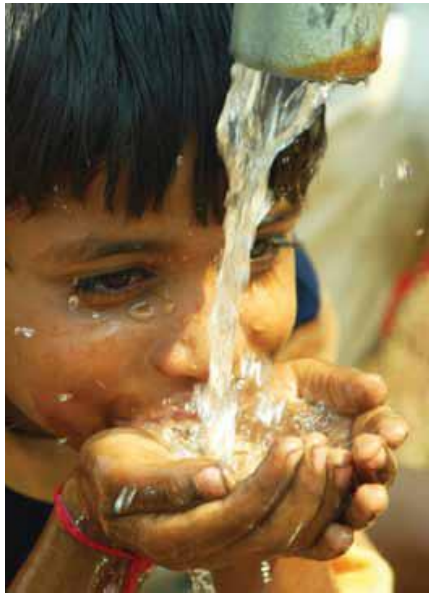


7th Meeting of the Interagency and Expert Group on Sustainable Development Goal Indicators

Vienna, Austria | 12 April, 2018



Integrating and Visualizing Earth Observation Data for the SDGs

Mike Gill

GEO BON Co-Chair

NatureServe Director of Biodiversity Indicators Program

Argyro Kavvada

NASA Earth Science/BAH & GEO EO4SDG



Societal Benefit Areas & SDGs



Public Health Surveillance



Water Resources



Biodiversity & Ecosystem Sustainability



Energy



Disaster Resilience



Food Security / Agriculture



Transportation / Infrastructure



Urban Development



| Target Contribute to progress on the Target, not necessarily the Indicator | | | | | | | | | Goal | Indicator Direct measure or indirect support to the Indicator | | | | |
|--|------|------|------|------|------|-------|-------|--|--------|---|--------|--------|--------|--|
| | | | | | | 1.4 | 1.5 | 1 No poverty | 1.4.2 | | | | | |
| | | | | | 2.3 | 2.4 | 2.c | 2 Zero hunger | 2.4.1 | | | | | |
| | | | | 3.3 | 3.4 | 3.9 | 3.d | 3 Good health and well-being | 3.9.1 | | | | | |
| | | | | | | | | 4 Quality education | | | | | | |
| | | | | | | | 5.a | 5 Gender equality | 5.a.1 | | | | | |
| | 6.1 | 6.3 | 6.4 | 6.5 | 6.6 | 6.a | 6.b | 6 Clean water and sanitation | 6.3.1 | 6.3.2 | 6.4.2 | 6.5.1 | 6.6.1 | |
| | | | | 7.2 | 7.3 | 7.a | 7.b | 7 Affordable and clean energy | 7.1.1 | | | | | |
| | | | | | | | 8.4 | 8 Decent work and economic growth | | | | | | |
| | | | | 9.1 | 9.4 | 9.5 | 9.a | 9 Industry, innovation and infrastructure | 9.1.1 | 9.4.1 | | | | |
| | | | | | 10.6 | 10.7 | 10.a | 10 Reduced inequalities | | | | | | |
| | 11.1 | 11.3 | 11.4 | 11.5 | 11.6 | 11.7 | 11.b | 11 Sustainable cities and communities | 11.1.1 | 11.2.1 | 11.3.1 | 11.6.2 | 11.7.1 | |
| | | | | 12.2 | 12.4 | 12.8 | 12.a | 12 Responsible consumption and production | 12.a.1 | | | | | |
| | | | | 13.1 | 13.2 | 13.3 | 13.b | 13 Climate action | 13.1.1 | | | | | |
| | 14.1 | 14.2 | 14.3 | 14.4 | 14.6 | 14.7 | 14.a | 14 Life below water | 14.3.1 | 14.4.1 | 14.5.1 | | | |
| | 15.1 | 15.2 | 15.3 | 15.4 | 15.5 | 15.7 | 15.8 | 15 Life on land | 15.1.1 | 15.2.1 | 15.3.1 | 15.4.1 | 15.4.2 | |
| | | | | | | | 16.8 | 16 Peace, justice and strong institutions | | | | | | |
| 17.2 | 17.3 | 17.6 | 17.7 | 17.8 | 17.9 | 17.16 | 17.17 | 17 Partnerships for the goals | 17.6.1 | 17.18.1 | | | | |

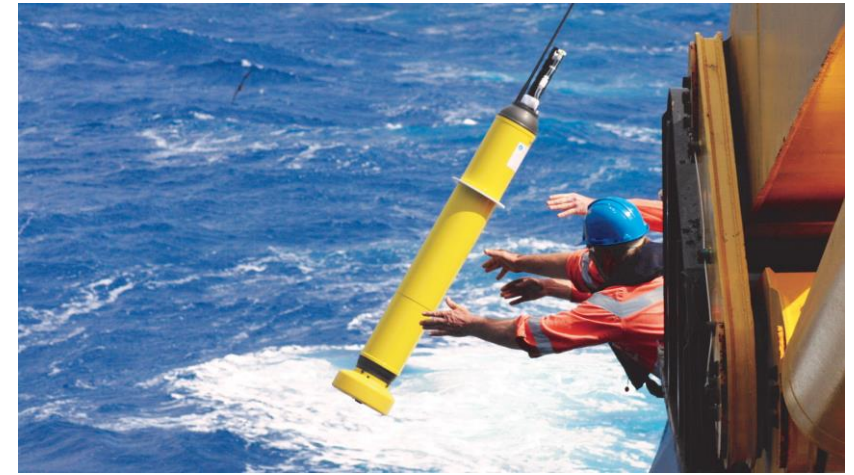
Earth Observations in Service of the 2030 Agenda

Purpose:

Organize and extend the potential of Earth observations and geospatial information within GEO to advance the 2030 Agenda and enable societal benefits through achievement of the SDGs.

Key Emphasis:

Collaborations with global statistical community, NSOs, line ministries, custodian agencies. Also, communication role in a federated approach to GEO community.



Argo floats are used to observe the ocean [image from Commonwealth Scientific and Industrial Research Organization]



Ground-based instruments used to observe precipitation include rain gauge tipping buckets, cylinders, and disdrometers & radar systems [top]

The GOES-R Series—a collaborative program between NASA and NOAA.



A sensor pod from NASA – Jet Propulsion Laboratory



Researchers with the University of Alaska-Fairbanks (UAF) use small aircraft such as the Havilland DHC-3 Otter. Credit: UAF

**Space-based
Satellites**

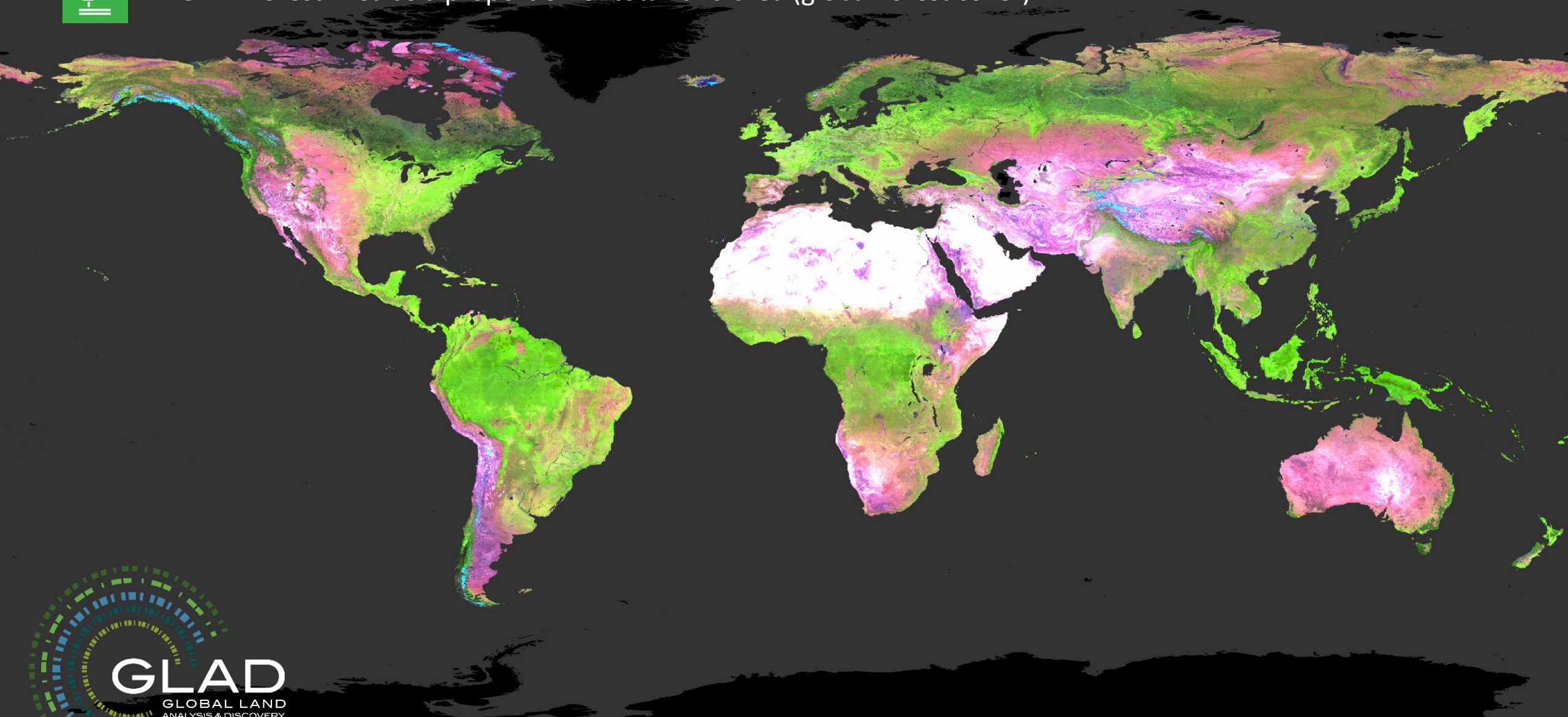
Airborne

Ground-based

In Situ



15.1.1 Forest Area as a proportion of total land area (global forest cover)



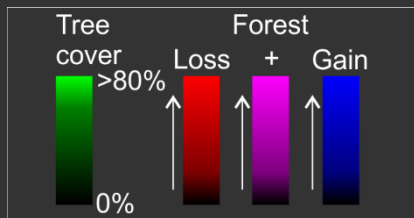
Landsat 5-4-3
2000 best pixel composite



UNIVERSITY OF
MARYLAND



15.1.1 Forest Area as a proportion of total land area (global forest cover)

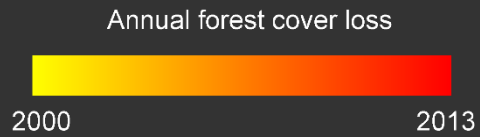


2000 to 2013 tree cover extent
and forest loss and gain



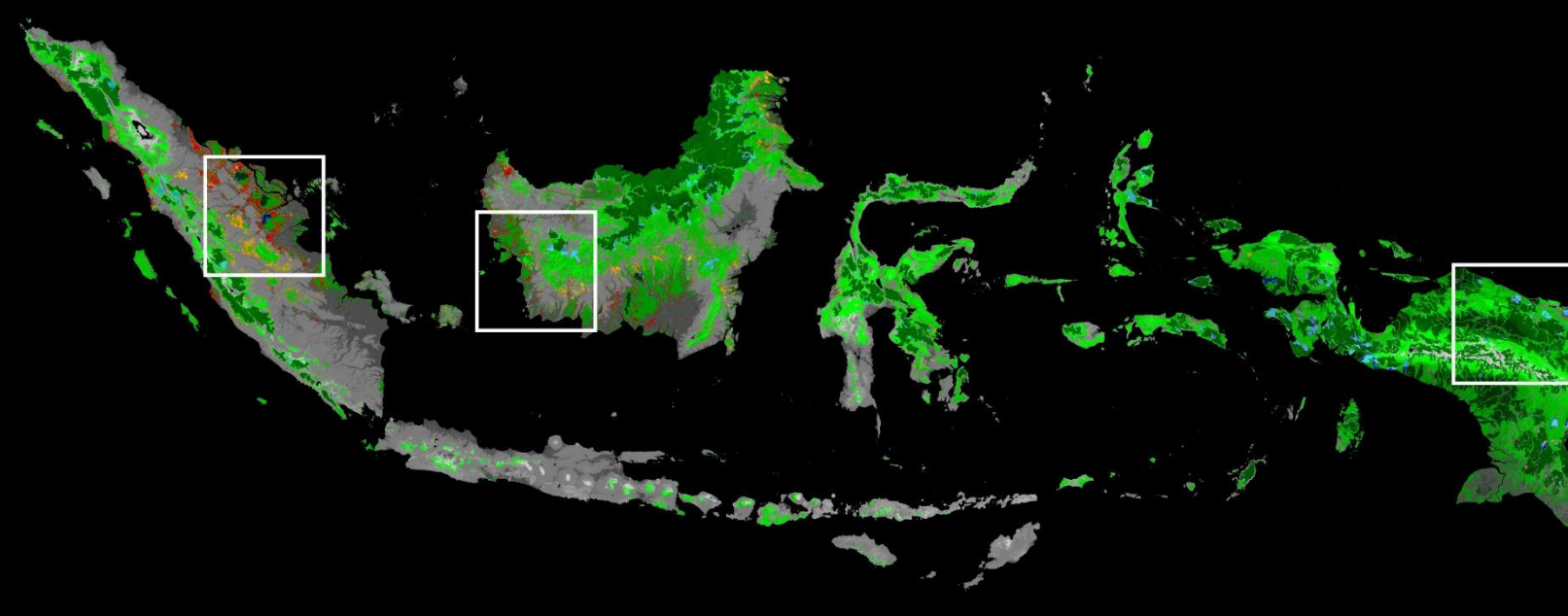
UNIVERSITY OF
MARYLAND

15.1.1 Forest Area as a proportion of total land area (global forest cover)



2000 to 2013 annual loss

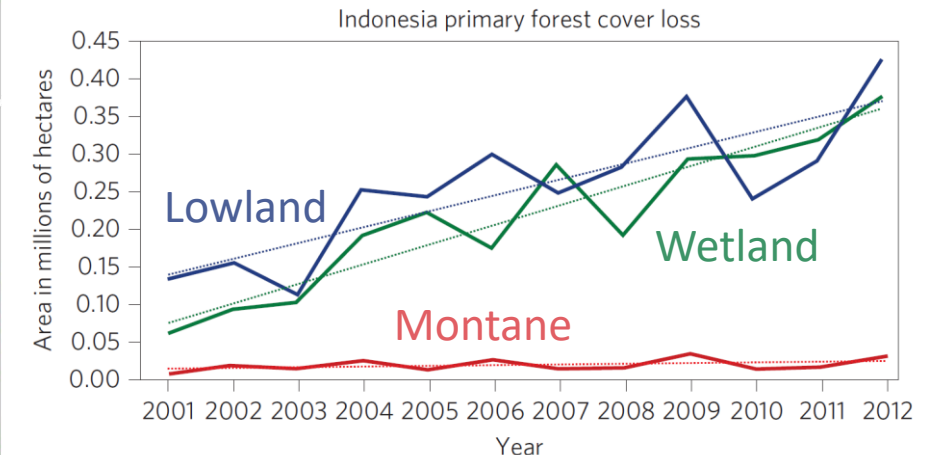
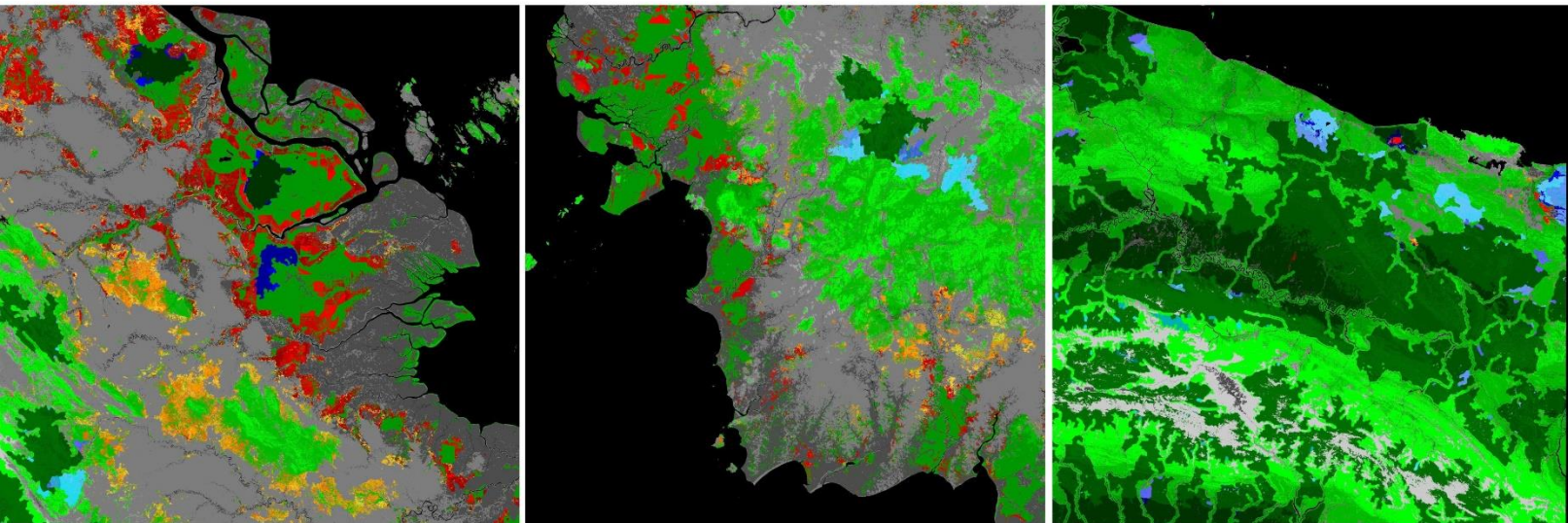




15.7Mha of mapped gross forest cover loss
14.4 ± 2.0Mha of reference gross forest cover loss

6.2Mha mapped primary forest loss
7.5 ± 2.2Mha of reference primary forest loss

10.7Mha of forest loss from MoF



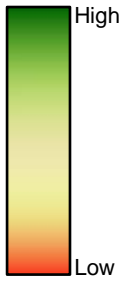
Annual primary forest loss disaggregated by landform for Indonesia as a whole, and the island groups of Sumatra, Kalimantan and Papua. Dashed lines are linear fits to the data

- wetland
- lowland
- montane
- intact wetland forest
- intact lowland forest
- intact montane forest
- degraded wetland forest
- degraded lowland forest
- degraded montane forest
- wetland forest loss 00-05
- wetland forest loss 05-10
- wetland forest loss 10-12
- lowland forest loss 00-05
- lowland forest loss 05-10
- lowland forest loss 10-12
- montane forest loss 00-05
- montane forest loss 05-10
- montane forest loss 10-12
- wetland forest degradation 00-05
- wetland forest degradation 05-10
- wetland forest degradation 10-12
- lowland forest degradation 00-05
- lowland forest degradation 05-10
- lowland forest degradation 10-12
- montane forest degradation 00-05
- montane forest degradation 05-10
- montane forest degradation 10-12

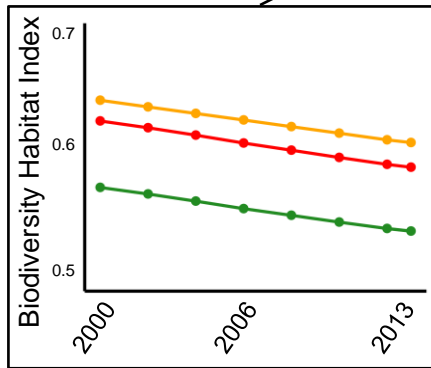
Margono et al., 2014,
 Primary forest cover loss in Indonesia, 2000 to 2012,
Nature Climate Change

15.1.1 Forest Area as a proportion of total land area (global forest cover)

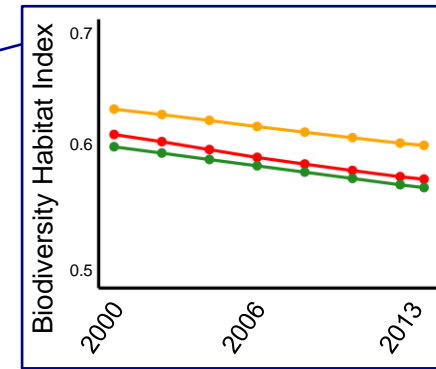
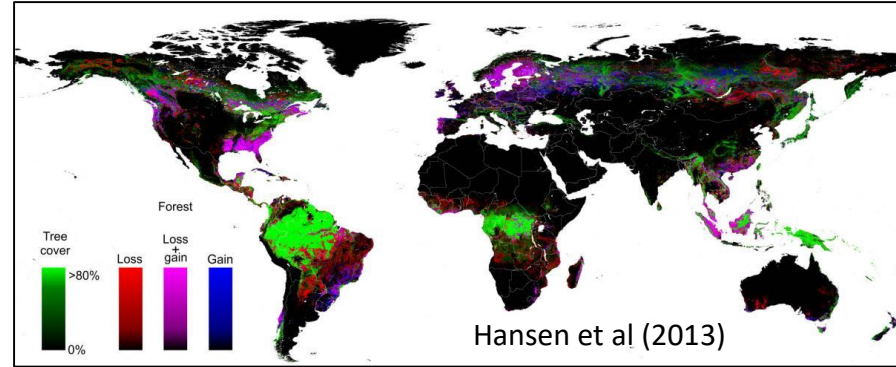
Biodiversity Habitat Index (1km grid cells) - 2013



- Plants
- Invertebrates
- Vertebrates



Neotropical moist forest biome - Peru



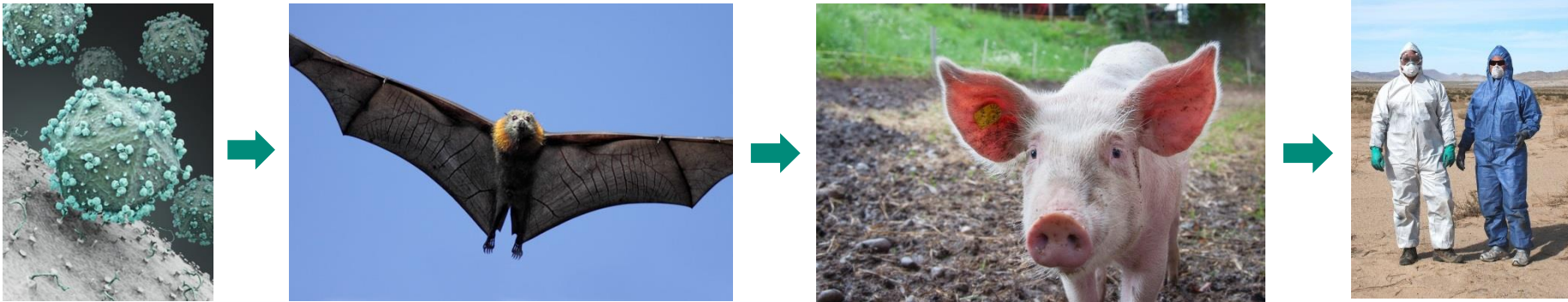
Neotropical moist forest biome - All



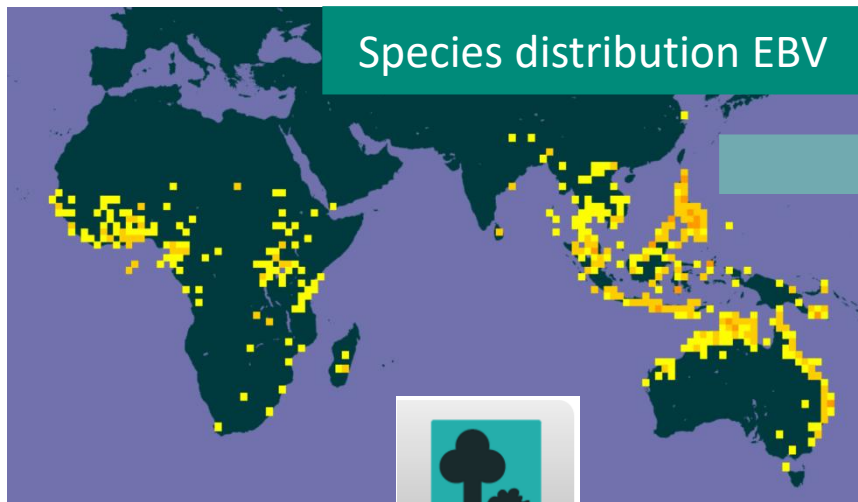


Integrating health, climate and biodiversity data to forecast future potential for zoonotic disease transmission

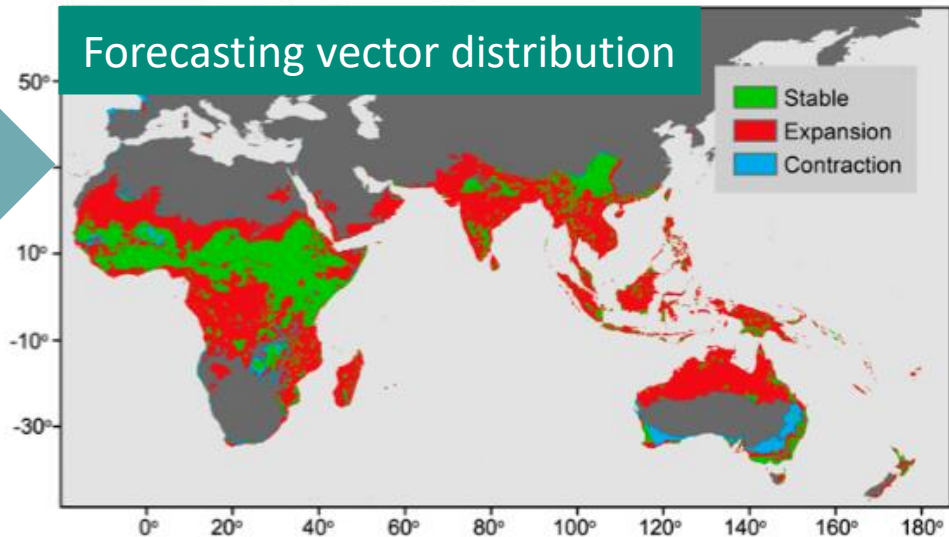
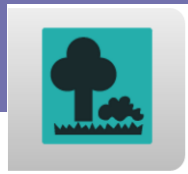
The example of the Nipah virus



Pteropus poliocephalus source: EOL



Source: GBIF Global Biodiversity Information Facility

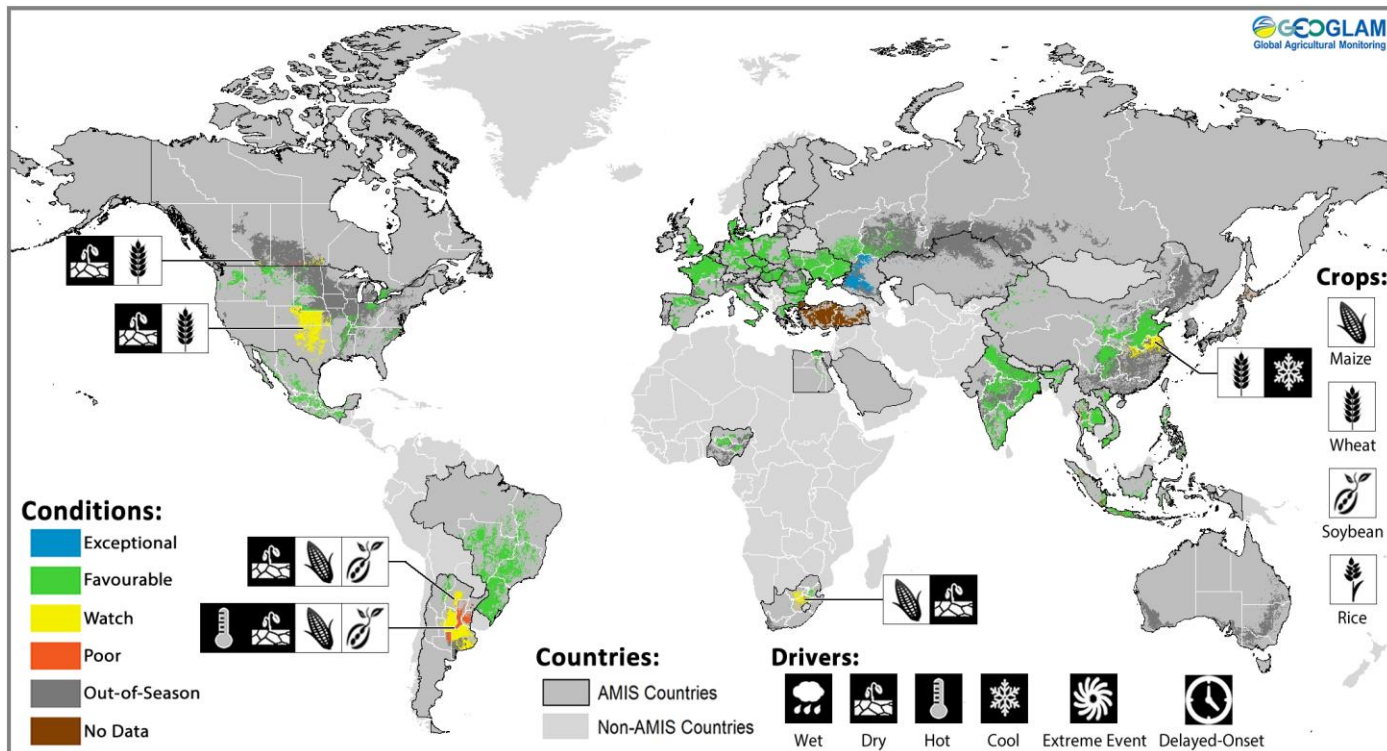


Source: Daszak et al. 2013, PNAS



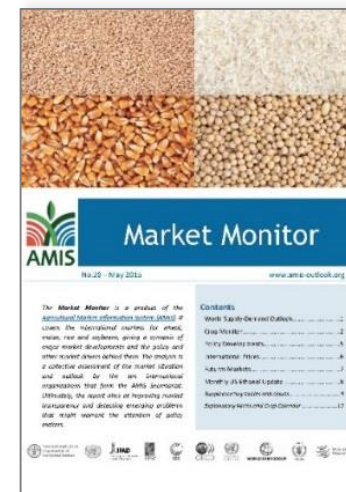
End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Condition Synthesis Maps Covering All AMIS Crops



Crop conditions and drivers are shown as of February 28. Crops that are in other than favorable conditions are displayed on the map with their crop symbol & driver.

<https://cropmonitor.org/>



Market Monitor:
Operational monthly bulletin for primary crop types for 49 countries

Four main crops:
Rice, Wheat, Maize, Soybeans

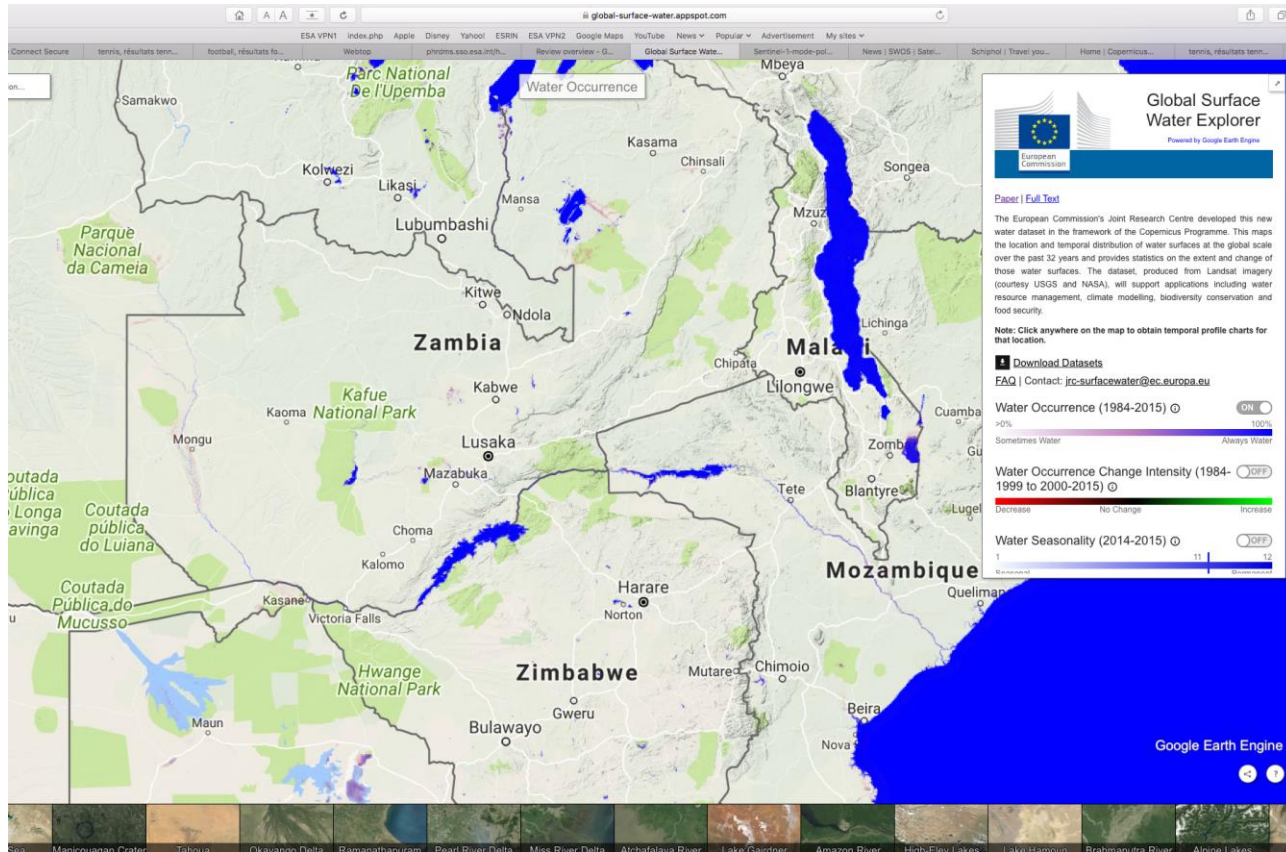
EO Data Use

- Satellite baseline datasets - GEOGLAM Crop Calendars and Crop Masks
- Satellite observations of land - NASA & USGS (MODIS, Landsat, SMAP), ESA (Sentinel-1, Sentinel-2, Sentinel-3), CSA (Radarsat-2, RCM), JAXA (GCOM-C, ALOS-2), DLR (TerraSAR-X, TanDEM-X), CNES (Pleiades)
- In-situ & agrometeorological data sets
- Novel crowd-sourced information – GEO WIKI



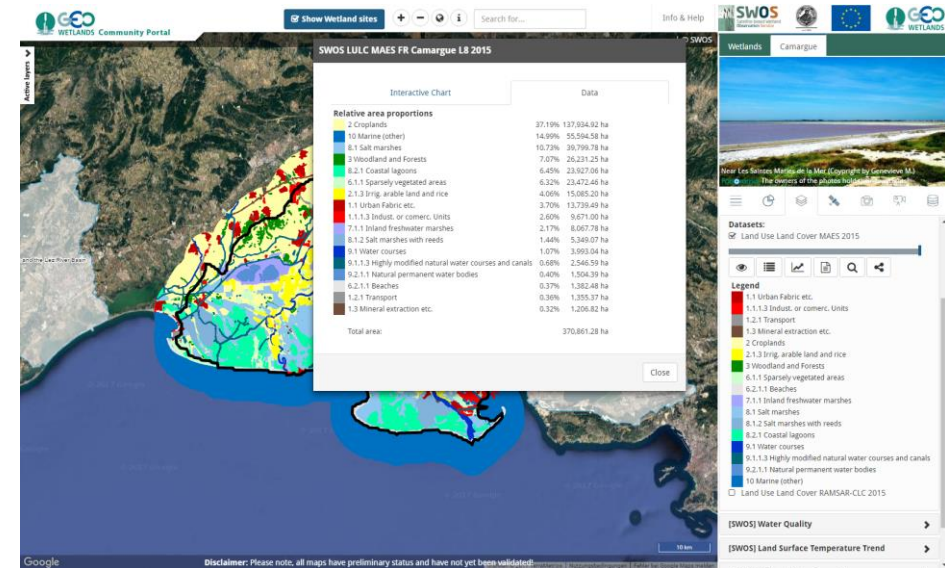
Earth observations for water-related ecosystem monitoring

High quality Global Data Set on spatial extent of inland water bodies (1984-2015, full Landsat archive, 30m, Joint Research Center supported by Google Earth Engine)



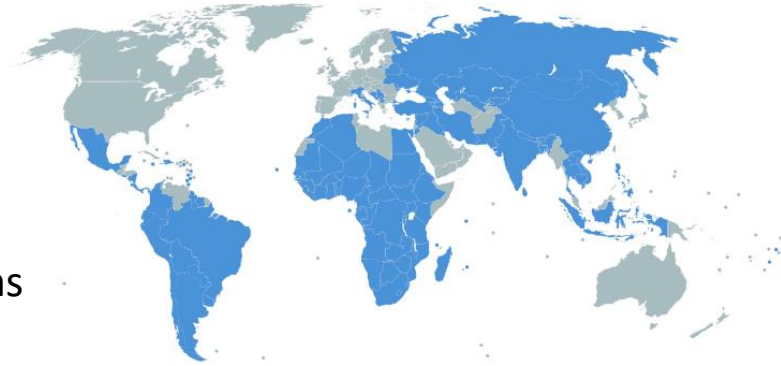
Water-related Community Portal

- Wetland-related datasets freely available
- EO best case practices & guidelines
- Portal customization for SDG 6 monitoring & reporting



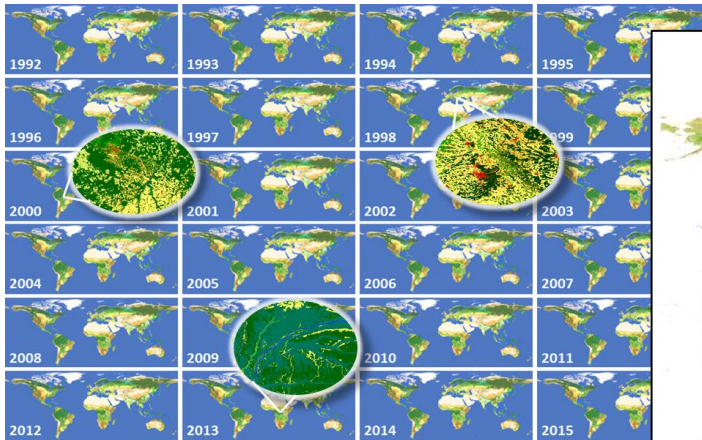
15.3.1. Proportion of land that is degraded over total land area

- Good Practice Guidance produced by UNCCD
- National official data sources, complemented by EO.
- EO Data: Land Cover – NASA (Landsat, MODIS), USGS (Landsat), ESA (Land Cover CCI); Land Productivity Dynamics (LPD) – JRC; Soil Organic Carbon (SOC) - International Soil Reference and Information Centre
- UNCCD - GEO regional capacity building workshops & federated collaborative platforms

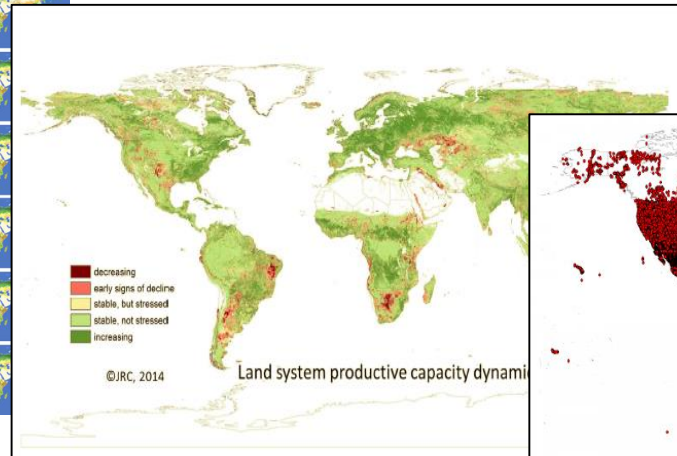


Countries setting LDN targets

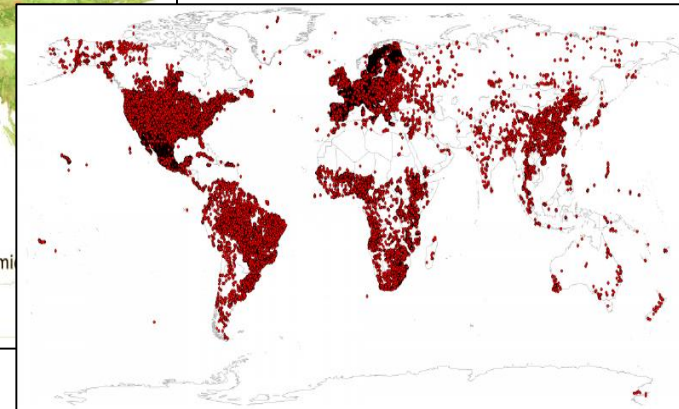
Disclaimer: Country names or borders shown on the map do not necessarily represent the UNCCD's official position. The map shown is simply for display purposes. It does not seek to imply views or opinions of the UNCCD, regarding the legal status of any territory or country.



ESA Climate Change Initiative Land Cover



JRC Land Productivity Dynamics



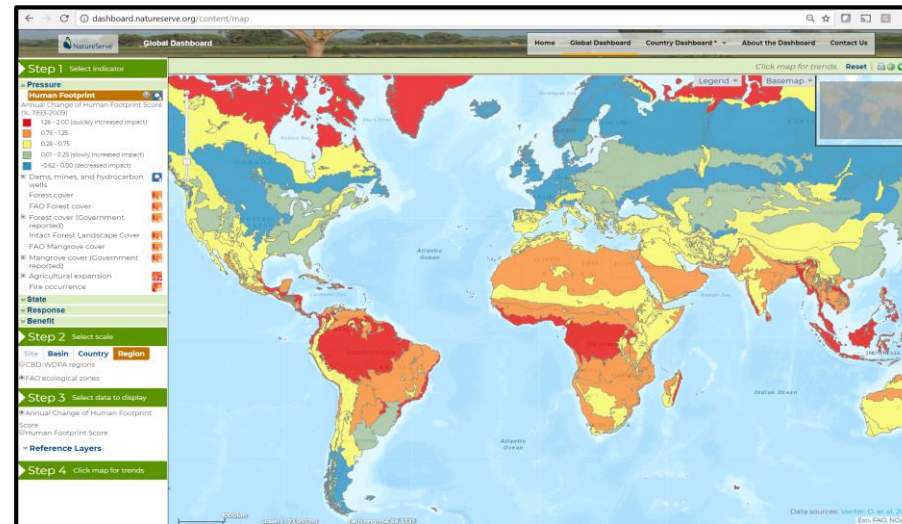
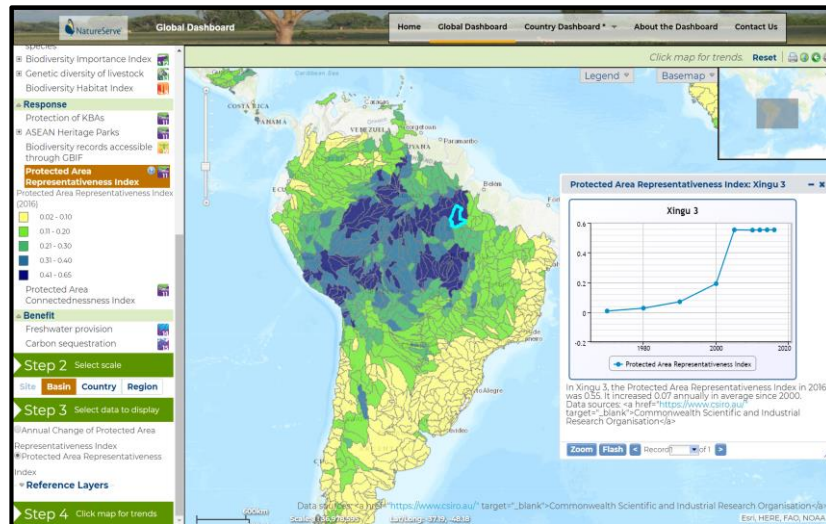
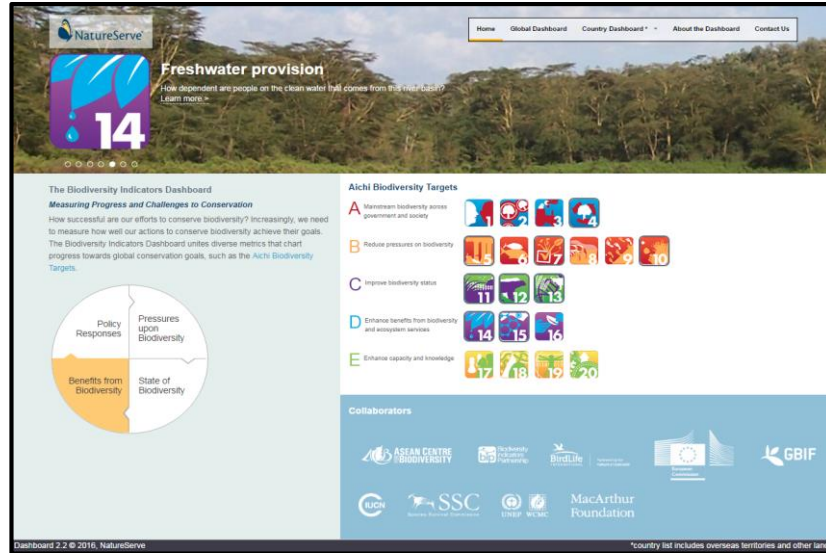
ISRIC SoilGrids250m



Out of the 113 countries that have committed to set LDN targets, 64 countries have already established a baseline



NatureServe Indicators Dashboard: Intuitive data visualization to quickly convey essential information



<http://dashboard.natureserve.org/>

Biodiversity Indicators Partnership Visualization Facility: creating a user-friendly and interactive indicator visualizations for the SDGs

Browse global indicators under the BIP

Aichi Targets | **SDGs** | MEAs | Themes | National Indicators

1 NO POVERTY | 2 ZERO HUNGER | 3 GOOD HEALTH AND WELL-BEING | 4 QUALITY EDUCATION | 5 GENDER EQUALITY | 6 CLEAN WATER AND SANITATION | 7 AFFORDABLE AND CLEAN ENERGY | 8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE | 10 REDUCED INEQUALITIES | 11 SUSTAINABLE CITIES AND COMMUNITIES | 12 RESPONSIBLE CONSUMPTION AND PRODUCTION | 13 CLIMATE ACTION | 14 LIFE BELOW WATER | 15 LIFE ON LAND | 16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS

NatureServe | Home | Global Dashboard | Country Dashboard | About the Dashboard

Ecuador | Protected Area | Select a Country

LAND AREA

| Category | Total | Protected | Global Average | South America Average |
|-----------|-------------------------|------------------------|----------------|-----------------------|
| Land Area | 285,179 km ² | 28,873 km ² | 15.40% | 24.37% |

MARINE AREA

| Category | Total | Protected | Global Average | South America Average |
|-------------|---------------------------|-------------------------|----------------|-----------------------|
| Marine Area | 1,675,961 km ² | 193,800 km ² | 13.06% | 8.40% |

Explore More Country Indicators | Visit Country Profile

Biodiversity

CORALS

| Category | Global Species | National Species | Threatened | Endemics | Threatened Endemics |
|----------|----------------|------------------|------------|----------|---------------------|
| Corals | 845 | 24 | 1 | 0 | 0 |

AMPHIBIANS

| Category | Global Species | National Species | Threatened | Endemics | Threatened Endemics |
|------------|----------------|------------------|------------|----------|---------------------|
| Amphibians | 6,424 | 485 | 175 | 178 | 196 |

BIRDS

| Category | Global Species | National Species | Threatened | Endemics | Threatened Endemics |
|----------|----------------|------------------|------------|----------|---------------------|
| Birds | 10,425 | 1,588 | 98 | 36 | 22 |

dashboard.natureserve.org/content/map

Global Dashboard | Home | Global Dashboard | Country Dashboard | About the Dashboard | Contact Us

Red List Index

Annual Change of Red List Index - All Species

Response

Protection of KBAs

Annual Change in Protected Area Coverage of KBAs (1980-2010)

| Color | Annual Change (%) |
|-----------------|-------------------|
| Lightest Yellow | 0% - 0.5% |
| Yellow | 0.6% - 1% |
| Orange | 1.1% - 1.5% |
| Red-Orange | 1.6% - 2% |
| Red | 2.1% - 3.5% |

ASEAN Heritage Parks

Lower Mekong

Biodiversity records accessible through GBIF

Benefit

Freshwater provision

NatureServe | Global Dashboard | Home | Global Dashboard | Country Dashboard | About the Dashboard | Contact Us

Clean Waters Score

Ocean Health Index

Red List Index

Red List Index for exploited species

Biodiversity Importance Index

Genetic diversity of livestock

Response

Protection of KBAs

Annual Change in Protected Area Coverage of KBAs (1980-2010)

Percent of KBA Area Covered by Protected Areas

The area of KBAs covered by protected areas changed from 8.55% in 1980 to 54.18% in 2010. The annual change in protected area coverage of KBAs from 1980 to 2010 was 1.52%.

Data sources: BirdLife International | IUCN

Zoom | Flash | Record | 1 of 1

