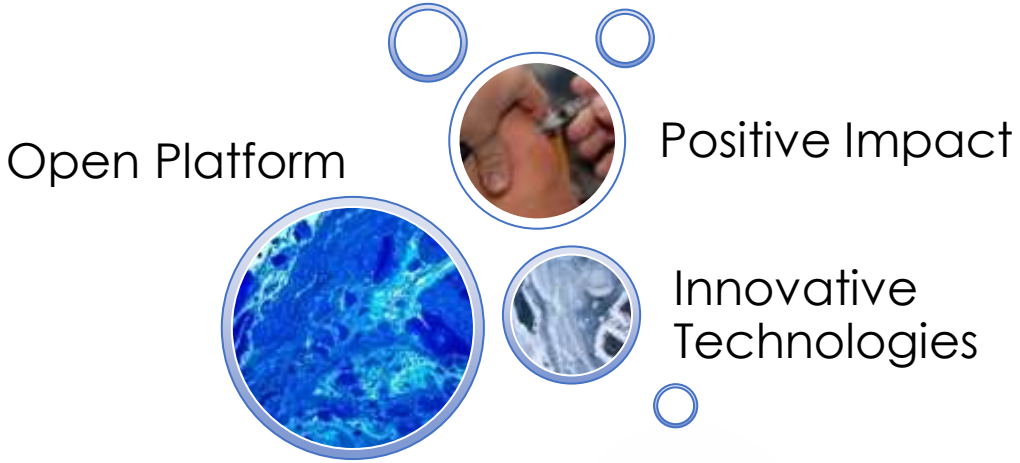
Radiant Earth Foundation

EARTH IMAGERY FOR IMPACT



Remotely Sensed Data in Support of Local Sustainable Development Projects

GEOSPATIAL WORLD FORUM | AMSTERDAM, THE NETHERLANDS | APRIL 2, 2019

ANNE HALE MIGLARESE

FOUNDER & CEO

Vision & Mission

Radiant Earth Foundation

- Open Geospatial Data for Positive Global Impact
- Connecting people globally to Earth Imagery, geospatial data, tools and knowledge to meet the world's most critical challenges

Why we exist

Radiant Earth Foundation

Problem

1 **DISCOVERY**

2 **COMPLEXITY**

3 **COSTS**

+

Global Development Community needs data and tools but often has the least access to it

Opportunity

- Increase in imagery and tools
- New technologies such as machine learning and cloud computing

Our Solution

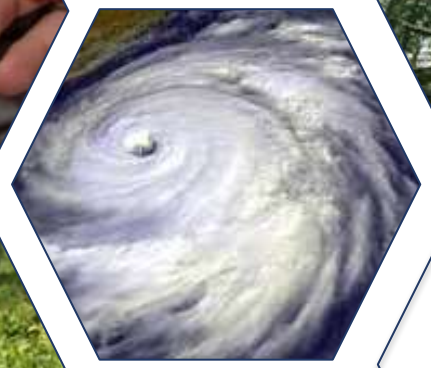
Facilitating access to imagery and data analytics to **enable the global development** community to address challenges

Mission Critical Support

Radiant Earth Foundation

Global Health

Humanitarian Response



Conservation, Forestry & Environment

Transparency & Journalism

Food Security & Agriculture

Poverty Reduction

Property Rights

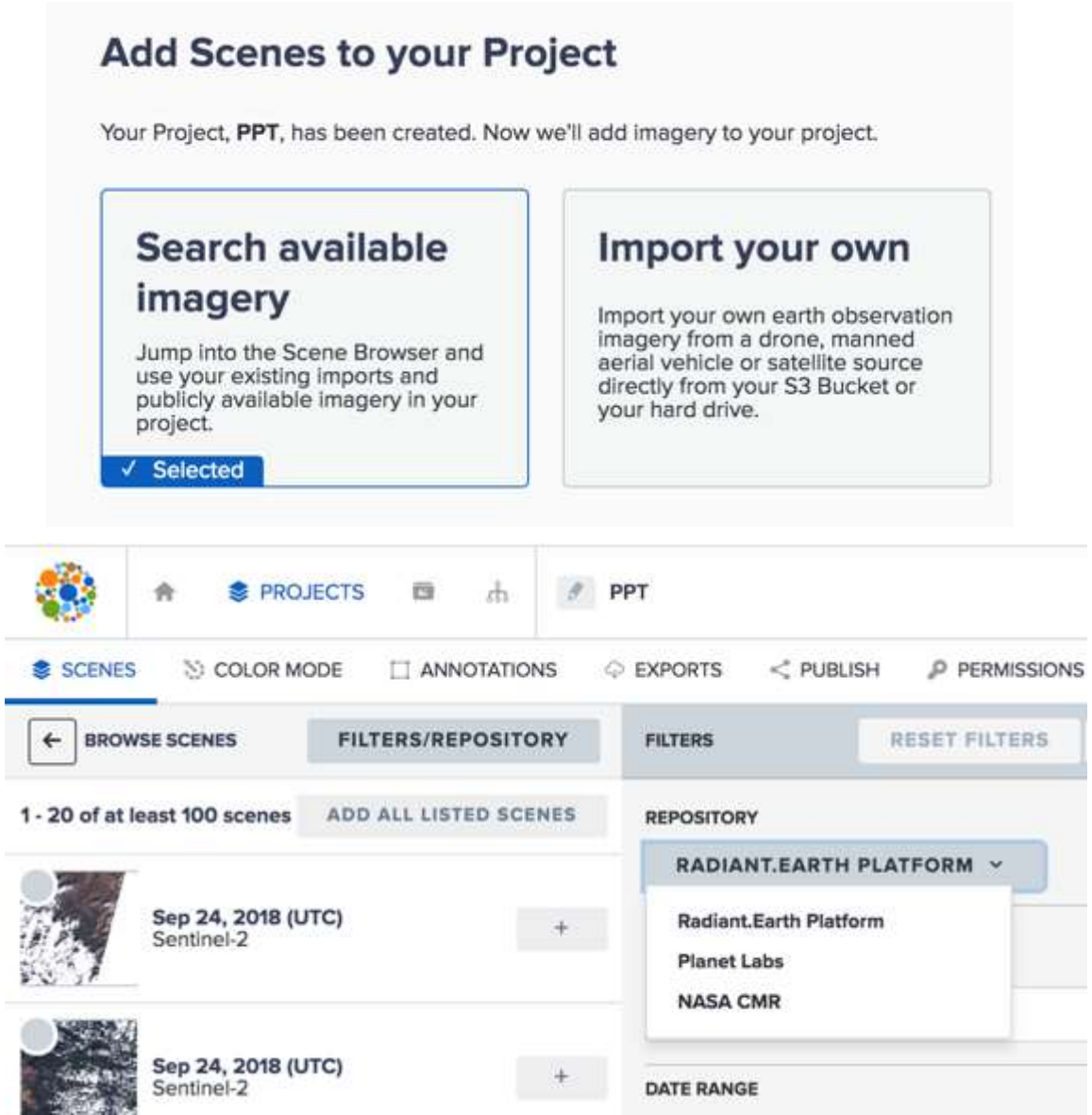
Water

Climate Change

Platform Features

Radiant Earth Foundation

- Supporting any imagery type:
  - Satellite
  - Drone
  - Airborne
- Uploading pipelines:
  - Local
  - Dropbox
  - Amazon Web Services (AWS) S3 Bucket
  - Planet API Connection
  - Radiant Earth Foundation API



Available Open Imagery

Radiant Earth Foundation

Datasource	Temporal Coverage	Temporal Revisit	Spatial Resolution
Sentinel 2-A/B	2015 - present	5 days	10 m
Landsat 4/5/7/8	1982 - present	16 days	30 m
MODIS	2000 - present	8 day composite from daily	250 m
ISERV	2012 - 2015	Specific operation times	3.5 m

EO Importance for the SDGs

Radiant Earth Foundation

Earth Observations potential contribution to the SDG Targets and Indicators

Target (Contribute to progress on the Target yet not the Indicator per se)								Goal	Indicator (Direct measure or indirect support)				
					1.4	1.5		1.4.2					
				2.3	2.4	2.c		2.4.1					
			3.3	3.4	3.9	3.d		3.9.1					
						5.a		5.a.1					
6.1	6.3	6.4	6.5	6.6	6.a	6.b		6.3.1	6.3.2	6.4.2	6.5.1	6.6.1	
			7.2	7.3	7.a	7.b		7.1.1					
						8.4							
			9.1	9.4	9.5	9.a		9.1.1	9.4.1				
				10.6	10.7	10.a							
11.1	11.3	11.4	11.5	11.6	11.7	11.b	11.c	11.1.1	11.2.1	11.3.1	11.6.2	11.7.1	
			12.2	12.4	12.8	12.a	12.b	12.a.1					
				13.1	13.2	13.3	13.b	13.1.1					
	14.1	14.2	14.3	14.4	14.6	14.7	14.a	14.3.1	14.4.1	14.5.1			
15.1	15.2	15.3	15.4	15.5	15.7	15.8	15.9	15.1.1	15.2.1	15.3.1	15.4.1	15.4.2	
							16.8						
17.2	17.3	17.6	17.7	17.8	17.9	17.16	17.17	17.18	17.6.1	17.18.1			

SDGs with most opportunities for EO data

Analysis performed by the GEO EO4SDGs initiative

Monitoring Sludge Volume in Sanitation Facilities

Radiant Earth Foundation

Sanitation Team at Bill & Melinda Gates Foundation

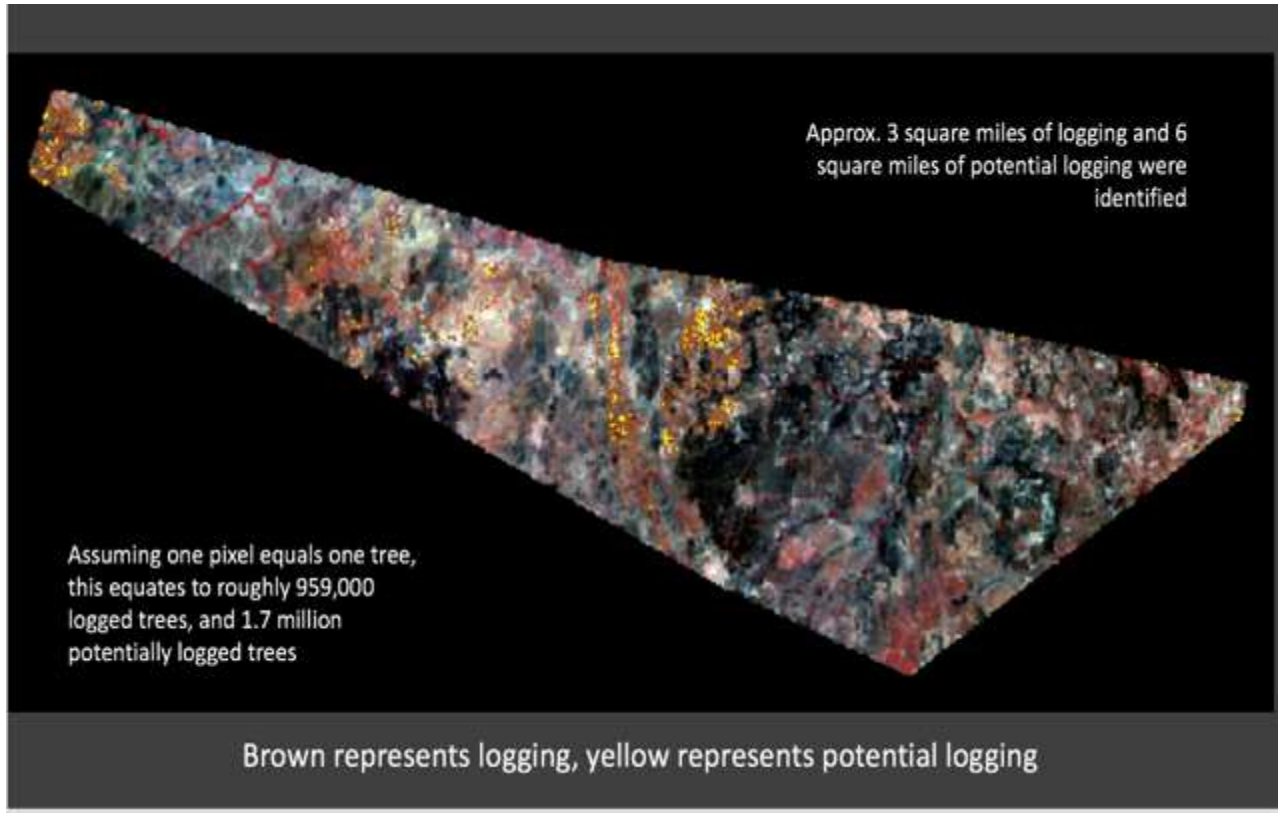
- Independent estimates of sewage processing operations in developing countries are needed to monitor and verify SDG 6.
- We built and tested two models using Sentinel 1 (3 locations) and Sentinel 2 (2 locations) open source satellite imagery with a machine learning technique.
- We concluded that the spatial and temporal resolution of available open imagery demands a larger amount of training data to improve the model fit. Alternate locations offering less cloud cover and more training data is recommended.

6 CLEAN WATER AND SANITATION

South Sudan Deforestation

Radiant Earth Foundation

- Radiant Earth Foundation provided analytic support to reporters from the Pulitzer Center for Crisis Reporting.
- Using high-resolution imagery, journalists sought to corroborate reports of illegal logging on the South Sudan/Uganda border.



15 LIFE ON LAND

13 CLIMATE ACTION

Pulitzer Center ON CRISIS REPORTING

Human Suffering & Environmental Loss

Radiant Earth Foundation

Problem: Deforestation and illegal Mining in Venezuela's Canaima National Park

- Illegal mining activity and deforestation in Amazonas and Orinoco regions of Venezuela, resulting in biodiversity loss and endangering health of indigenous populations
- Remote area making travel difficult and dangerous for investigation

Solution

- Radiant Earth set up a workspace on SOS Orinoco's platform, and facilitated access to satellite allowing analysts to examine and corroborate the reports of destruction

Benefits / Impact

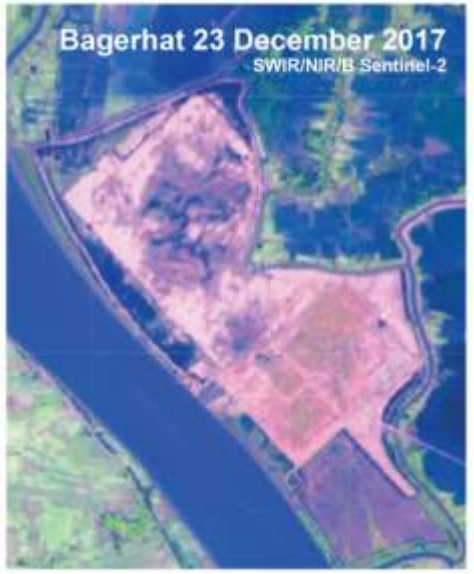
- Raised the visibility of ecological and public health damage
- Educated journalist, politicians, activists and the public on the impact of the damage

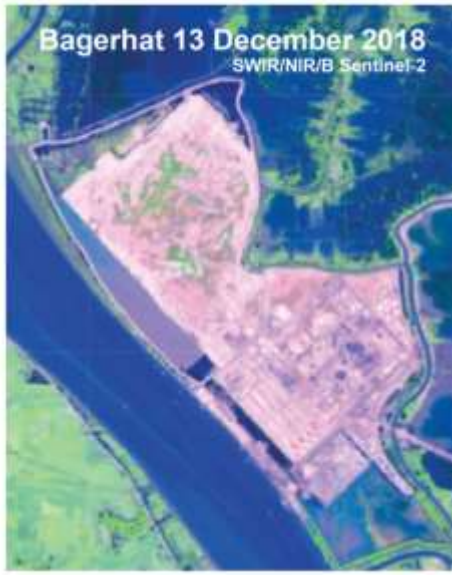
Environmental Protection & Health

Radiant Earth Foundation

Problem

- The request to halt construction was placed by the UNESCO World Heritage Committee and the International Union for Conservation of Nature (IUCN)
- Earthjustice sought to determine whether the Government of Bangladesh halted construction of coal plant at Rampal, near the Sundarbans World Heritage site





Solution

- Radiant Earth analyzed satellite imagery from 2016-2018 of the site, and observed changes to the infrastructure present, filling of wetlands.

Benefits / Impact

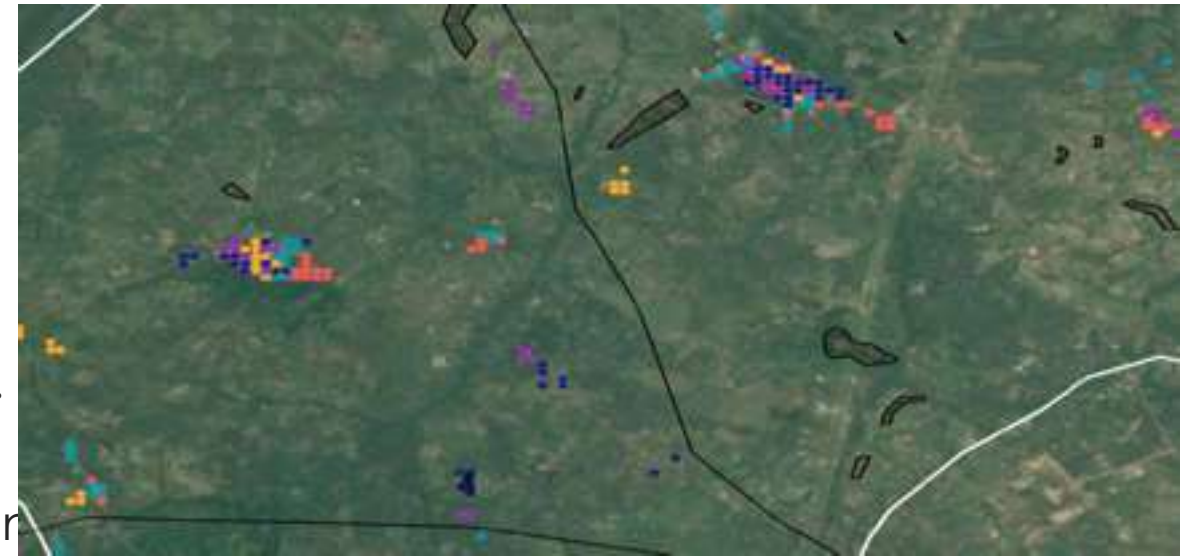
- EO evidence confirmed ongoing construction of the coal plant. Report with Radiant Earth's analysis was submitted to the World Heritage Committee and IUCN

Malaria Program in Nigeria

Radiant Earth Foundation

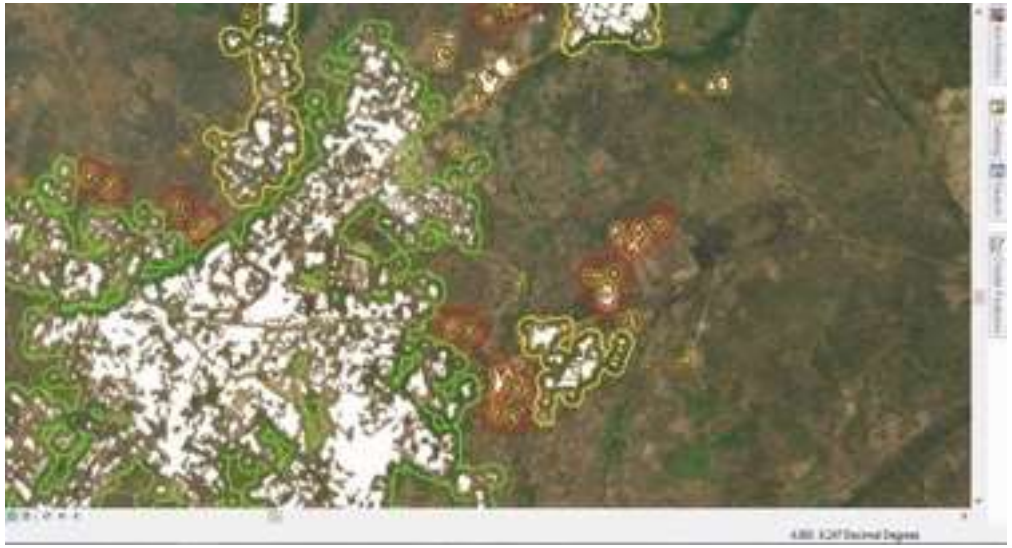
Problem: 30 M Bed Net Distribution Program

- Nigeria-- highest Malaria burden globally
- Population distribution not captured by maps.



Solution

- Radiant.Earth houses BMGF settlement databases.
- Up-to-date high resolution imagery, village boundaries, transportation networks and population estimates.



Benefits / Impact

- Significant staff time and money saved
- CRS able to distribute bed nets to targeted communities faster and more accurately
- Increased percentage of all communities served, due to this provision of data
- 3.3 mil bed net vouchers distributed

3 GOOD HEALTH AND WELL-BEING

Radiant Earth Foundation

Using SIF to Analyze Monkey Pox Vector Habitat Change in Democratic Republic of Congo

- Solar induced fluorescence (SIF) is a direct measure of photosynthetic activity of plants in contrast to NDVI which is a greenness index.
- This methodological study will determine the relative suitability of these two measures to assess habitat change of the monkeypox vector(s).

3 GOOD HEALTH AND WELL-BEING

Forest Mapping

Radiant Earth Foundation

Forest is a suitable habitat for malaria vectors in tropical regions. Using Synthetic Aperture Radar (SAR) measurements from Sentinel-1 satellite, we

- developed a data pipeline to process Sentinel-1 imagery at scale
- developed (a) random forest and (2) convoluted neural network models architecture and training data generation

Next steps

- Improve U-Net training with more samples.
- Optimize U-Net architecture and training parameters based on the results from new samples.

Forest Mapping in Tropical Regions
Malaria Program, Bill & Melinda Gates Foundation

Land Use Analysis

Radiant Earth Foundation

South Africa and Mozambique

Radiant Earth Foundation provided **satellite imagery** and **analysis of the built environment** to assess community compositional changes to Oxpeckers journalists investigating land-seizures along the Mozambique - South Africa border.

OXPECKERS
Investigative Environmental Journalism

Radiant Earth Foundation

Supporting the Health of Artisanal and Small-Scale Miners in Cameroon

- Small scale mining is an unregulated industry, and it can pose a number of environmental and occupational hazards
- Monitoring and regulation of industry difficult
- Radiant Earth streamlined the survey process by supporting the design of a mobile phone-based survey application using Open Data Kit, which integrates the survey, geospatial and image data.

Get in touch

740 15th St NW, Suite 900
Washington DC 20005

+ 1. 202.596.3603
hello@radiant.earth

Follow Us

@OurRadiantEarth

https://www.facebook.com/OurRadiantEarth

www.radiant.earth | app.radiant.earth | help.radiant.earth | demos.radiant.earth