Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

Meeting the Next Generation Science Standards with SEDAC Data

Robert R. Downs

rdowns@ciesin.columbia.edu

NASA Socioeconomic Data and Applications Center (SEDAC)
Center for International Earth Science Information Network (CIESIN)
The Earth Institute, Columbia University

2013 SUMMER MEETING OF THE

FEDERATION OF EARTH SCIENCE INFORMATION PARTNERS

Chapel Hill, North Carolina
Thursday July 11, 2013

Using SEDAC Data for Education

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

- SEDAC educational activities
- NGSS Disciplinary Core Ideas (DCI) and Topics relevant to human interactions in the environment
- Finding SEDAC Data for NGSS DCI and topics for Earth and Space Science: High School
- Examples of using SEDAC data to address NGSS Performance Expectations

SEDAC Educational Activities

- Enabling Education and Professional Development
  - ESIP Education Committee
  - Earth Exploration Toolbook http://serc.carleton.edu/eet/
    - EET Chapter, Exploring Characteristics of Wetlands
  - NSF EarthCube SIG, Education and Workforce Development
- SEDAC Data in Educational Products
  - TerraViva! SEDAC Viewer
    - http://sedac.ciesin.columbia.edu/tools/terra-viva
  - CHANGE Viewer
    - http://climatechangehumanhealth.org/changeviewer/
  - SEDAC data and maps in textbooks

NGSS for Studying Human Interactions in the Environment

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

- Relevant NGSS Disciplinary Core Ideas (DCI)
  - HS-ESS3 Earth and Human Activity
- Relevant NGSS Topic
  - NGSS Topic: HS. Human Sustainability

* Derived from: National Academy of Sciences. A Framework for K-12 Science Education: Practices, Core Ideas, and Crosscutting Concepts.. 2012. Washington, DC: The National Academies Press. See: http://www.nextgenscience.org/hsess3-earth-human-activity

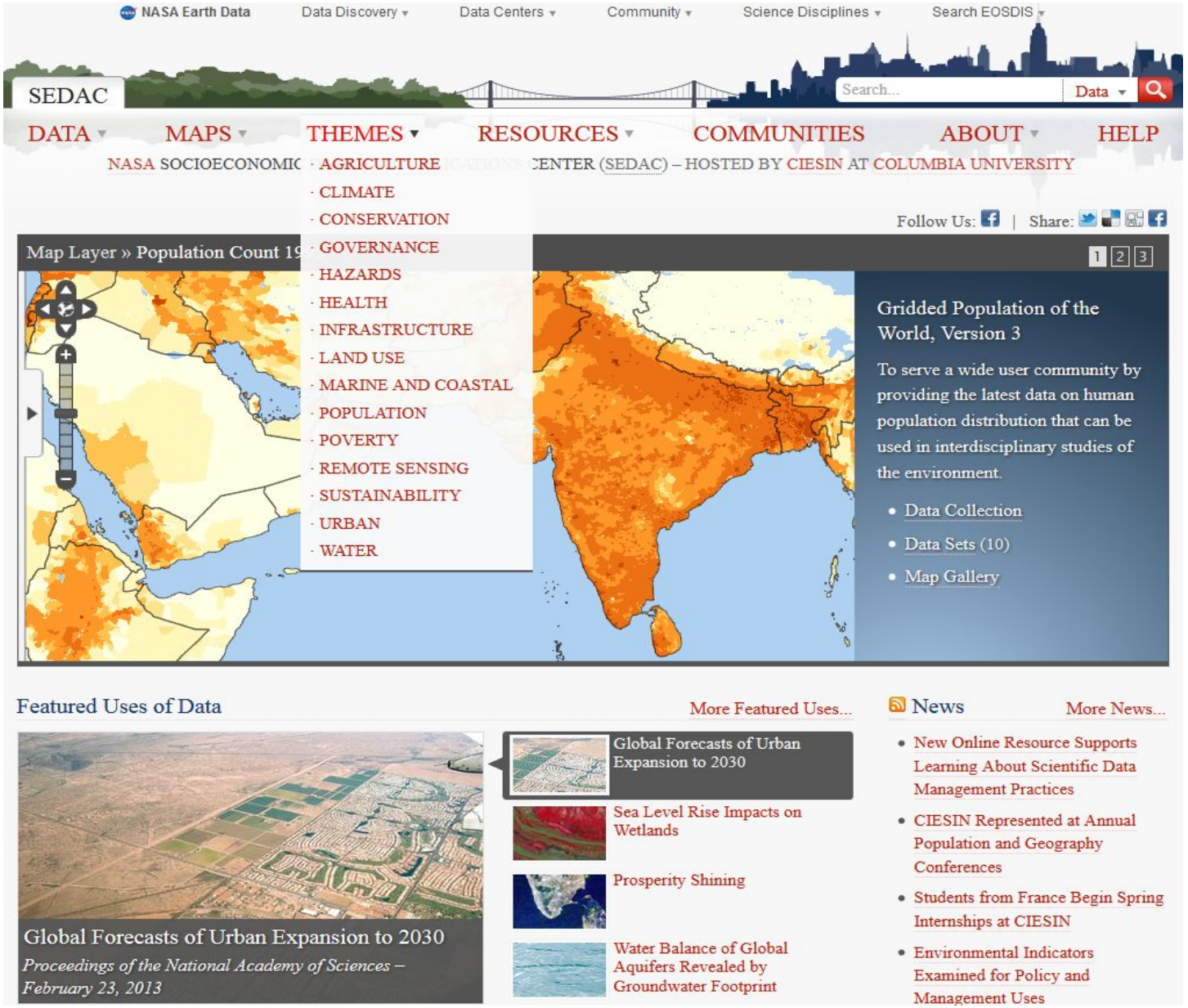
SEDAC Themes and Data for NGSS DCI HS-ESS3 Earth and Human Activity

Center for International Earth Science Information Network
Earth Institute | Columbia University

- ESS3A: Natural Resources
  - SEDAC Themes (Data Sets): Agriculture (34), Land Use (21), Water (22)
- ESS3B: Natural Hazards
  - SEDAC Theme (Data Sets): Hazards (35)
- ESS3C: Human Impacts on Earth Systems
  - SEDAC Themes (Data Sets): Agriculture (34), Climate (40), Conservation (50), Governance (13), Health (22), Infrastructure (5), Land Use (21), Marine and Coastal (11), Remote Sensing (23), Sustainability (85), Water (22)
- ESS3D: Global Climate Change
  - SEDAC Theme (Data Sets): Climate (40)

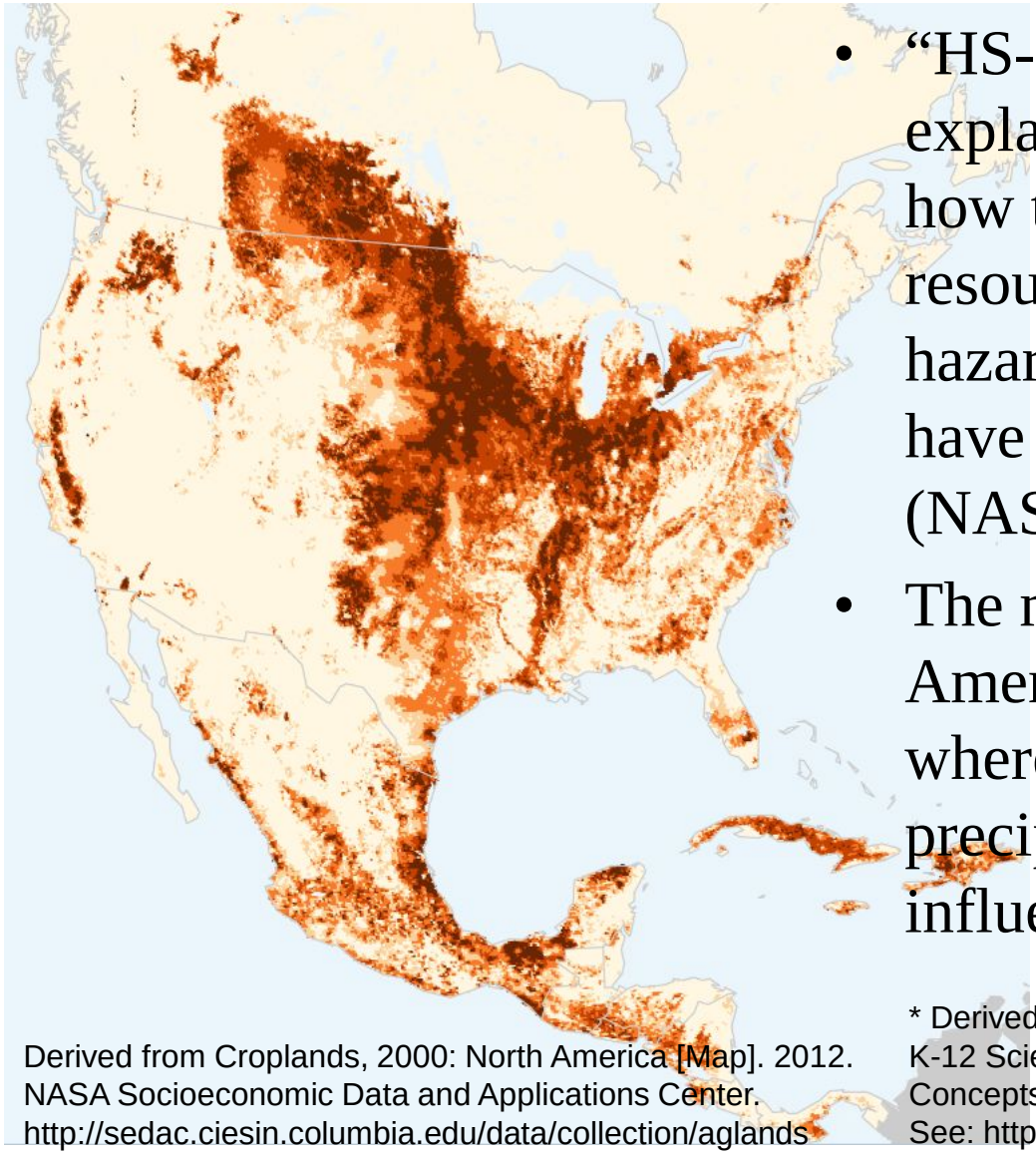
Finding SEDAC Data by Themes

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY



Example: Using SEDAC Data to Meet NGSS Performance Expectations

Center for International Earth Science Information Network
Earth Institute | Columbia University



- "HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity" (NAS, 2012). *
- The map of croplands in North America demonstrates locations where conditions such as precipitation and temperature, have influenced the cultivation of crops.

Derived from Croplands, 2000: North America [Map]. 2012. NASA Socioeconomic Data and Applications Center. http://sedac.ciesin.columbia.edu/data/collection/aglands

* Derived from: National Academy of Sciences. A Framework for K-12 Science Education: Practices, Core Ideas, and Crosscutting Concepts.. 2012. Washington, DC: The National Academies Press. See: http://www.nextgenscience.org/hsess3-earth-human-activity

Global Agricultural Lands: Croplands, 2000

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

Croplands, v1: Global Agricultural Lands ...

sedac.ciesin.columbia.edu/data/set/aglands-croplands-2000

NASA SOCIOECONOMIC DATA AND APPLICATIONS CENTER (SEDAC) – HOSTED BY CIESIN AT COLUMBIA UNIVERSITY

Global Agricultural Lands

Follow Us: | Share:

- Collection Overview
- Methods
- Data Sets (2)
  - *Croplands, v1 (2000)*
  - Show All...
- Map Gallery (14)
- Map Services (2)
- Citations

Croplands, v1 (2000)

Set Overview | Data Download | Maps | Map Services | Metadata

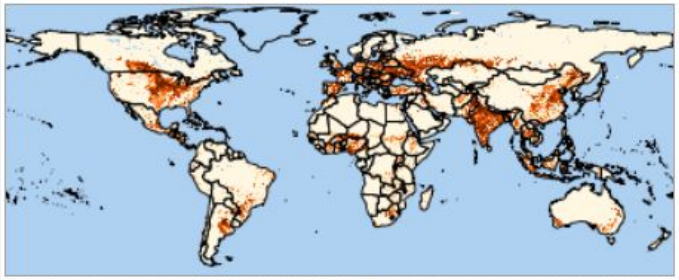
Purpose:

To provide data on the extent of croplands for research on human-environment interactions.

Abstract:

The Global Croplands data set represents the proportion of land areas used as cropland (land used for the cultivation of food) in the year 2000. Satellite data from Modetate Resolution Imaging Spectroradiometer (MODIS) and Satellite Pour l'Observation de la Terre (SPOT) Image Vegetation sensor were combined with agricultural inventory data to create a global data set. The visual presentation of this data demonstrates the extent to which human land use for agriculture has changed the Earth and in which areas this change is most intense. The data was compiled by Navin Ramankutty , et. al. (2008) and distributed by the Columbia University Center for International Earth Science Information Network (CIESIN).

Global Agricultural Lands: Croplands, 2000



1 of 1

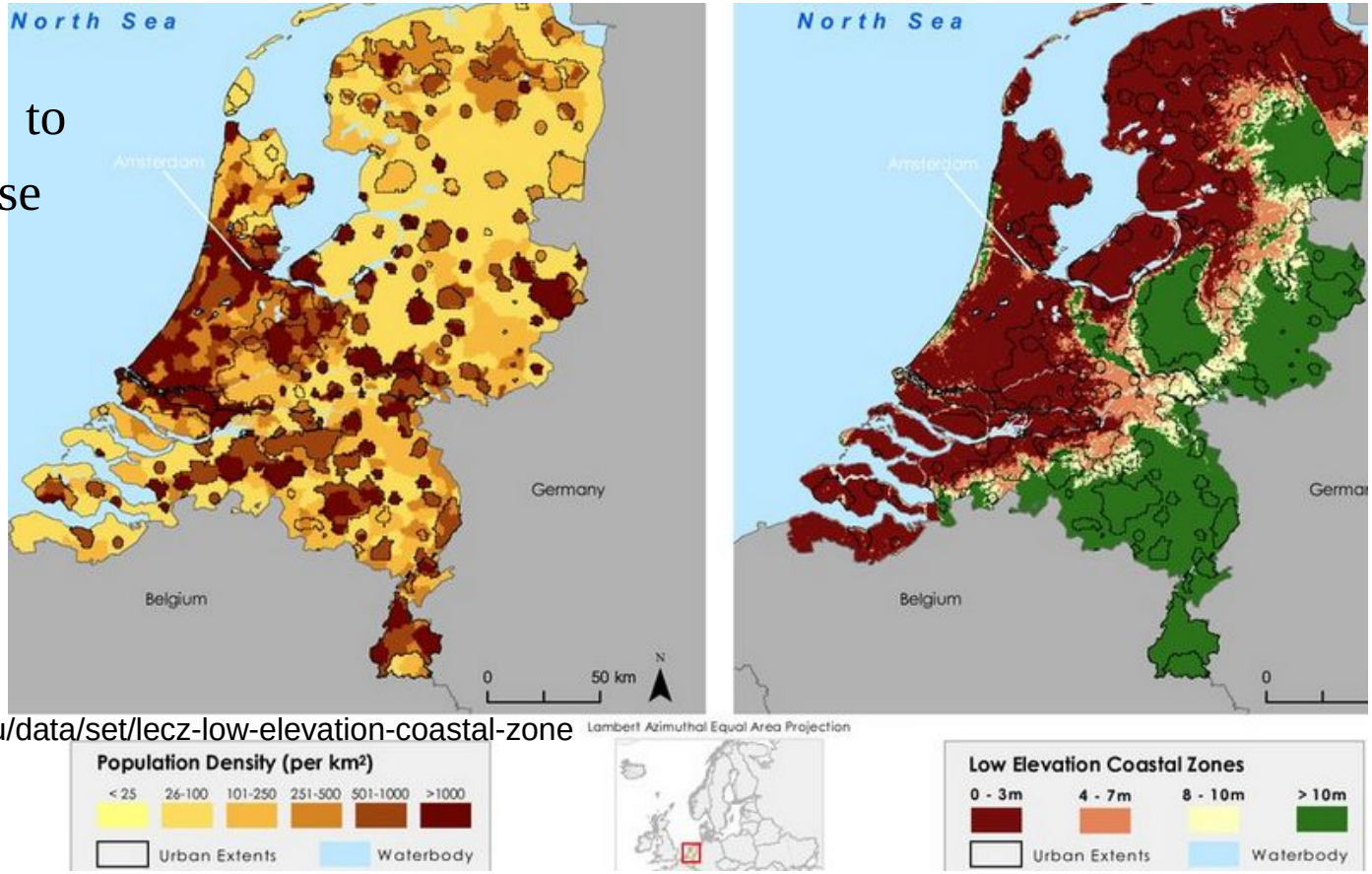
feedback and support

Example: Using SEDAC Data to Meet NGSS Performance Expectations

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

* “HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems” (NAS, 2012).

Locations vulnerable to projected sea-level rise can increase risks to human populations living near sea level.

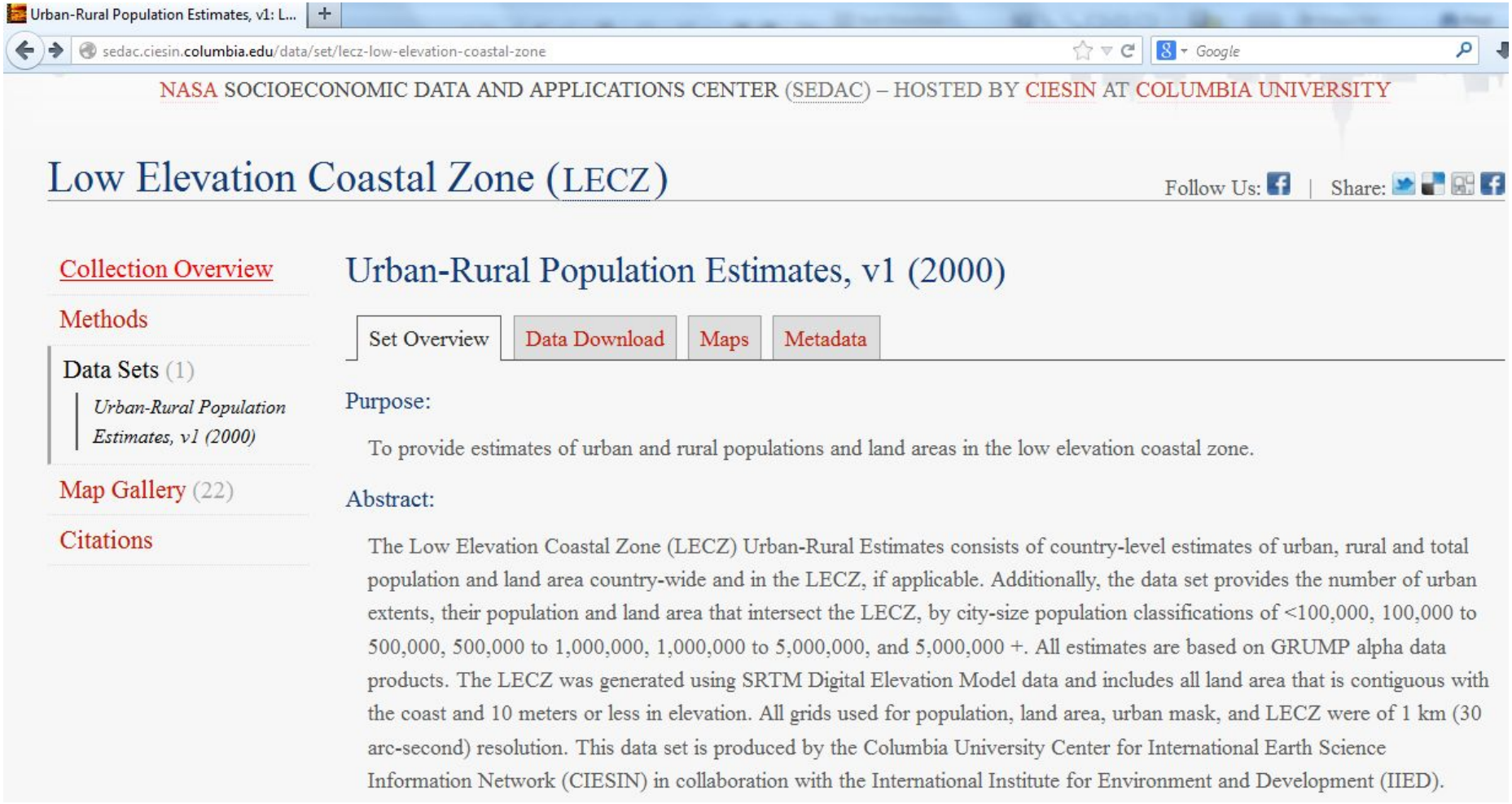


Derived from: Netherlands Population Density and Low Elevation Coastal Zones. [Map]. 20009. NASA Socioeconomic Data and Applications Center. http://sedac.ciesin.columbia.edu/data/set/lecz-low-elevation-coastal-zone

* Derived from: National Academy of Sciences. A Framework for K-12 Science Education: Practices, Core Ideas, and Crosscutting Concepts.. 2012. Washington, DC: The National Academies Press. See: http://www.nextgenscience.org/hsess3-earth-human-activity

Low Elevation Coastal Zone (LECZ) Urban-Rural Population Estimates

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY



Thank you!

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

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