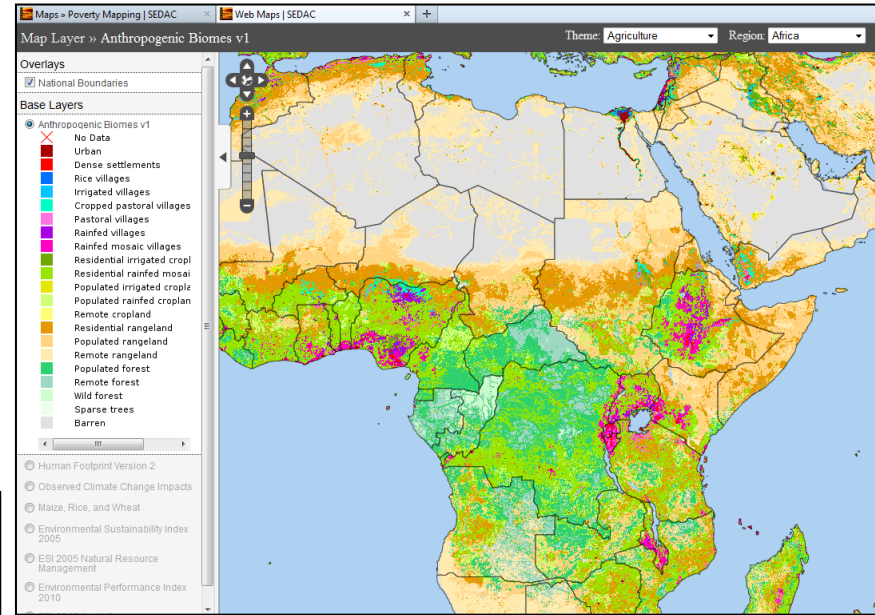
Article: Addressing nutrient

- ▶ 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

NASA Socioeconomic Data and Applications Center (SEDAC)

- Map Clients

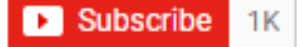
- ▶ SEDAC Map Client (<http://sedac.ciesin.columbia.edu/maps/client>)
- ▶ Population Estimation Service
- ▶ Natural Hazards Mapper (<http://sedac.ciesin.columbia.edu/mapping/hazards/>)



NASA Earthdata Webinar Series:



NASA Earthdata



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>

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

SEDAC Data and Applications

Live Demo