UN-REDD PROGRAMME

Collect Earth and Sepal

Multi-purpose land monitoring

JONATHAN WESLEY ROBERTS
NFI Consultant - FAO

Capacity-development workshop for Central, Eastern and Southern Africa on the restoration of forests and other ecosystems to support the achievement of the Aichi Biodiversity Targets
6th October 2017
Durban
South Africa

History

- Open Foris Initiative www.openforis.org
  - Collect, Collect Mobile and Collect Earth
  - Calc
  - Geospatial Toolkit
- Capacity Building for REDD+ NFMS
  - 18 Countries + more UN-REDD countries such as PNG and Mongolia
  - Supporter by BMU-International Climate Initiative

UN-REDD PROGRAMME

Google earth engine
a google.org project
Sampling Design

Collect Earth

Balloon : HTML data entry form

Google Earth

Supplementary high-res imagery

Google earth engine
a google.org project
Supplementary high-res imagery

SQLite
Single-user database

PostgreSQL
Multi-user database

saiku
Data analysis

CSV
Collect Earth Fusion Table CSV export

Google fusion tables beta
Data Visualization/ processing

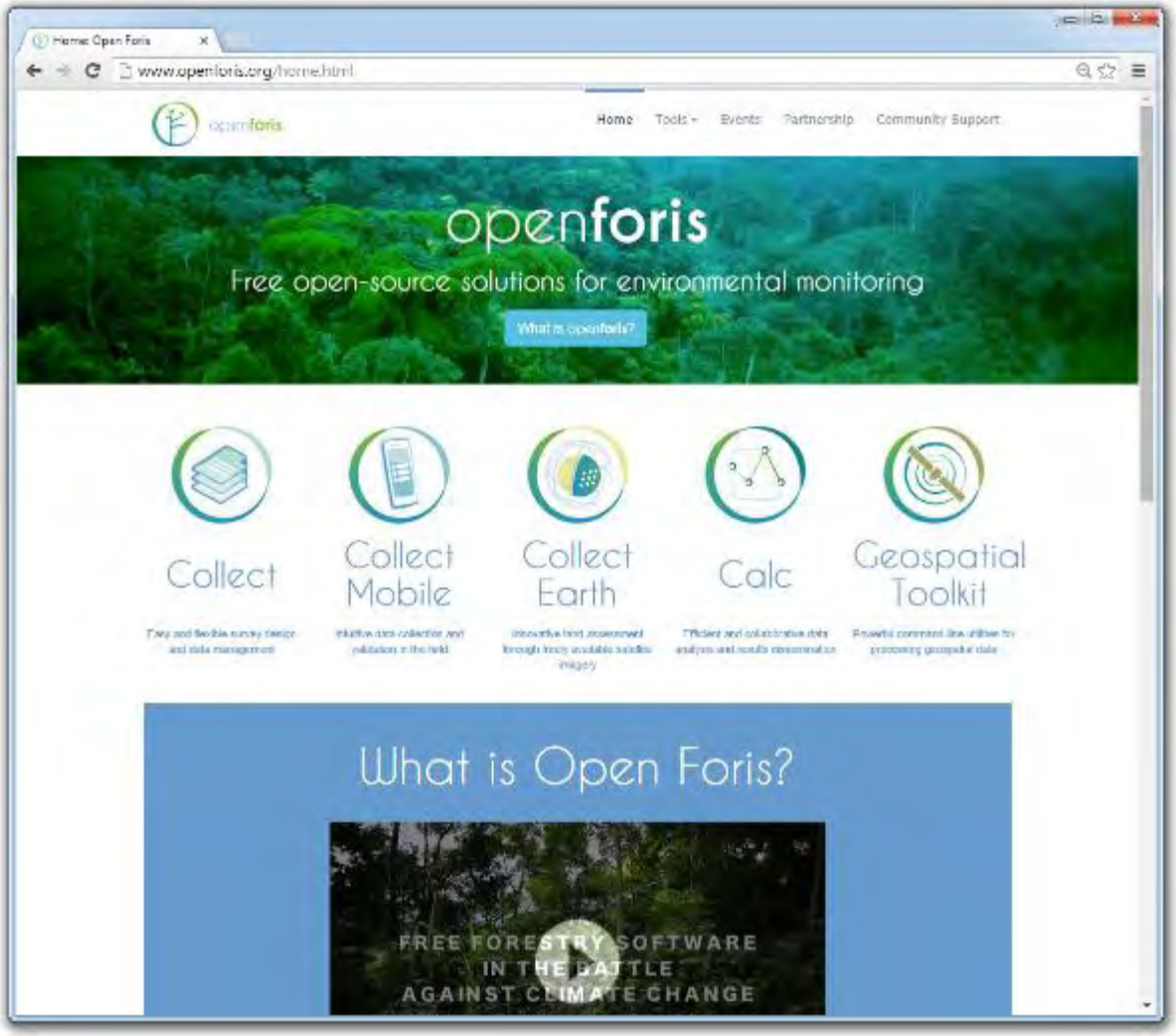
Google earth engine
a google.org project
Supervised Classification

- User friendly, java-based data collection tool
- Fully customizable data entry
- Limited computer skills necessary
- Individual or team based data collection
- Open-source software with code available on Github.com

UN-REDD PROGRAMME

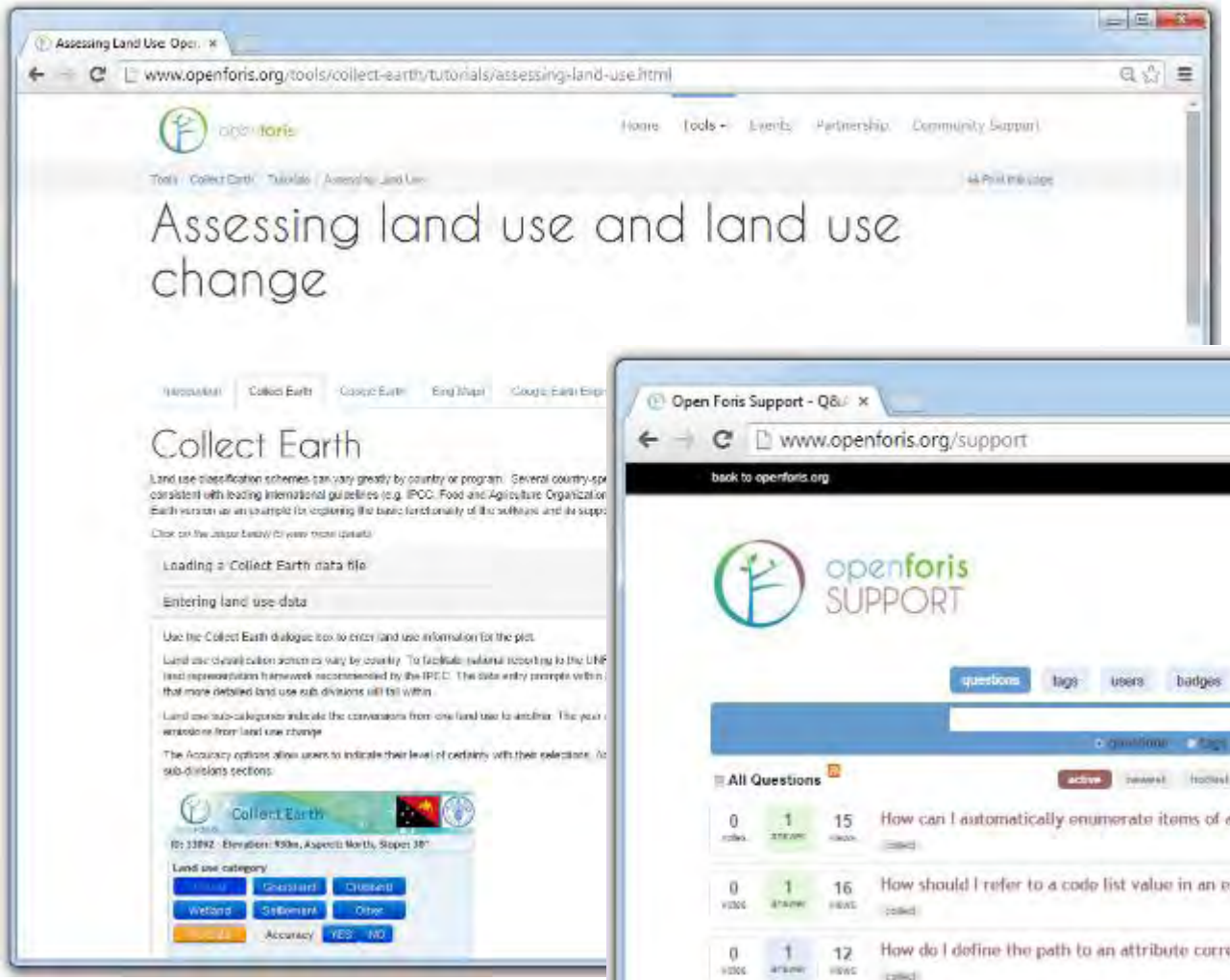
OpenForis.org

Learn more about the rest of the software suite online



UN-REDD PROGRAMME

Collect Earth on OpenForis.org



- Download the latest version of Collect Earth
- View Collect Earth tutorials
- Participate in the technical support forum

UN-REDD PROGRAMME

Where……..countries

ICI BMU funded: Algeria, Argentina, Bhutan, Brazil (implementing partner), Chile, Colombia, Ghana, Kyrgyzstan, Lao People's Democratic Republic, Morocco, Mozambique, Peru, Philippines, South Africa, Tajikistan, Thailand, Tunisia, Uruguay, Zambia

Norway funded: Mongolia, Papua New Guinea

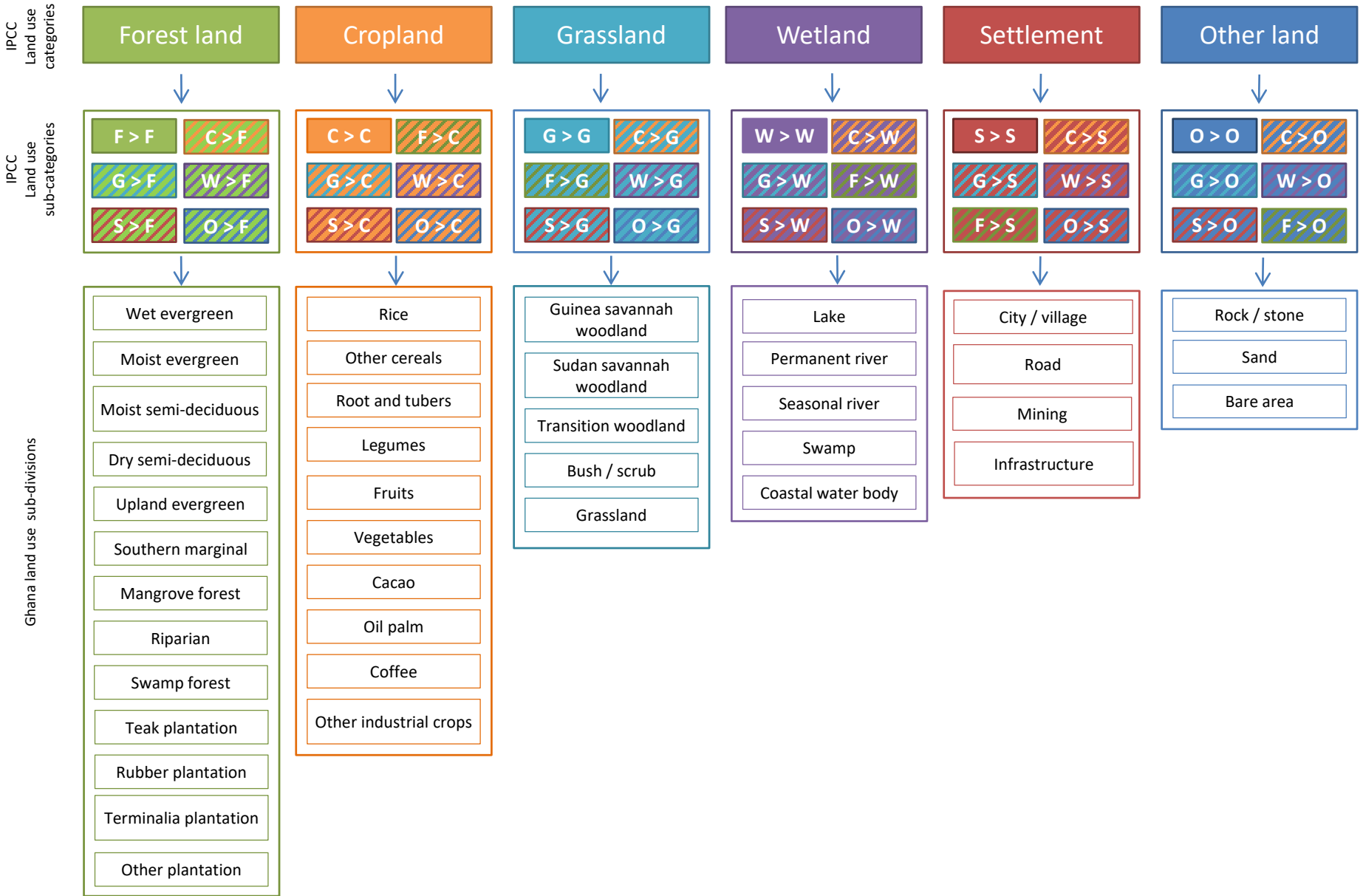
Collect Earth user cases

Collect Earth facilitates the analysis of high and very high resolution satellite imagery for a wide variety of purposes, including :

- Support **multi-phase National Forest Inventories**
- **Land Use, Land Use Change and Forestry (LULUCF) assessments** (18 partnering countries)
- **Monitoring agricultural land** and urban areas
- Accuracy assessment of existing maps (DRC, Zambia)
- Collection of spatially explicit socio-economic data (Vietnam)
- Quantifying deforestation, reforestation and desertification

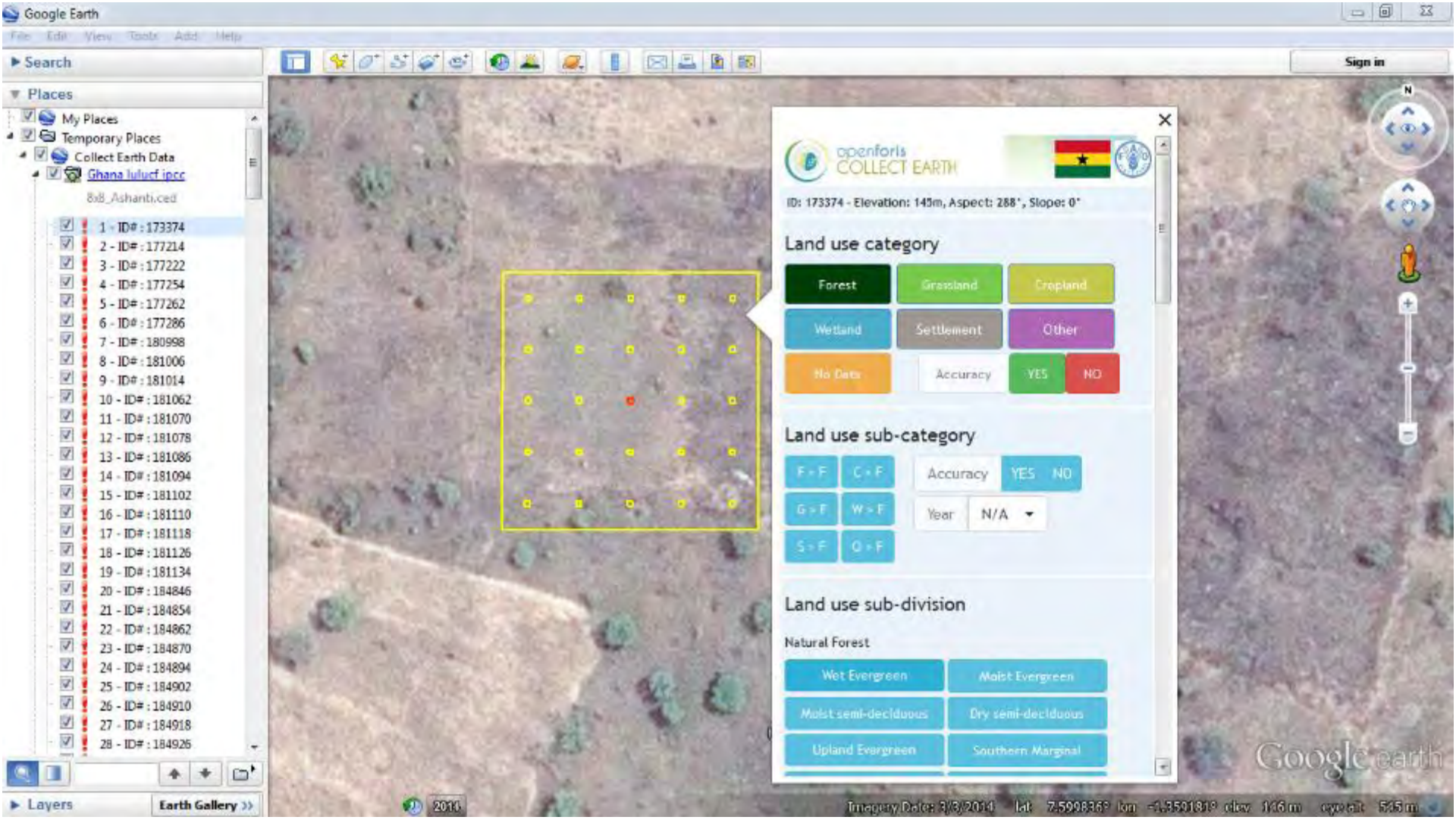
Restoration?

Ghana land use classification scheme



UN-REDD PROGRAMME

Collect Earth - Ghana

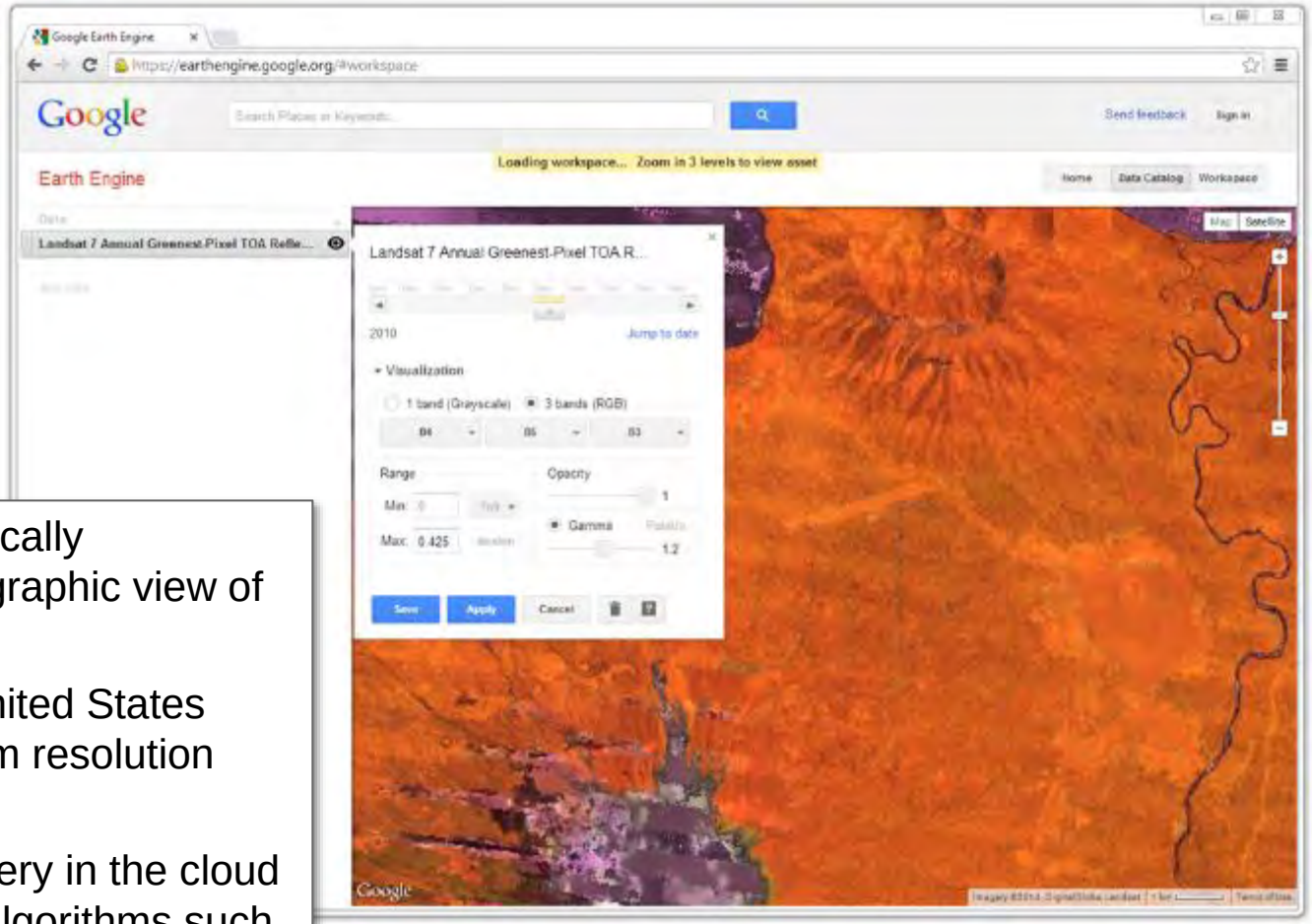


Geo link Bing Maps

- Collect Earth automatically synchronizes the geographic view of the plot
- Digital Globe very high resolution imagery ranging from 3m to 30cm resolution
- Imagery acquisition dates available with Collect Earth customization

UN-REDD PROGRAMME

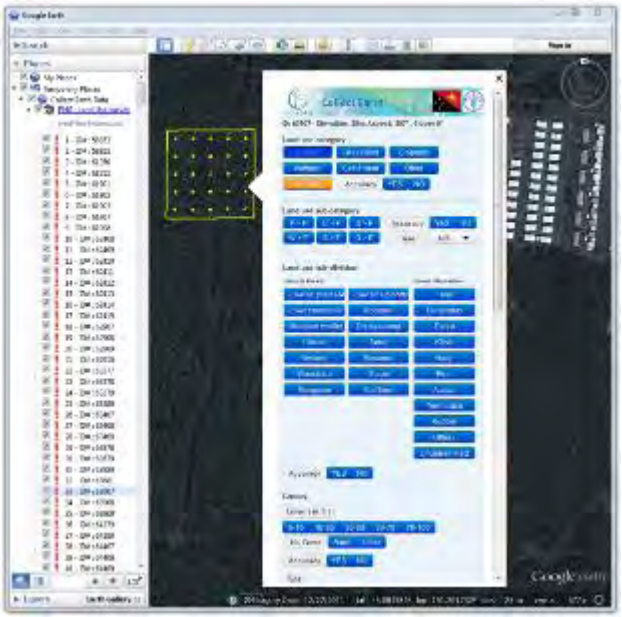
Google Earth Engine

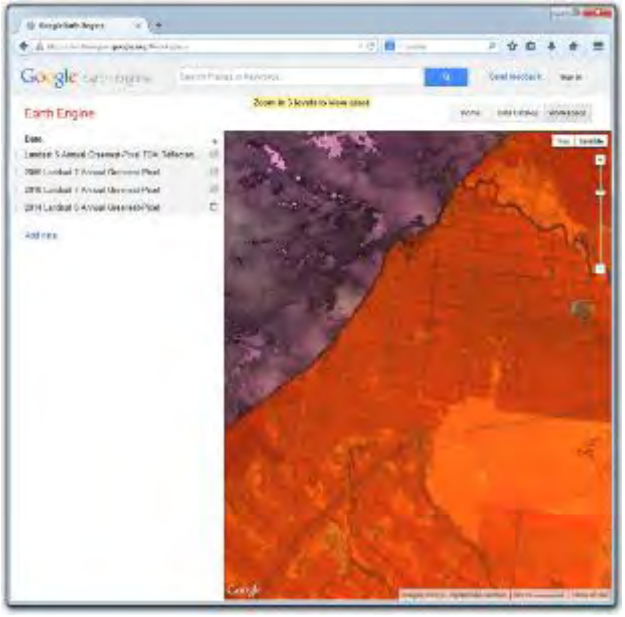


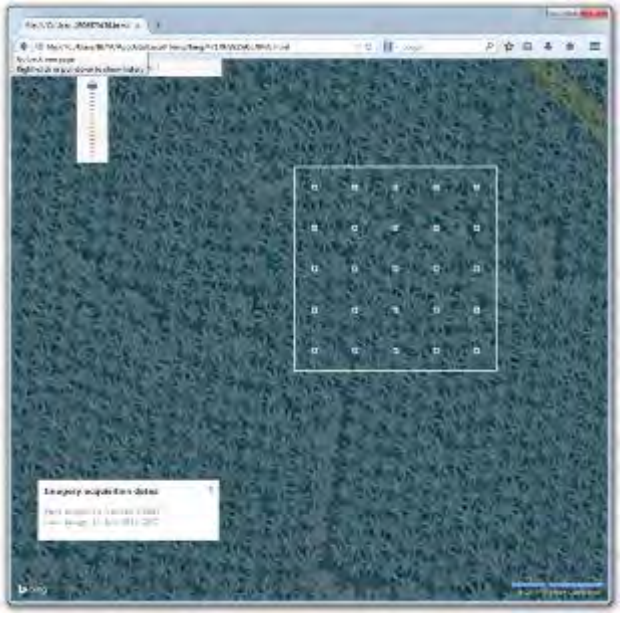
- Collect Earth automatically synchronizes the geographic view of the plot
- Access to 40 years United States Geological Survey 30m resolution Landsat imagery
- Process satellite imagery in the cloud with commonly used algorithms such as RandomForests classifier
- Import Collect Earth land use data for supervised classification and validation assessments

UN-REDD PROGRAMME

Geo-link between three data repositories

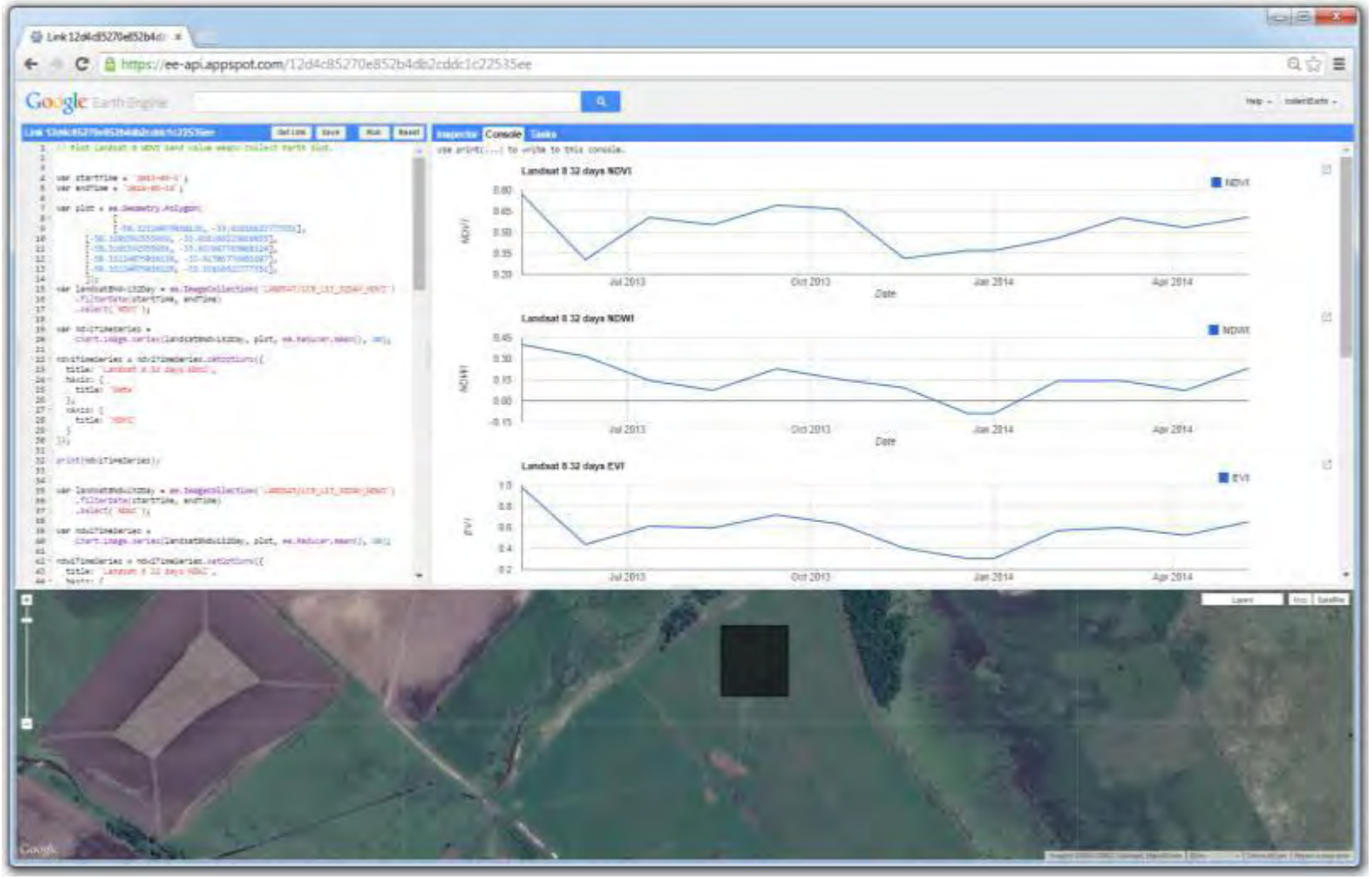






UN-REDD PROGRAMME

View inter- and intra-annual vegetation indices

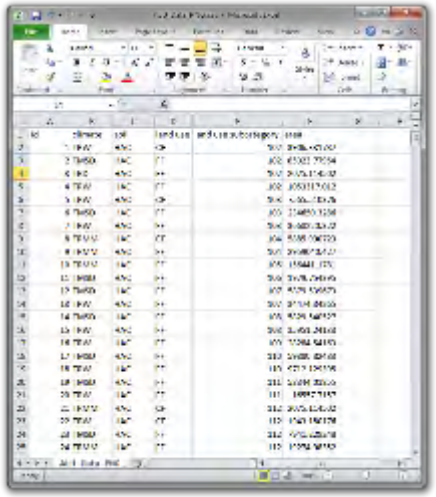


UN-REDD PROGRAMME

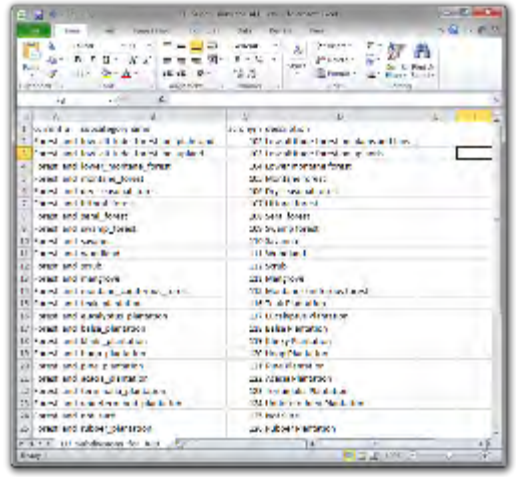
Compatible with ALU GHG Inventory Software

openforis COLLECT EARTH

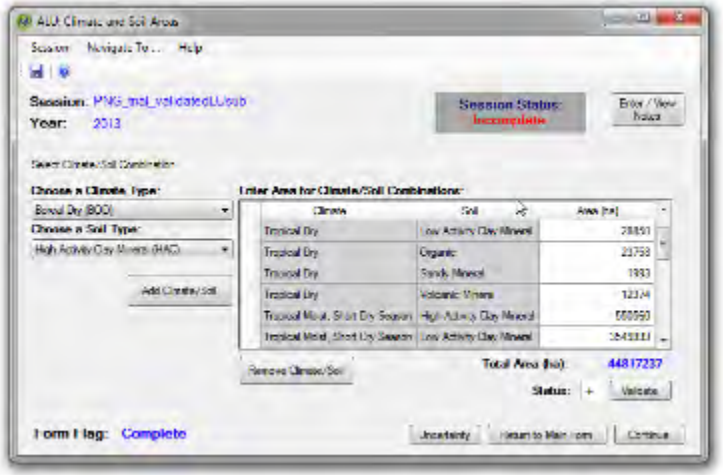
Land use assessment with Collect Earth



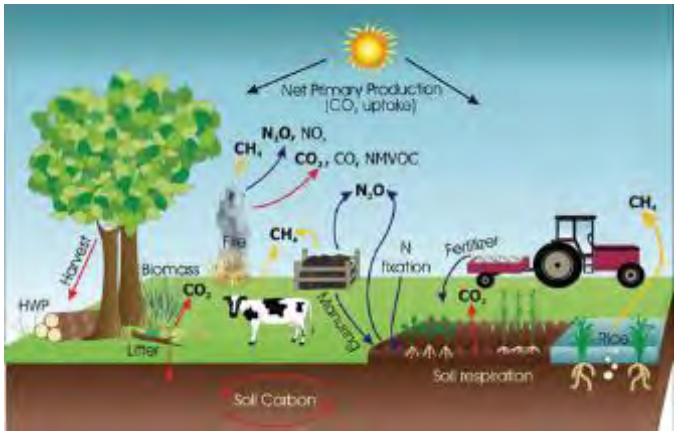
Land use data exported from Collect Earth as CSV



Land use subdivisions exported from Collect Earth as CSV



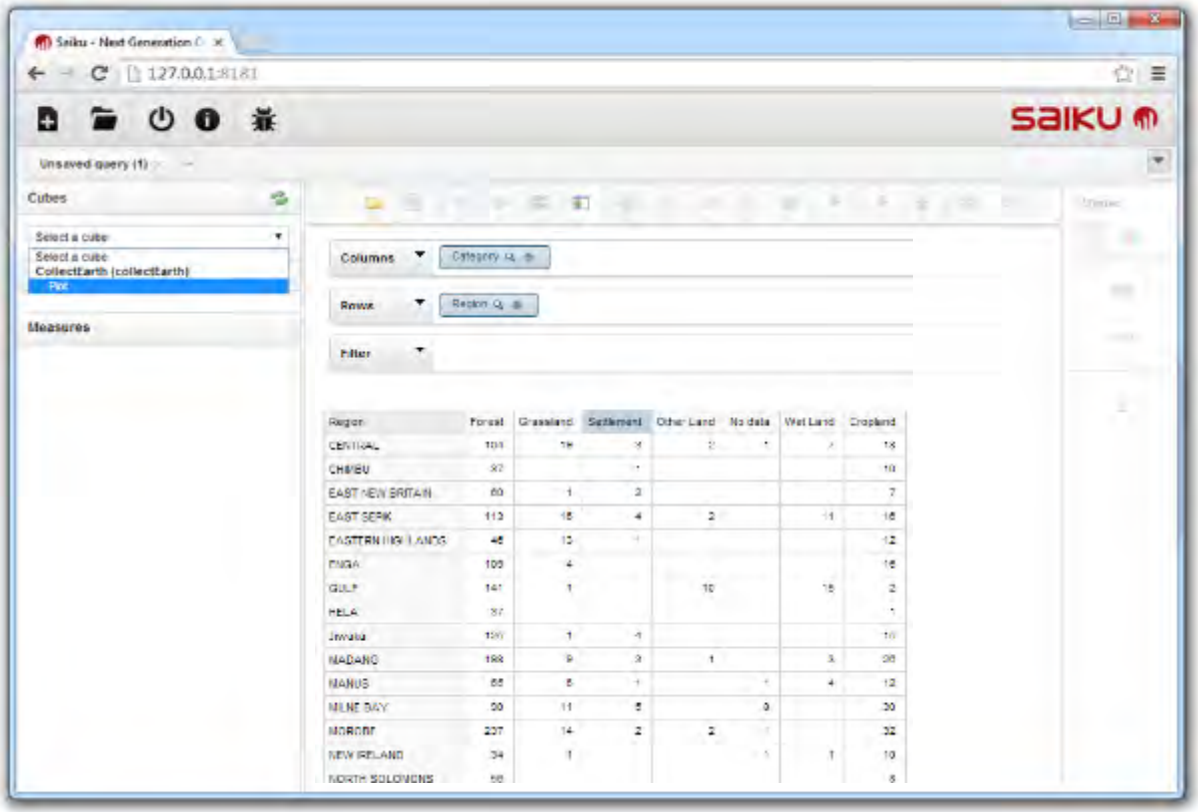
LULUCF Greenhouse Gas Inventory

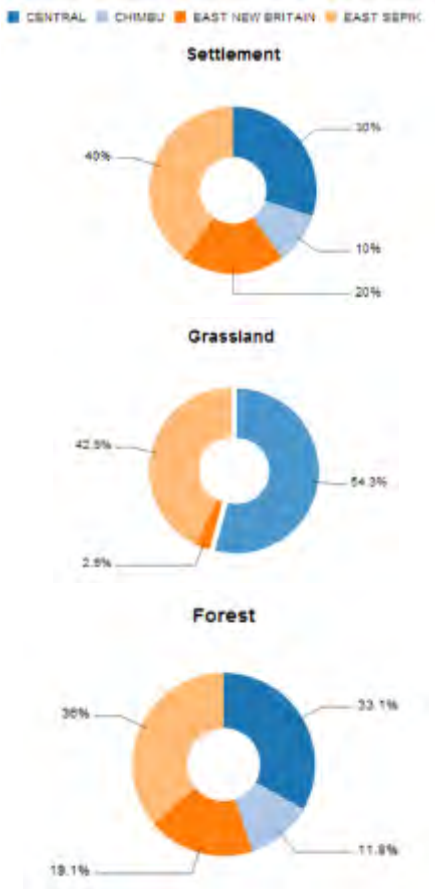


LULUCF emissions factions

UN-REDD PROGRAMME

Saiku





- Fast, intuitive and flexible data analysis
- Powerful tool for data quality control
- Data export to Excel, CSV and PDF
- Produce colorful and informative charts and graphs with a few clicks
- Export graphics to JPG, PNG or other formats

UN-REDD PROGRAMME

SEPAL

System for earth observations, data access, processing & analysis for land monitoring

SEPAL is a cloud computing platform for geographical data processing. It enables users to quickly process large amount of data without high network bandwidth requirements or need to invest in high-performance computing infrastructure.

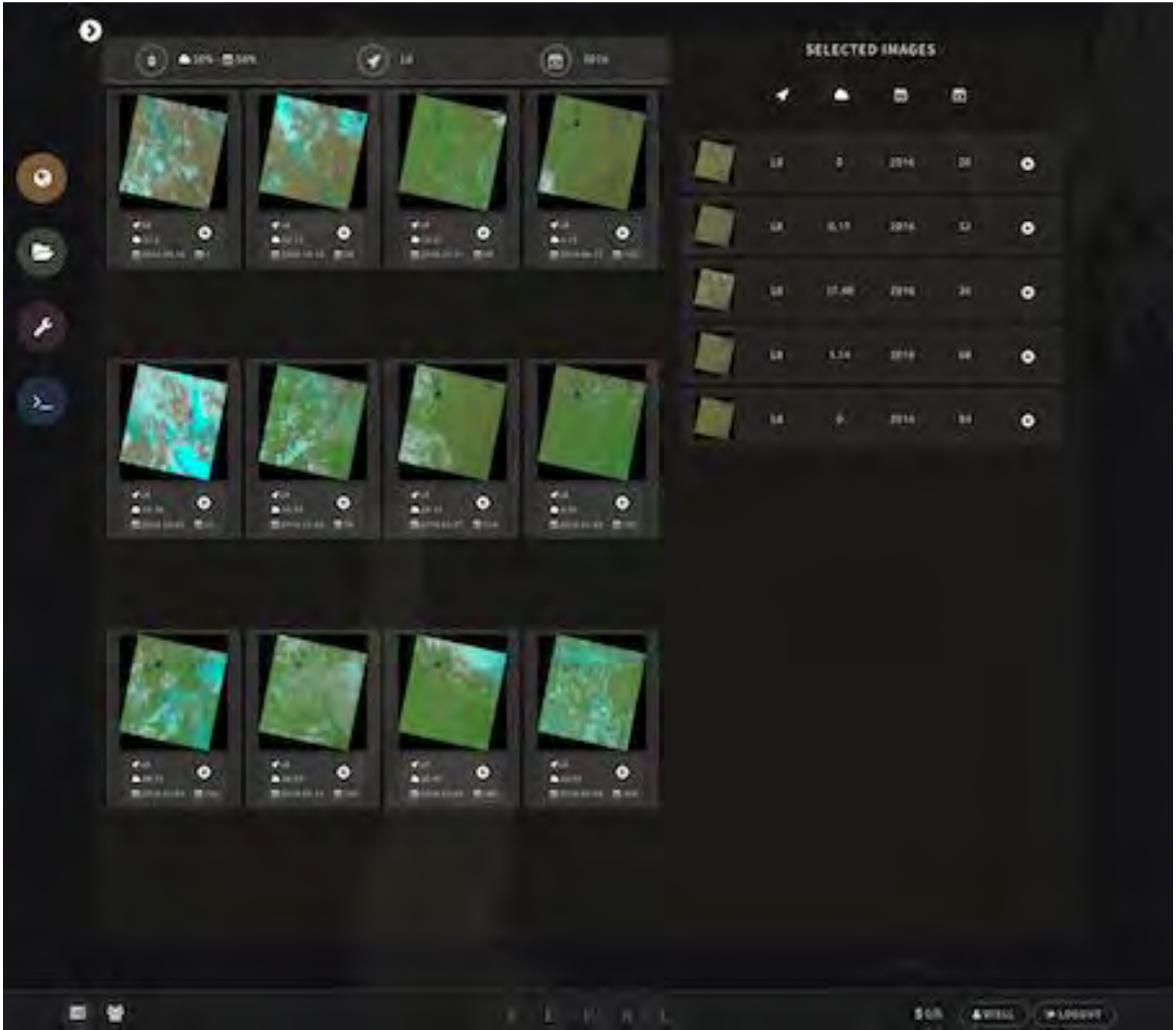
UN-REDD
PROGRAMME

UN-REDD
PROGRAMME

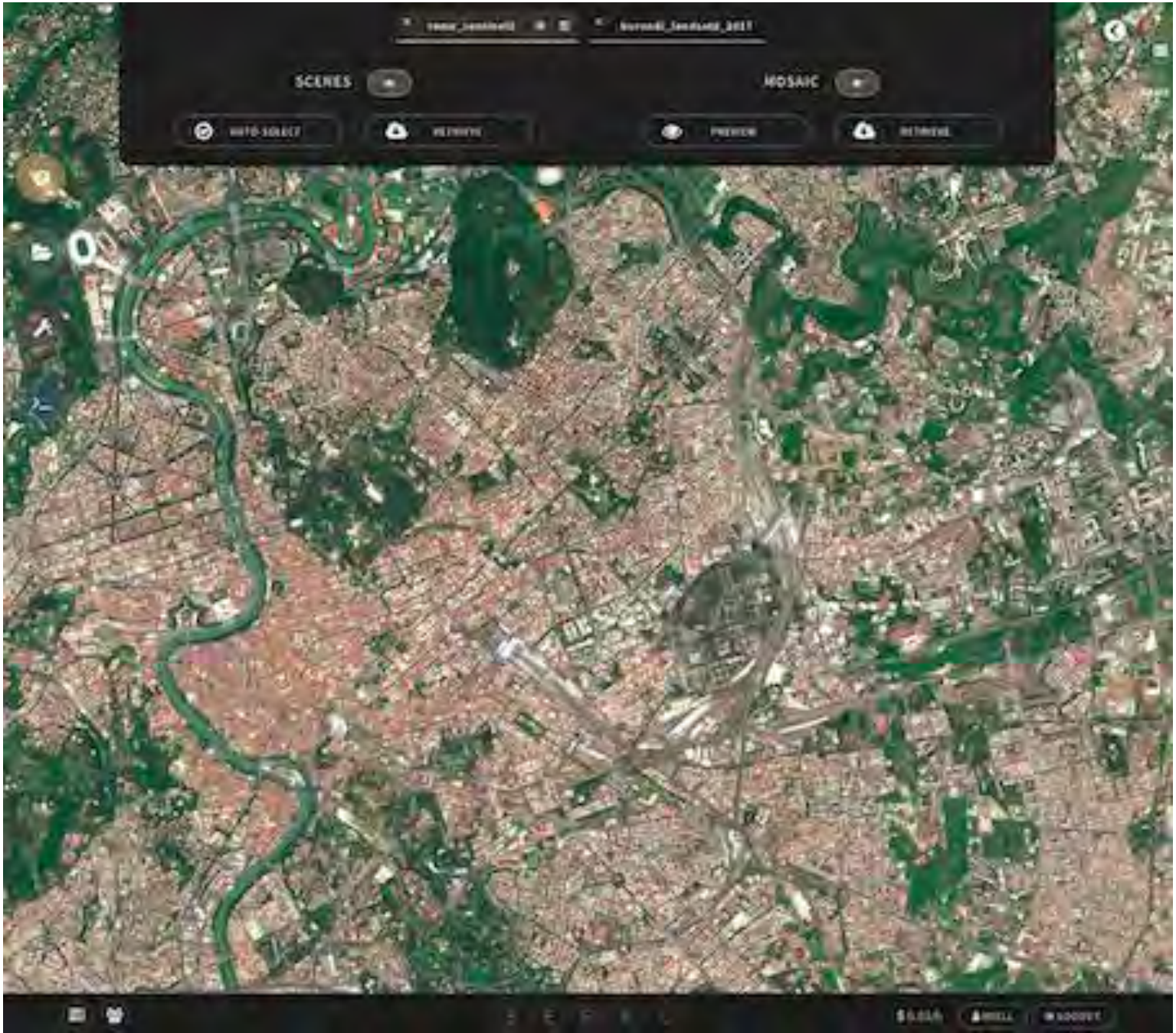
UN-REDD PROGRAMME

UN-REDD
PROGRAMME

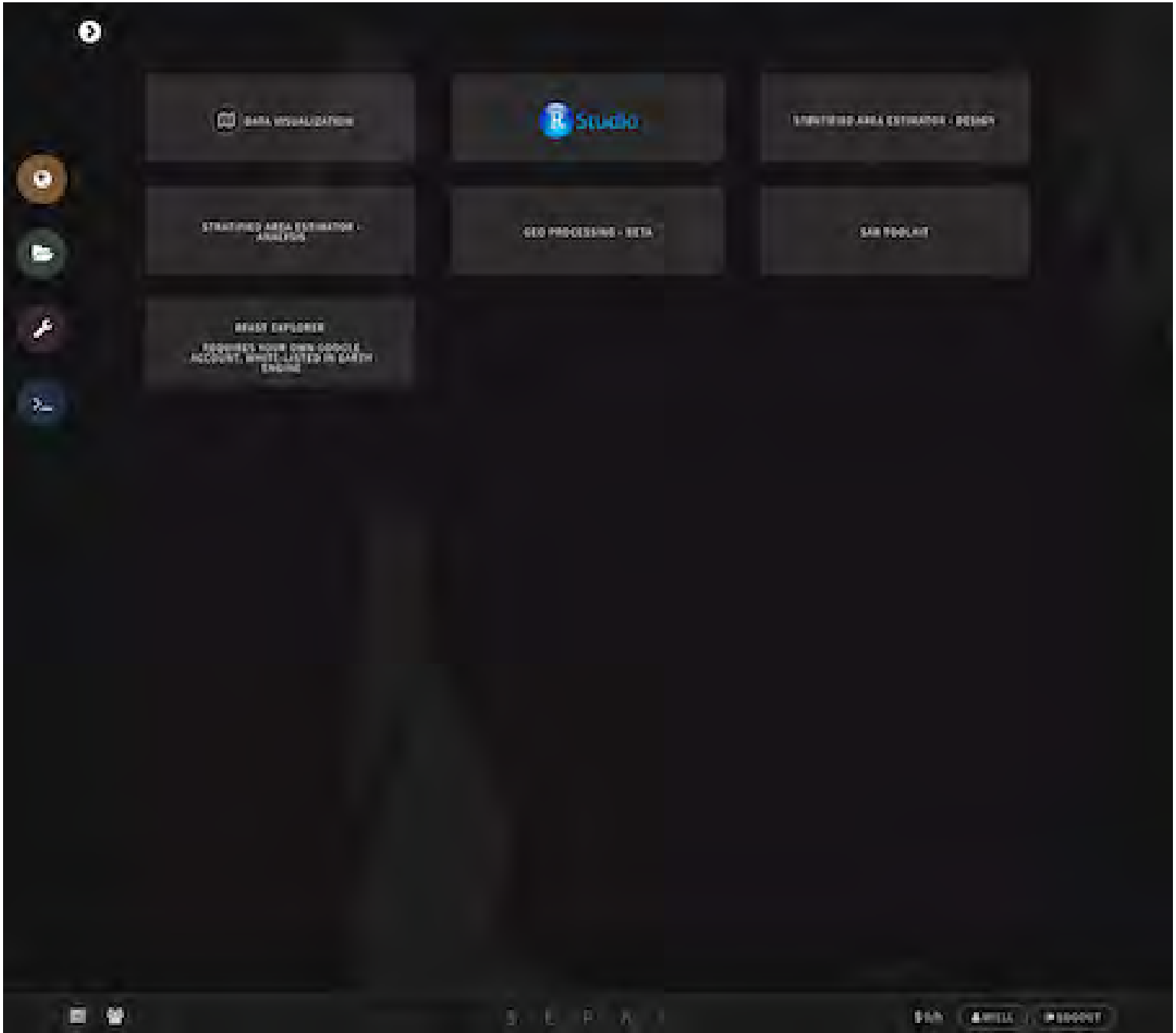
UN-REDD PROGRAMME



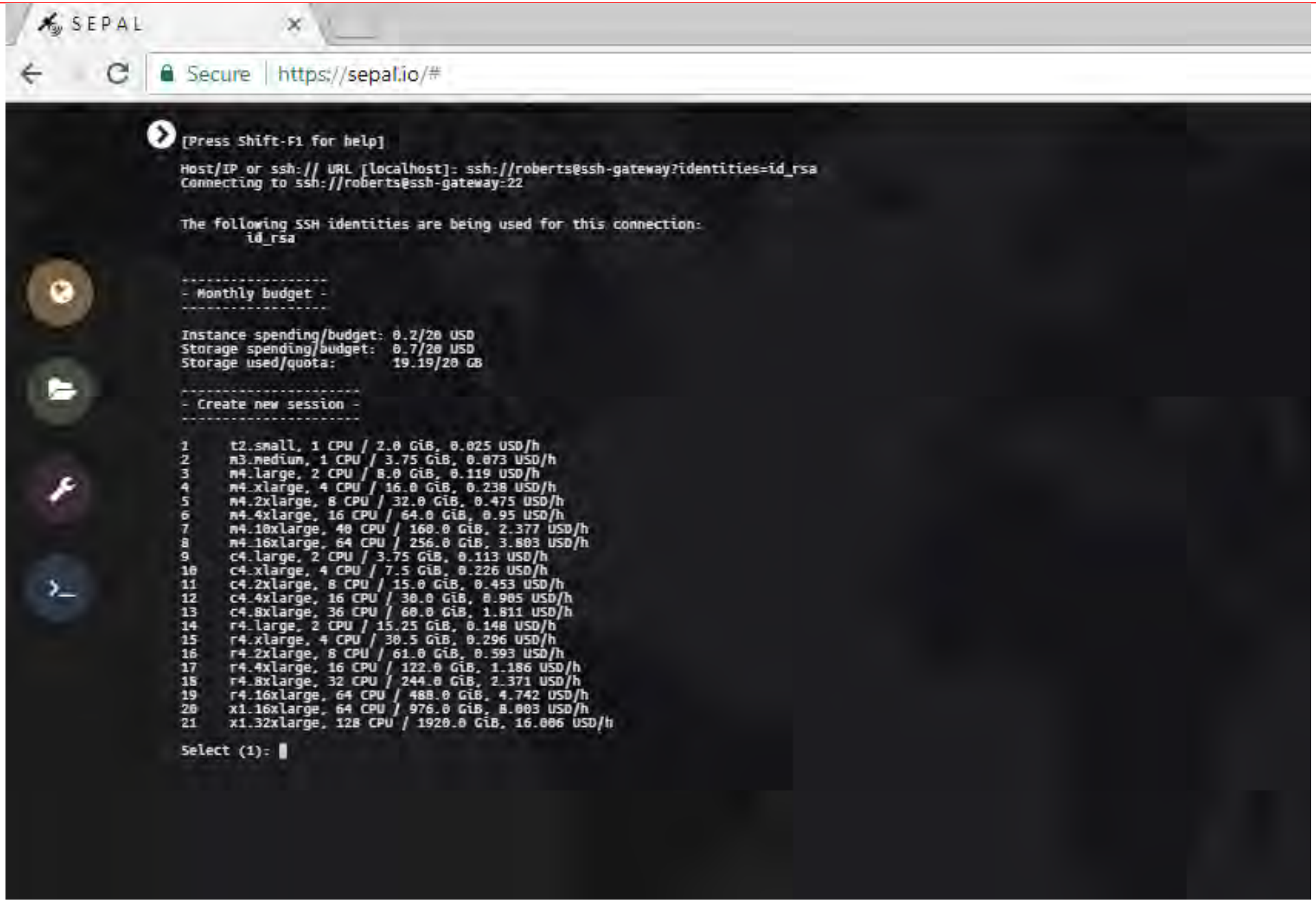
UN-REDD
PROGRAMME



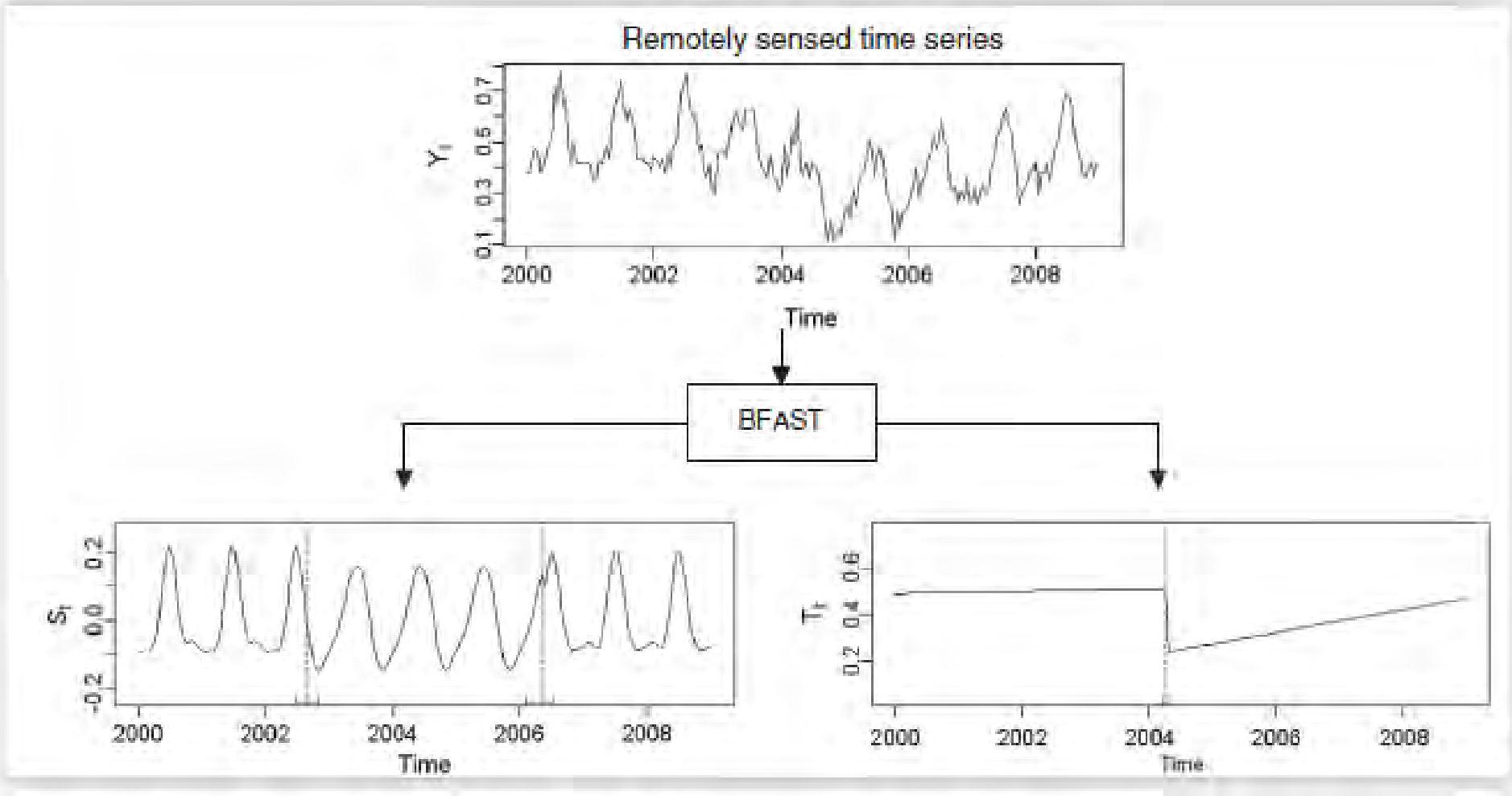
UN-REDD
PROGRAMME



UN-REDD
PROGRAMME

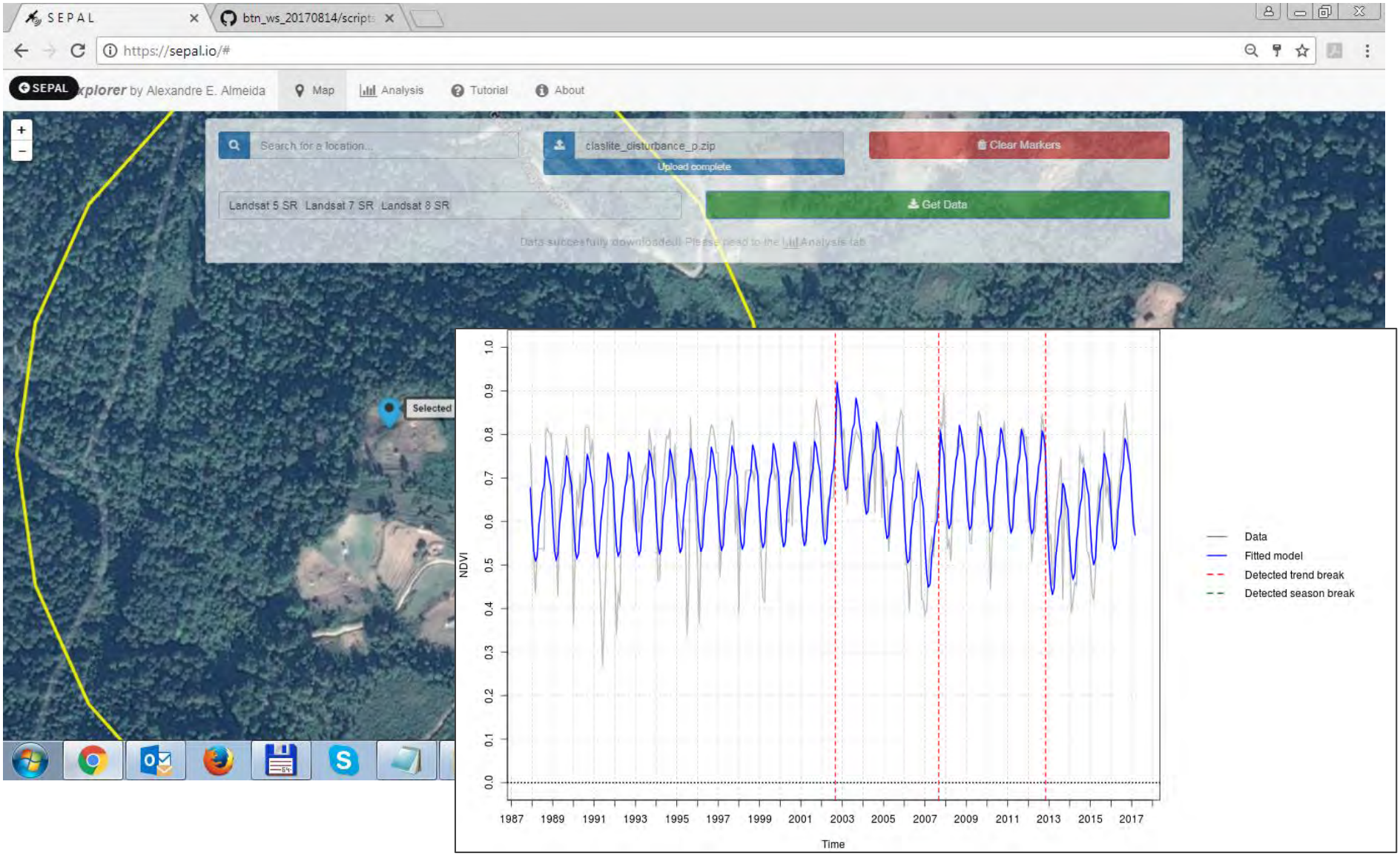

SEPAL
Secure
https://sepal.io/#
[Press Shift-F1 for help]
Host/IP or ssh:// URL [localhost]: ssh://roberts@ssh-gateway?identities=id_rsa
Connecting to ssh://roberts@ssh-gateway:22
The following SSH identities are being used for this connection:
id_rsa
- Monthly budget -
Instance spending/budget: 0.2/20 USD
Storage spending/budget: 0.7/20 USD
Storage used/quota: 19.19/20 GB
- Create new session -
1 t2.small, 1 CPU / 2.0 GiB, 0.025 USD/h
2 m3.medium, 1 CPU / 3.75 GiB, 0.073 USD/h
3 m4.large, 2 CPU / 8.0 GiB, 0.119 USD/h
4 m4.xlarge, 4 CPU / 16.0 GiB, 0.238 USD/h
5 m4.2xlarge, 8 CPU / 32.0 GiB, 0.475 USD/h
6 m4.4xlarge, 16 CPU / 64.0 GiB, 0.95 USD/h
7 m4.10xlarge, 40 CPU / 160.0 GiB, 2.377 USD/h
8 m4.16xlarge, 64 CPU / 256.0 GiB, 3.803 USD/h
9 c4.large, 2 CPU / 3.75 GiB, 0.113 USD/h
10 c4.xlarge, 4 CPU / 7.5 GiB, 0.226 USD/h
11 c4.2xlarge, 8 CPU / 15.0 GiB, 0.453 USD/h
12 c4.4xlarge, 16 CPU / 30.0 GiB, 0.905 USD/h
13 c4.8xlarge, 36 CPU / 60.0 GiB, 1.811 USD/h
14 r4.large, 2 CPU / 15.25 GiB, 0.148 USD/h
15 r4.xlarge, 4 CPU / 30.5 GiB, 0.296 USD/h
16 r4.2xlarge, 8 CPU / 61.0 GiB, 0.593 USD/h
17 r4.4xlarge, 16 CPU / 122.0 GiB, 1.186 USD/h
18 r4.8xlarge, 32 CPU / 244.0 GiB, 2.371 USD/h
19 r4.16xlarge, 64 CPU / 488.0 GiB, 4.742 USD/h
20 x1.16xlarge, 64 CPU / 976.0 GiB, 8.003 USD/h
21 x1.32xlarge, 128 CPU / 1920.0 GiB, 16.006 USD/h
Select (1):

BFAST: extraction of significant trend breaks within dense time series



Verbesselt et al., (2010), DeVries et al., (2015)

BFAST in SEPAL: point based through GUI + bfastSpatial for mapping



UN-REDD PROGRAMME

Additional information and examples

Accuracy assessment / stratified area estimator tools
http://www.gofcgold.wur.nl/redd/training-materials/webinar-series/episode/6
Intro and overview to SEPAL
http://www.gofcgold.wur.nl/redd/training-materials/webinar-series/episode/7