Big Data for SDGs

Investing in Global and Enabling Public Goods

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Mobilizing the data revolution (Big Data) for sustainable development

A slow and long process of modernization for NSOs in low-income countries

- Many criteria to be satisfied for use in official statistics: affordable, technically doable, sustainable, auditable, legal, ethical, safe
- Need a more enabling environment
 - Access to data (legal, trust, procurement, IT issues)
 - Tools, methods, IT infrastructure
 - Expertise
 - Funding
- Safeguards against accidental/intentional misuse of data

NSOs as enablers of Big Data use

- Without using Big Data, NSOs can have a big impact by supporting users of Big Data
 - NSO data needed to fit, calibrate, validate models
 - But issues of access, fitness-for-purpose
- NSOs to foster data integration and use by:
 - Adapting their data collection instruments/methods
 - How can data sources augment each other?
 - Disseminating more (micro)data, responsibly
- International community to contribute:
 - Data documentation and cataloguing tools to foster data discoverability and usability
 - Data protection tools and guidelines
 - Data dissemination tools (bulk, API)
 - Training, funding

NSOs as USERS of Big Data

- Multiple constraints
 - Legal and institutional environment (obstacles to data access)
 - Technical capacity (IT infrastructure, expertise)
 - Cost (storage, transfer, compute)
- Global public goods
 - Prioritize scalable, safe, sustainable solutions
 - Provide open, analysis-ready data to enable broader audiences
 - Free, formatted, documented, protected data
 - With open analytical tools and tutorials
 - Central catalog of relevant resources for improved discoverability
 - Training programs (incl. improvement of curricula)

Supporting the use of Big Data by providing analysis-ready open data

Example

7 AFFORDABLE AND CLEAN ENERGY

SDG 7: Sustainable, reliable, affordable energy for all

- Data: Light Every Night (1992-2020 to be cont'd)
 - With the National Oceanic and Atmospheric Administration (NOAA) and the University of Michigan
 - Tbs of free data in Cloud Optimized GeoTIFF format
- Tutorial: in Python

Tutorial organization

- Module 1: Introduction to remote sensing
- Module 2: Introduction to open source tools
- Module 3: Basic operations on raster files
- Module 4: Charting
- Module 5: Data analysis and intercalibration
- Module 6: Exercise on analyzing economic activity in Nepal
- World Bank Light Every Night Archive: docs on accessing this new archive
- Applications of nighttime lights: assessing the power grid with nighttime lights





MODULE 1 INTRODUCTION TO REMOT

2. Introduction to nighttime light data (20

MODULE 2 INTRODUCTION TO OPEN

2. Getting started with Python (10 n

3 Introduction to Junyter notebooks (1

5 GEE Python API and geeman (5 min

MODULE 3 BASIC OPERATIONS ON

Q. Search this book.

SENSING

3. VIDEO:

4 Introduct

(GEE) (5 min)

7. VIDEO:

RASTER FILES

and nighttime light

DATA AND TOOLS

1. Data overview (10 min

World Bank - Light Every Night

Overview

World Bank Light Every Night is a comprehensive data repository of nightlime light satellite imagery collected from two sensors over the last three decades: the Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS) with data from 1992-2017, and the Visible Infrared Imaging Radiometer Suite (VIIRS) Day-Night Band (DNB) with data spanning 2012-2020.

The DMSP-OLS and VIIRS-DNB sensors capture various sources of low-light emissions from Earth. These include sources that indicate aspects of numma activity, life city lights, gas flares, fishing boats, and agricultural frees, while also capturing other nightline lights phenomena such as auroras.

The World Bank worked in collaboration with the National Oceanic and Atmospheric Administration (NOAA) and the University of Michigan to publish this repository, designed from the ground up to be analysis-ready. The underlying data are sourced from the NOAA National Centers for Environmental Information (NoCI) archite. Additional processing by the University of Michigan enables accesse in Cloud Optimized CentTief Formst (COCI) and earch using the Spatial Temporal Asset Catalog (STAC) standard. These standards are part of the growing Analysis Ready Data coxystem that is Improving access to geopadial data sets, enabling broader audiences to readily discove, process and analyze geospatial data.

Learn more about remote sensing, nighttime light images and using these data for analysis at World Bank's Open Nighttime Lights tutorial.

Accessing Light Every Night data on AWS

You can access these data via the link, s1//glabals/get1iget and using the web interface via the AWS console. Or via the AWS command Line Interface, for example to list all files in the VIIRS 201505 sub-directory (using the --to-s1gn-request flag since this bucket is public.

\$ aws s3 ls s3://globalnightlight/201505 --no-sign-request

Light Every Night file structure

The data for both DMSP-OLS and VIIRS-DNB are in the root AWS S3 bucket, s3://globalnightlight/. DMSP-OLS data are

https://worldbank.github.io/OpenNightLights/wb-light-every-night-readme.html

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Example

7 AFFORDABLE AND CLEAN ENERGY

- Tool: High Resolution Electricity Access (HREA) model by University of Michigan
 - Combines night light data and high-resolution population density data
 - Estimates at settlement level
 - Access: Likelihood lit
 - Reliability: Frequency lit
 - Use: Brightness z-scores
 - Results validated using Sustainable Energy for All (SE4ALL) data as gold standard



https://github.com/zachokeeffe/nightlight_electrification





UNMET NEED





START EXPLORING

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Global Electrification Platform

Explore least cost electrification strategies around the world interacting with country contextual data and different investment scenarios.

LEARN MORE

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01 MODEL 59 COUNTRIES

Then use other (big) data and model to act ...

https://electrifynow.energydata.info/

