

Informing UN-assisted National Biodiversity Strategy Action Plans with Earth Observations: Application to Forest Integrity and Connectivity

Forest Integrity for Sustainable Development Planning



Photo: UNDP

NASA Ecological Forecasting Meeting, April 2018, Washington DC



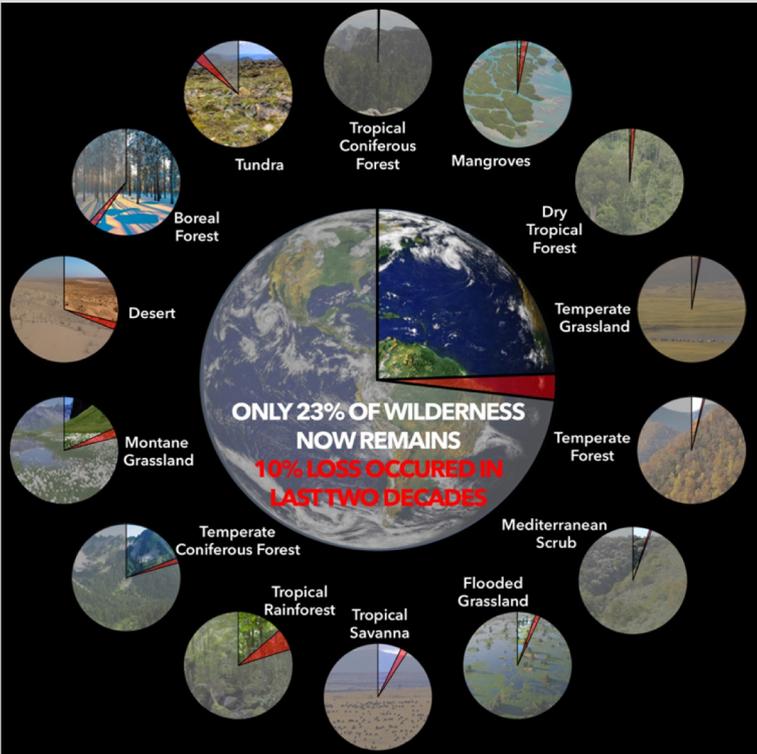
Key Issue: Loss of Wildlands



Grand Canyon National Park, US

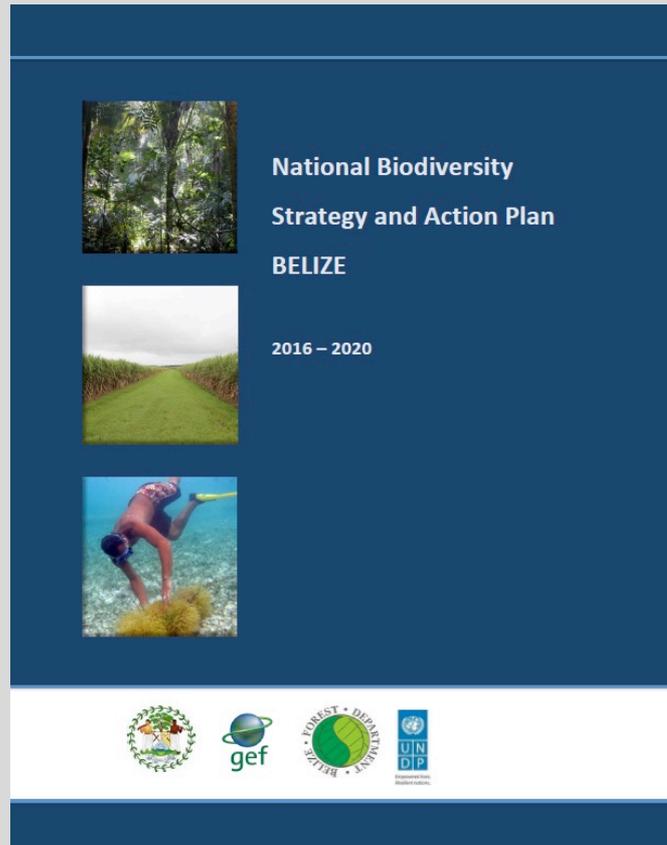


Near Tanjung Puting National Park, Indonesia



Watson et al 2016

Potential Solution: International Biodiversity Conservation



Convention on Biodiversity (2010) Targets for 2020

- Target 5 - fragmentation
- Target 11 - connectivity
- Target 17 - National Biodiversity Strategy Action Plans

The UNDP's is working with 135 countries to implement NBSAPs.

Spatial Data

UNDP Review of 225+ NBSAPs

- Key findings:
 - **Average # of maps per NBSAP/country was fewer than 4**
 - **32 NBSAPs (29%), and 20 5NR (14%) had *no maps at all*, and 78 NBSAPs (72%) and 90 5NR (62%) had 4 or fewer maps**
 - **87 countries (83%) have a combined average of 7 maps or fewer between both reports, and 73 countries (70%) have a combined average of 4 maps or fewer between both reports**



Project Purpose

Goal:

Develop credible and consistent global satellite-based products and analysis methods to inform connectivity implementation of forest integrity in NBSAPs

Objectives:

- 1. Develop satellite-based products mapping forest condition, human pressure, and forest integrity, and assessing habitat fragmentation and connectivity.**
- 2. Use the products to inform a biodiversity Decision Support System (DSS).**
- 3. Incorporate the DSS into the UN Pulse Lab and demonstrate its use by countries implementing NBSAPs**

Project Team

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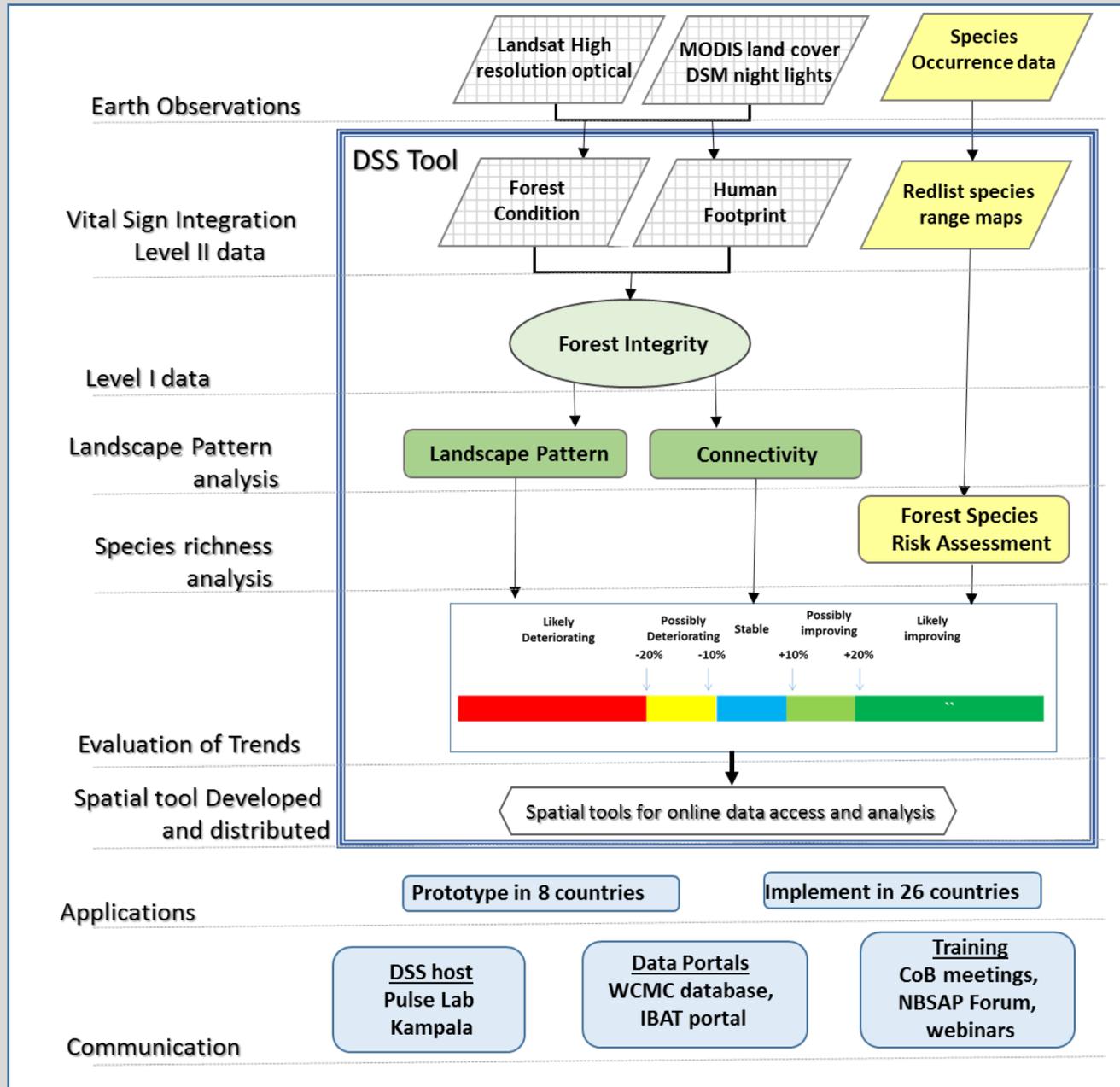


Anne Vernig

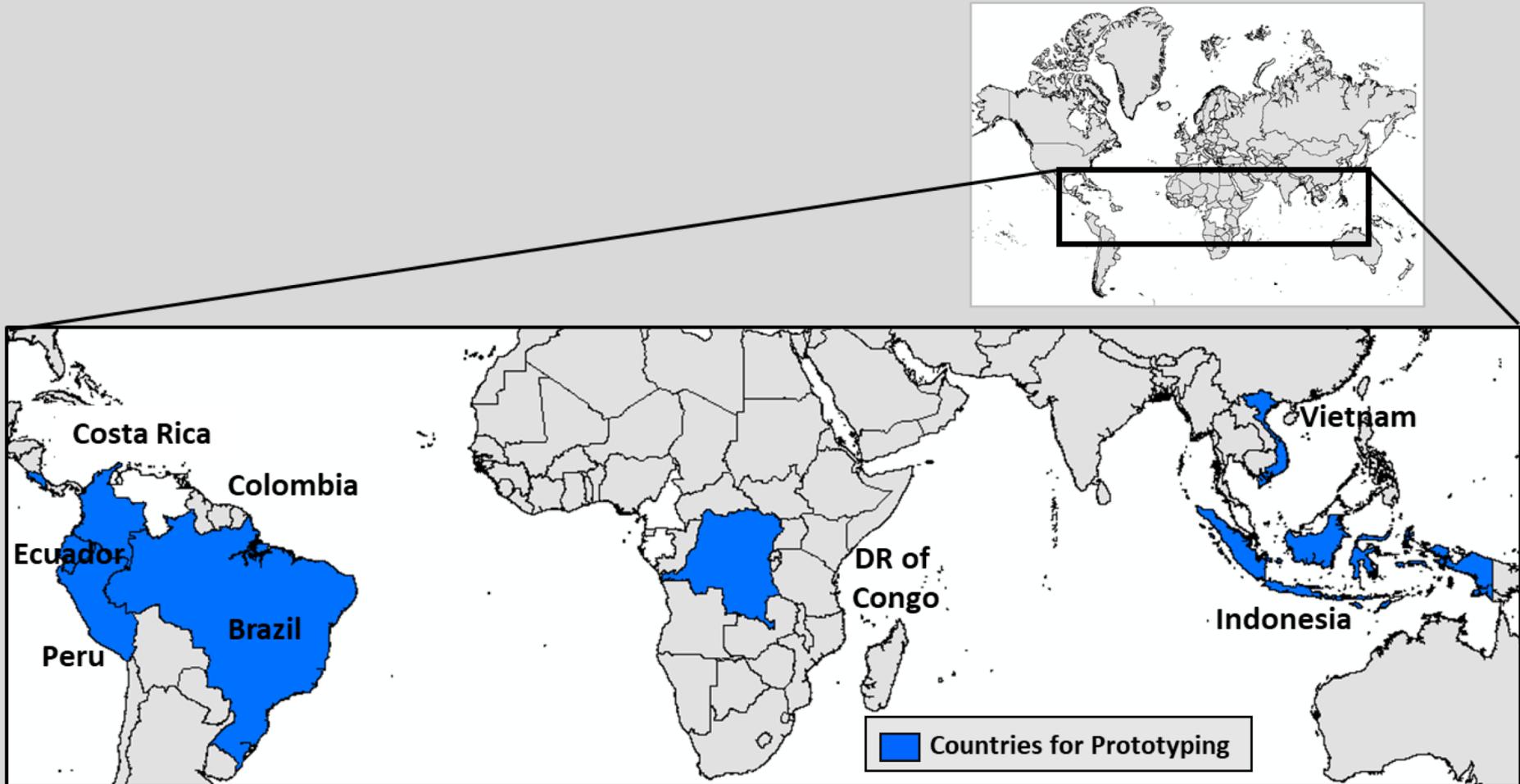


Heena Ahmed

Project Flow

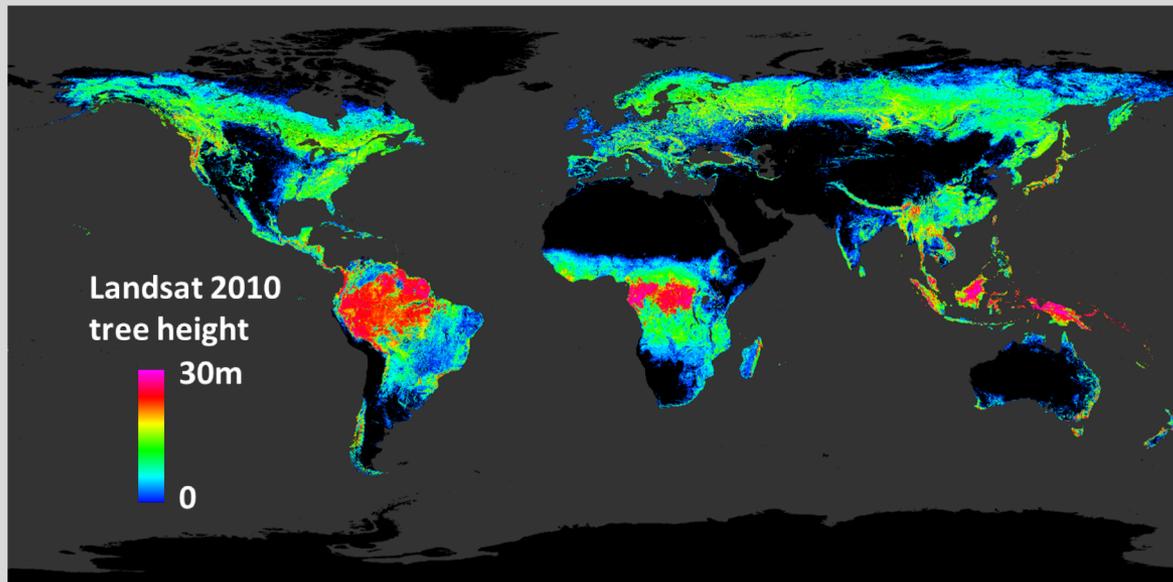
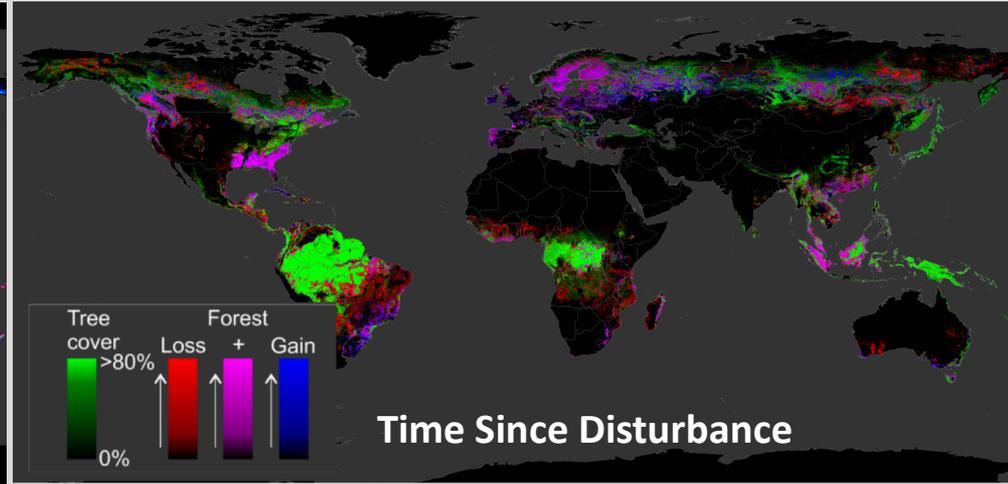
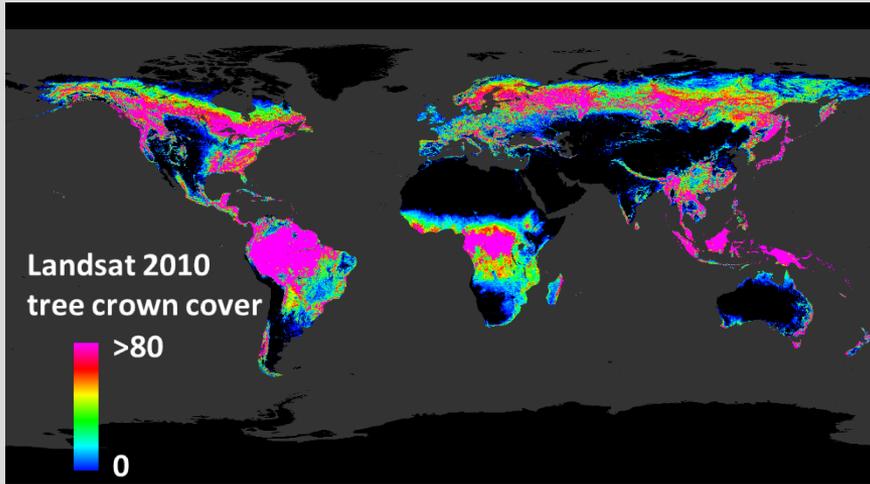


Study Area and Pilot Countries



Forest Condition

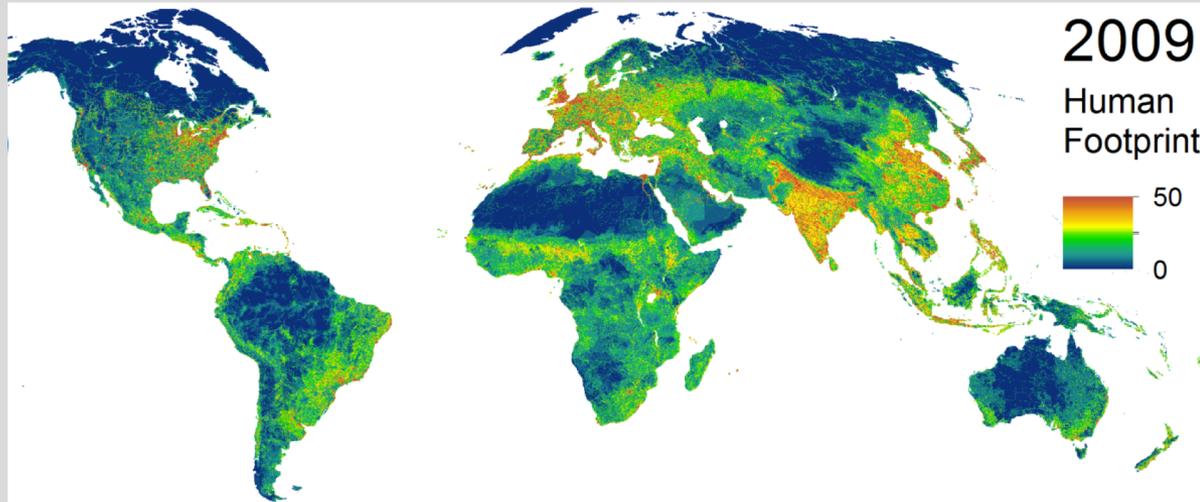
M. Hansen et al.
multiple



Enhancements

- Canopy cover 2000, 2010
- Canopy height 1986, 2001, 2016

Human Footprint



Venter et al. 2016

Step 1 Acquire or develop data on individual human pressures

1993 pressure data

- Built environments
- Population density
- Electric infrastructure
- Crop lands
- Pasture lands
- Railways
- Major roadways
- Navigable waterways

2009 pressure data

- Built environments
- Population density
- Electric infrastructure
- Crop lands
- Pasture lands
- Railways
- Major roadways
- Navigable waterways

Step 2 Assign relative pressure scores to individual pressures

1993 pressures

2009 pressures

Step 3 Overlay individual pressures to create Human Footprint maps

1993 Human Footprint

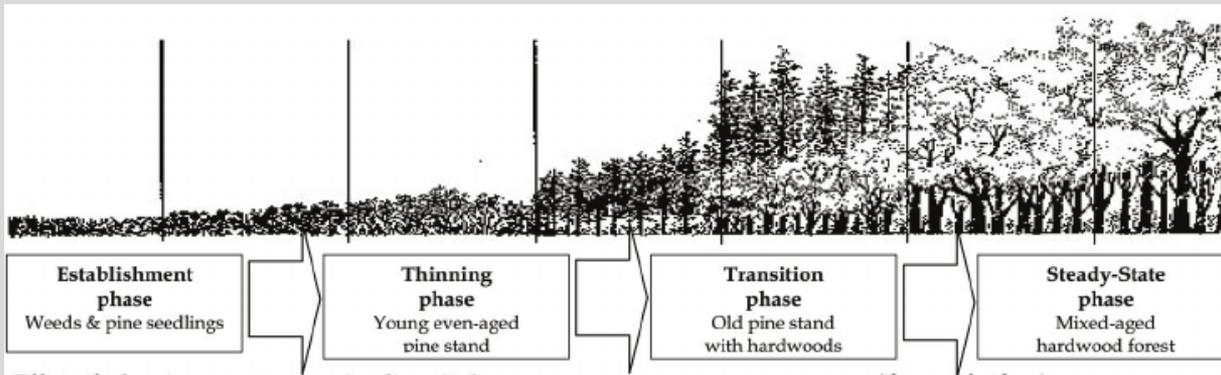
2009 Human Footprint

Enhancements

- HFP 2000, 2013
- National HFP maps

Forest Integrity

Forest Structural Condition



Human Footprint



Forest Integrity

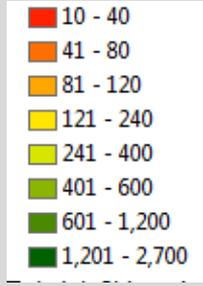
Forest structural condition	Canopy cover (%), Canopy change threshold Canopy height
Forest integrity	Canopy cover (%), Canopy change threshold Canopy height Human footprint



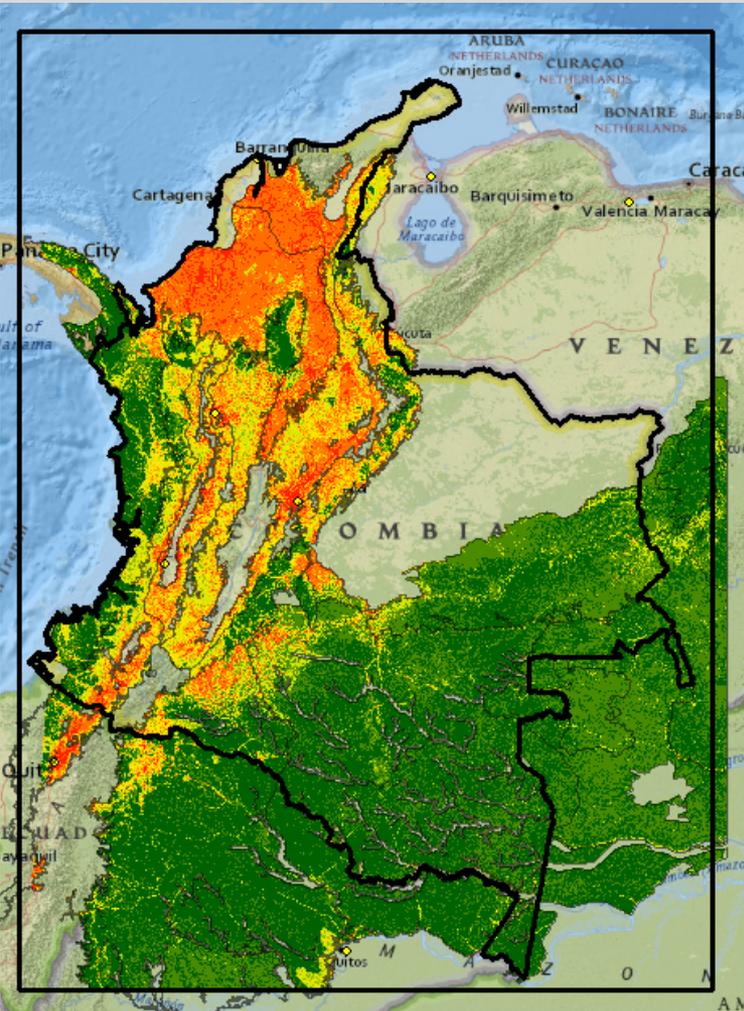
High integrity forests – tall, older, closed canopy, low human pressure

Forest Integrity Index

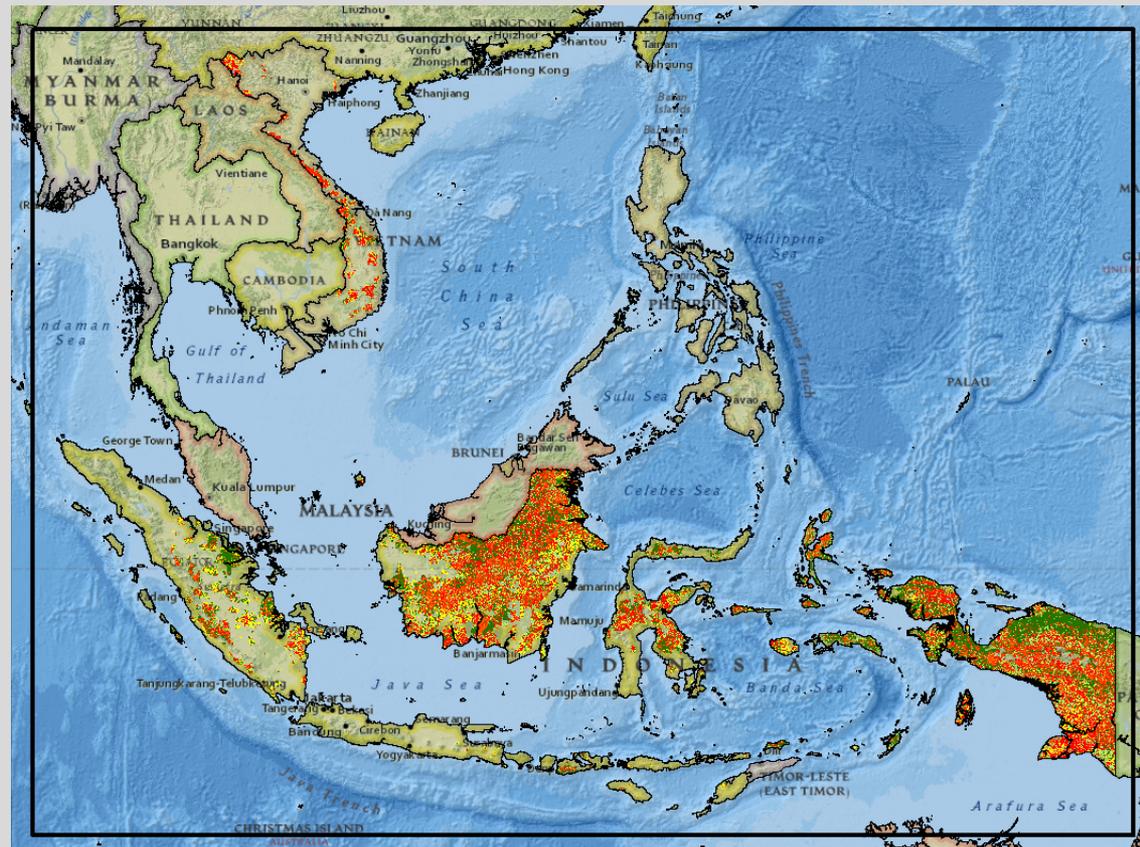
Integrity index (x100)



Colombia

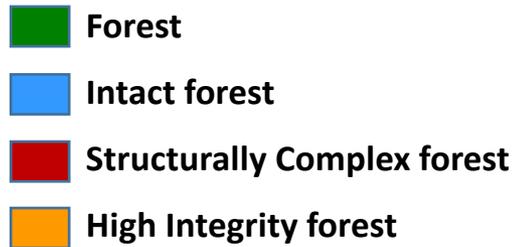
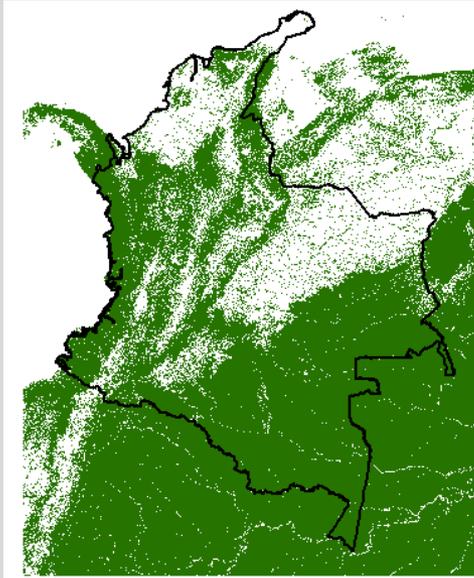


Indonesia and Vietnam

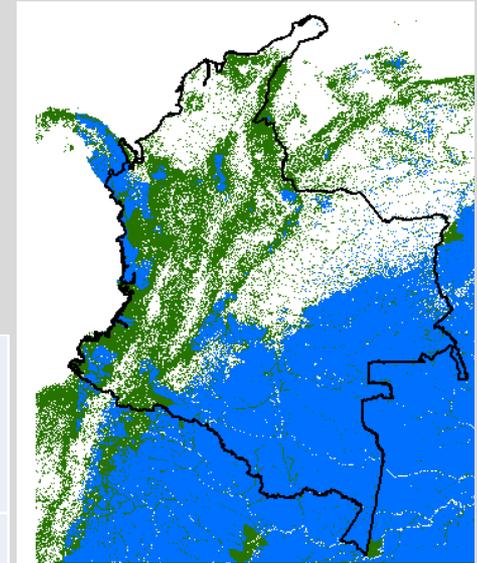


Comparing Forest Metrics

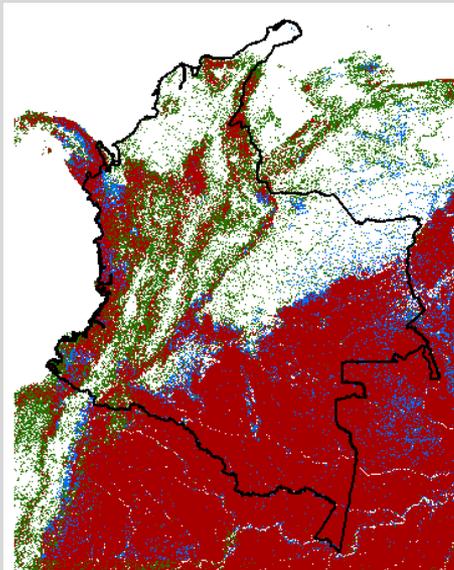
Forest



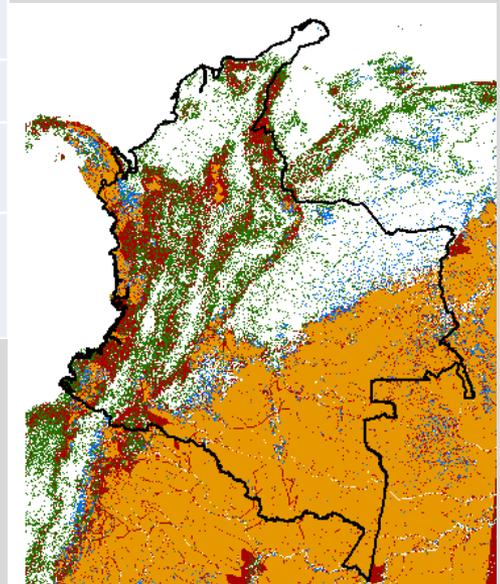
Intact forest



Structurally Complex



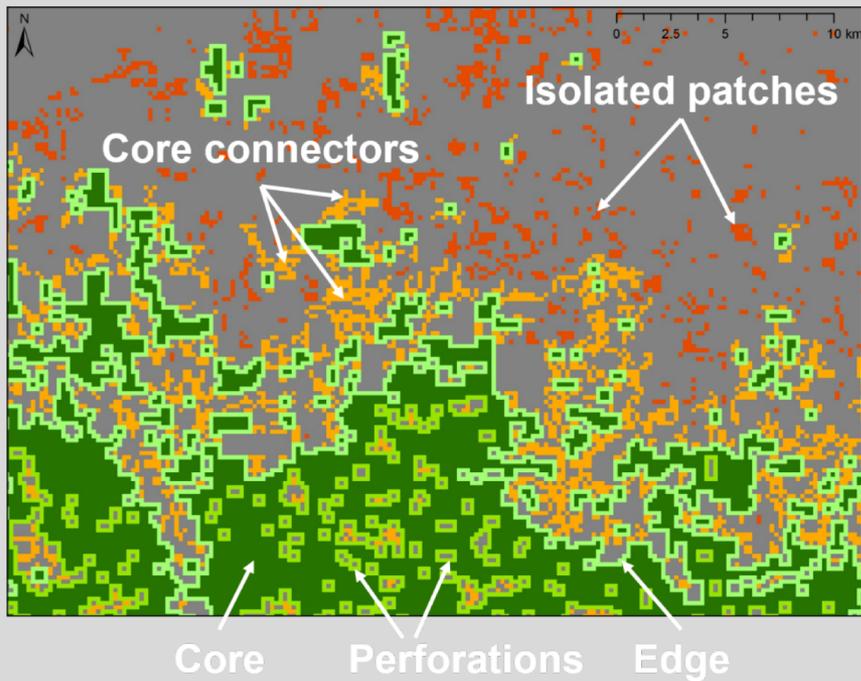
High Integrity forest



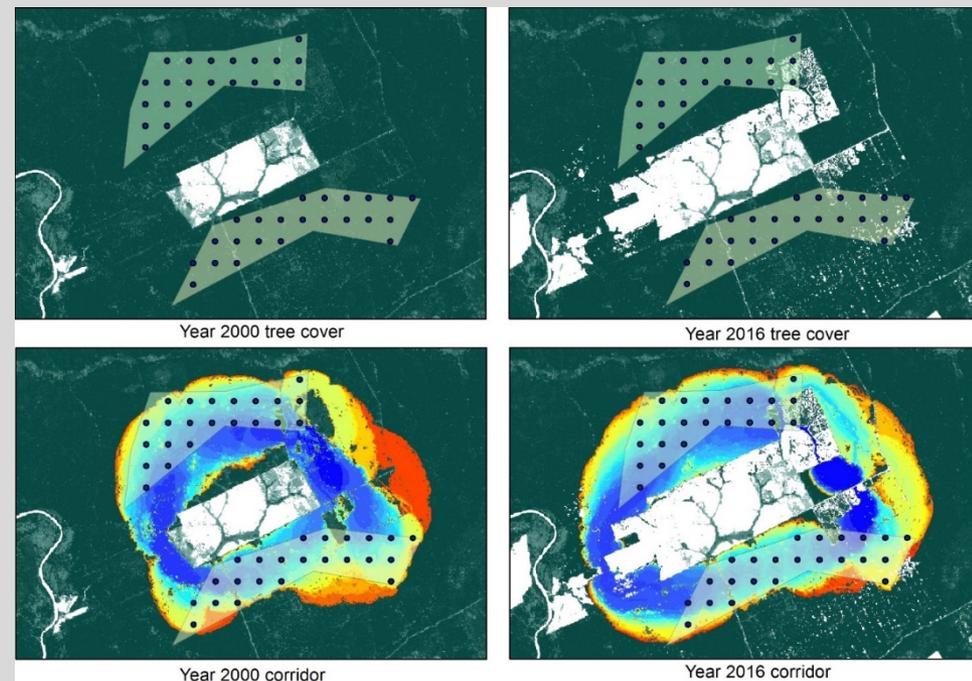
Ecoregion	Forest	Intact forest	Structurally Complex forest	High integrity forest
Caqueta Moist forest	95.22	88.25	87.39	82.22
Choco-Darien Moist forest	91.09	47.90	58.88	33.43
Dry forest	24.88	0.00	3.32	0.00
Montane Moist forest	73.23	8.66	31.54	5.93
Mag-Uraba Moist forest	27.94	0.87	5.77	0.63

Forest Fragmentation and Connectivity

Morphological Spatial Pattern Analysis



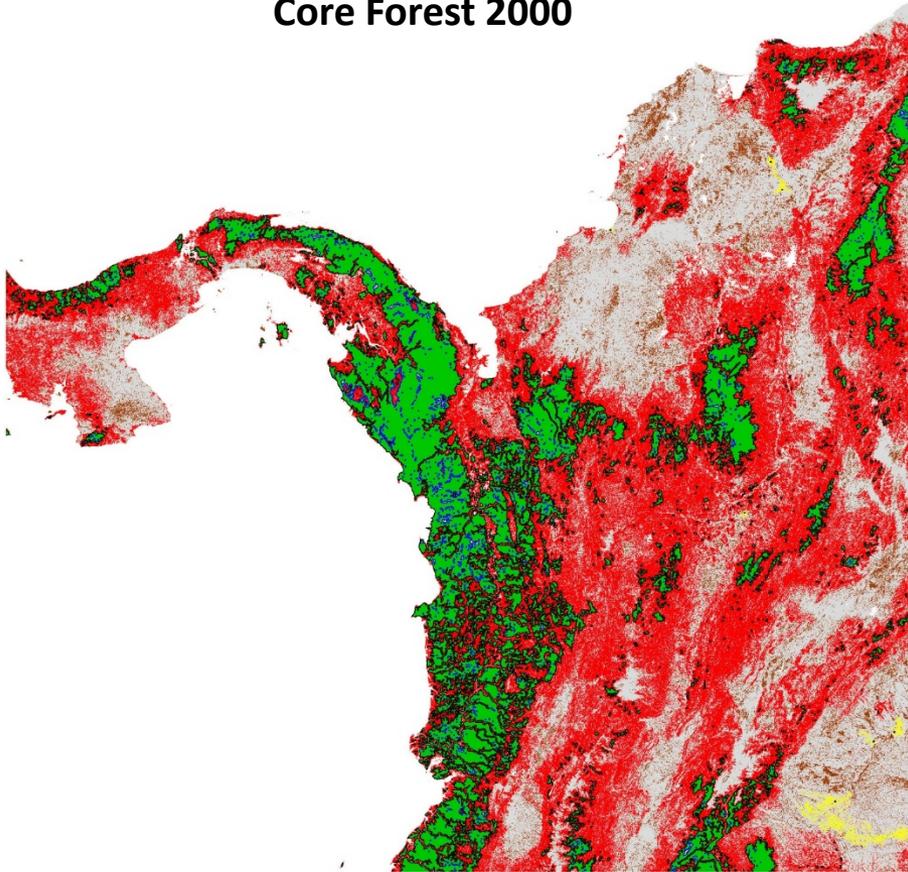
Multi-Corridor Mapping



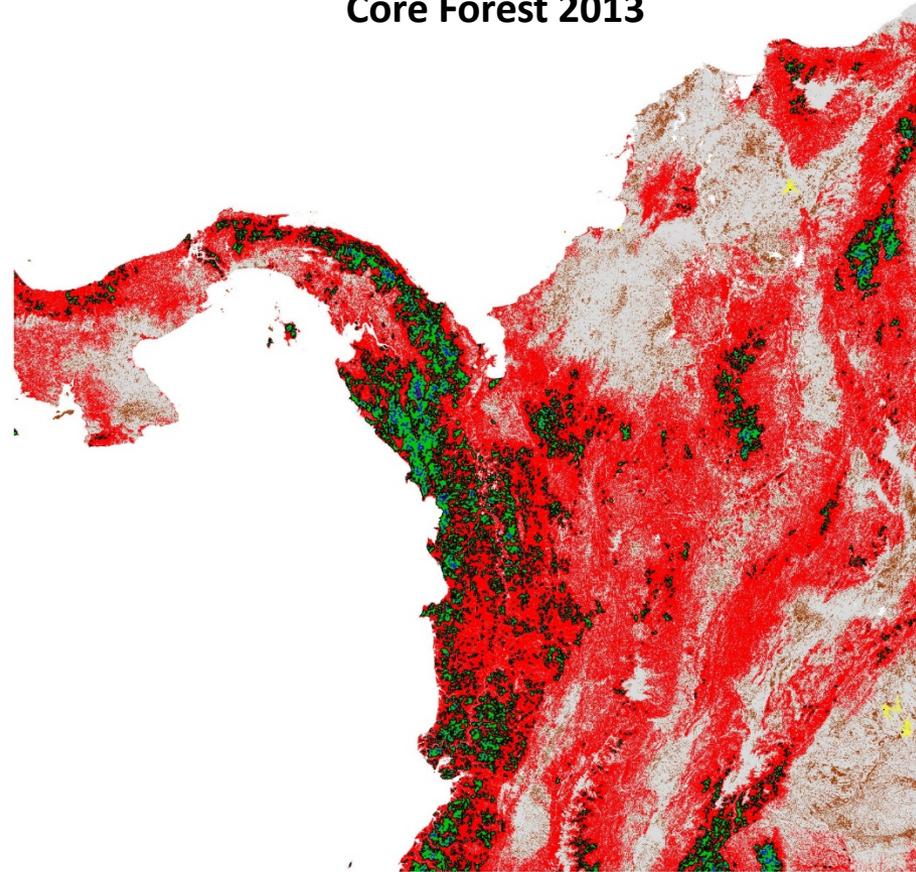
Forest Fragmentation and Connectivity

Colombia MSPA Examples for Canopy Cover

Core Forest 2000



Core Forest 2013



Consequences for Biodiversity

e.g. Venter et al. 2009

Goal: To evaluate biodiversity responses (richness, population trends, endangerment trends) to HFP, connectivity and forest integrity.

Biodiversity data

Predicts – diversity metrics at local sites (all taxa)

IUCN range maps – coarse grain range maps (vertebrates)

Living Planet Index: 14,152 populations of 3,706 species



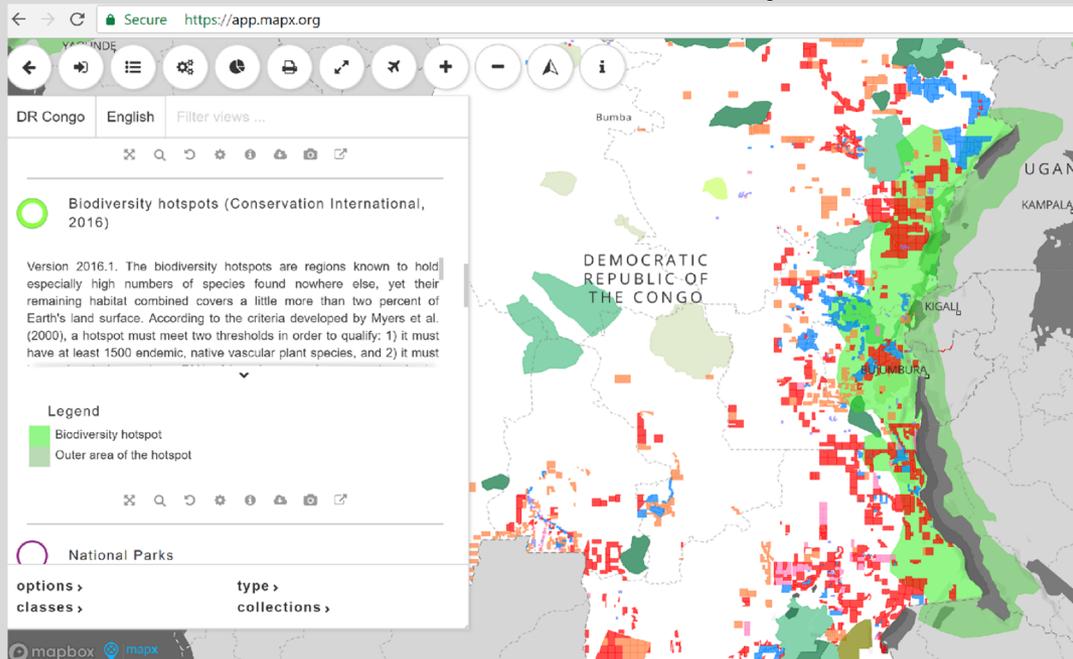
Decision Support

UNDP is creating a 'sandbox data environment' to:

- Provide a minimum data set to answer essential ABT and SDG questions
- Allow countries to upload their own national data sets
- Allow queries that would answer key status and trends questions
- Allow users to draw shape files to capture local knowledge



Platform: UN Environment's MapX



July 2018 release

30 data layers

- **Biodiversity data** – ecosystems, key biodiversity areas, forest cover change, forest health, connectivity
- **Conservation data** – protected areas, locally managed marine areas, indigenous areas
- **Threat data** – human footprint as individual and aggregate layers
- **SDG data** – water sources, land tenure, poverty, carbon stocks, disaster risk reduction

Partner Interactions



Assessment (April 2018)

- 1.1 Have you downloaded and how do you plan to download the seven datasets?
- 1.2. If you are not using the data, why not?
- 1.3 How are you planning to use the forest morphology data to update your 6NR?
- 1.4 How are you planning to use all of the project data to update your 6NR?
- 1.5 How else are the data from this project helping your conservation work?
- 1.6 What additional data do you need to improve your ability to develop a data driven 6NR
- 2.1. Have you attending previous capacity building activities?

Partner Interactions

2.1. Have you attending previous capacity building activities?

Country	Intro Webinar	Technical Workshop	Spatial Data Summit	Pre-SBSTTA workshop	Webinar (Spatial Data)
Brazil	✓	✓	✓	X	✓
Colombia	✓	✓	✓	X	✓
Costa Rica	✓	✓	✓	✓	X
DRC	✓	✓	✓	X	X
Ecuador	✓	✓	✓	✓	✓
Indonesia	✓	✓	✓	X	✓
Peru	✓	✓	✓	✓	✓
Viet Nam	✓	✓	✓	X	X

Forest Integrity for Sustainable Development Planning



The project has great potential to help countries in the humid tropics meet the 2020 targets using NASA products (and help save life on earth).