Open Foris Initiative

Free and Open Source Tools and Methods for Data Collection, Analysis and Reporting

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FAO-FIN Forestry Team
Adapted by Adam Gerrand for presentation
GIZ inventory workshop Jakarta 17/3/2016

openforis is a suite of 5 tools to help you collect and process forest plot and image data

Collect

Collect Mobile

Collect Earth

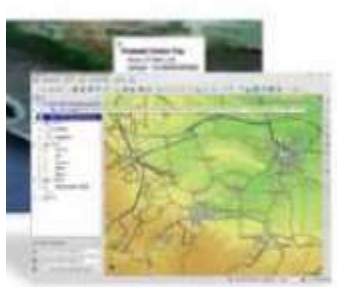
Calc

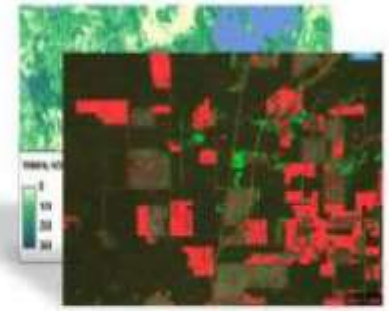
Geospatial Toolkit

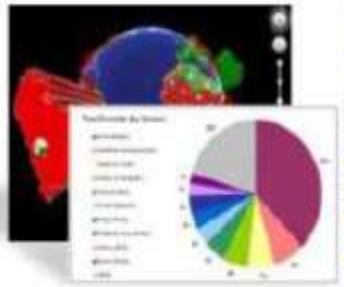
openforis

Using Open Foris tools

Design and planning → **Data collection** → **Analysis** → **Reporting results**







Collect Earth
Visual interpretation of

Collect
Data collecton on PC and

Collect Mobile
Data mobile collector via

Geospatial Toolkit
Processing of satellite images

Calc
Data analysis and result

Open Foris Tools

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COLLECT

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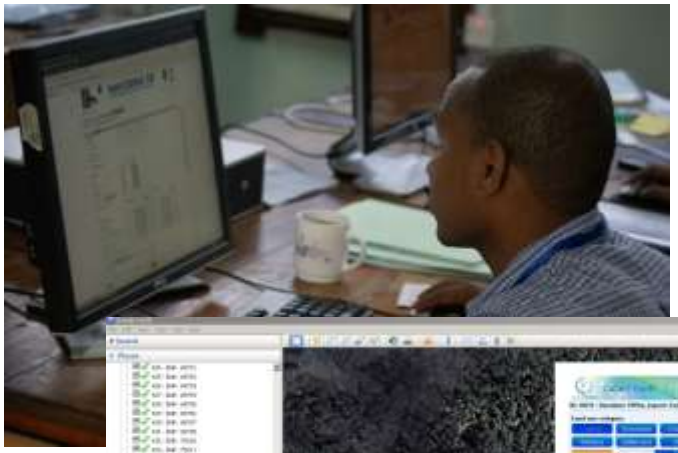
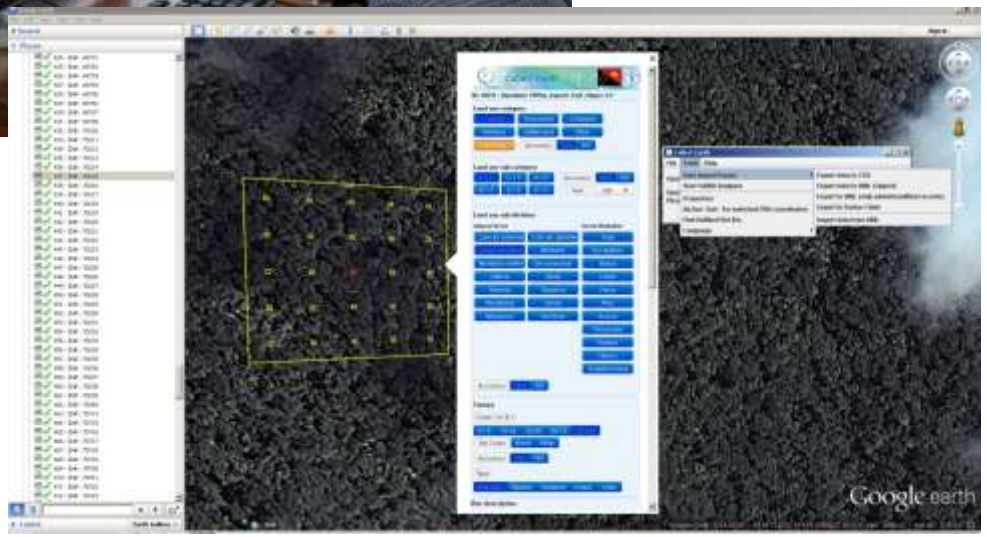
Collect tool

For field use



For Office



For Office

Collect desktop is a flexible tool for office or field camp based inventory data entry. Customizable validation rules minimize data entry errors and feedback reports help to identify potential problems.

For Field

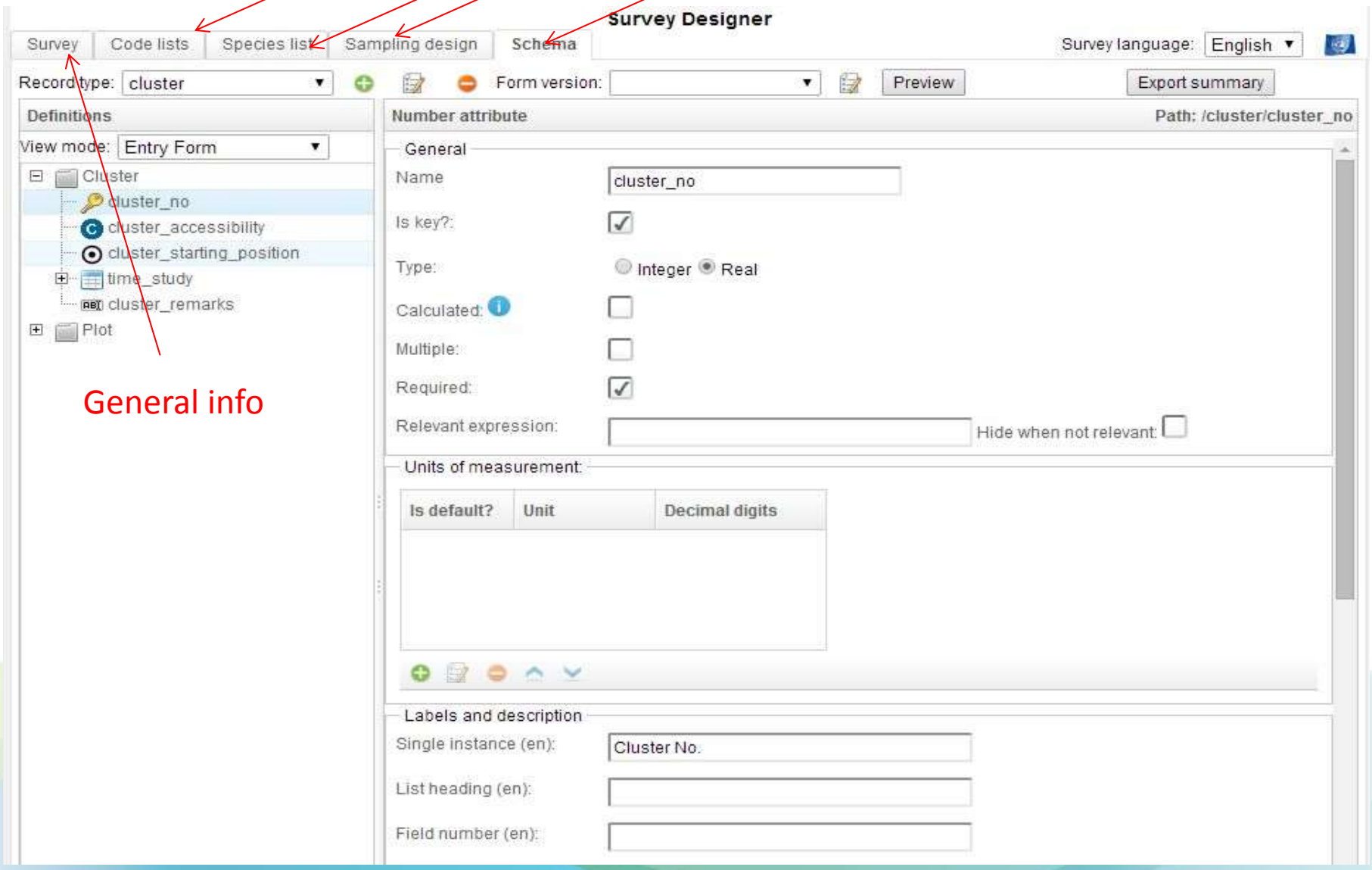
Collect Mobile is an easy to use Collect client for mobile Android devices. Entering the data already in the field can significantly improve the quality of the data and reduce time needed for data cleansing.

For Fast Delivery

Collect Earth is an interactive image interpretation tool which uses Google Earth interface. Collect Earth allows you to collect land cover and land use information in the fastest possible way and with minimum GIS experience.

Main Features

- Easy-to-use interface for complex surveys
- Survey designer
  - From scratch/using template
  - Validation rules – checks your data in the field to reduce mistakes
- Data entry interface generated automatically
- Standard workflow: entry, cleansing, analysis
- Server / desktop


LC classes, admin regions, ..
Species lists & strata in regions, ..
Survey Designer
Survey
Code lists
Species list
Sampling design
Schema
Survey language: English
Record type: cluster
Form version:
Preview
Export summary
Definitions
View mode: Entry Form
Cluster
cluster_no
cluster_accessibility
cluster_starting_position
time_study
cluster_remarks
Plot
Number attribute
Path: /cluster/cluster_no
General
Name
cluster_no
Is key?:
Type:
Integer
Real
Calculated:
Multiple:
Required:
Relevant expression:
Hide when not relevant:
Units of measurement:
Is default?
Unit
Decimal digits
Labels and description
Single instance (en):
Cluster No.
List heading (en):
Field number (en):
General info

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openforis COLLECT MOBILE

Collect Mobile - Main Features

- Field-data collection using Collect survey
- On-the-fly validation
- Export collected data to Collect Desktop
- Android 4+ phones and tablets

Objectives

- Support large, complex, surveys
- Simple and efficient to use
- Optimize for field use
- Use device camera and GPS
- Focus on data quality
- Data safety – some advantages over paper, but also some risks

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- Validation in the field
- Integrated code and species lists
- Easy backups
- Saves typing in handwritten forms

Show CollectEarth video (8 minutes)

https://www.youtube.com/watch?v=FxOCck_c5CU

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COLLECT EARTH

Visual interpretation tool for land use/cover classification

Java
openforis
Google Earth
Google earth engine
a google.org project
Google fusion tables
beta
bing maps
COLLECT EARTH
saiku
CUTTING EDGE OPEN SOURCE ANALYTICS
PostgreSQL
SQLite

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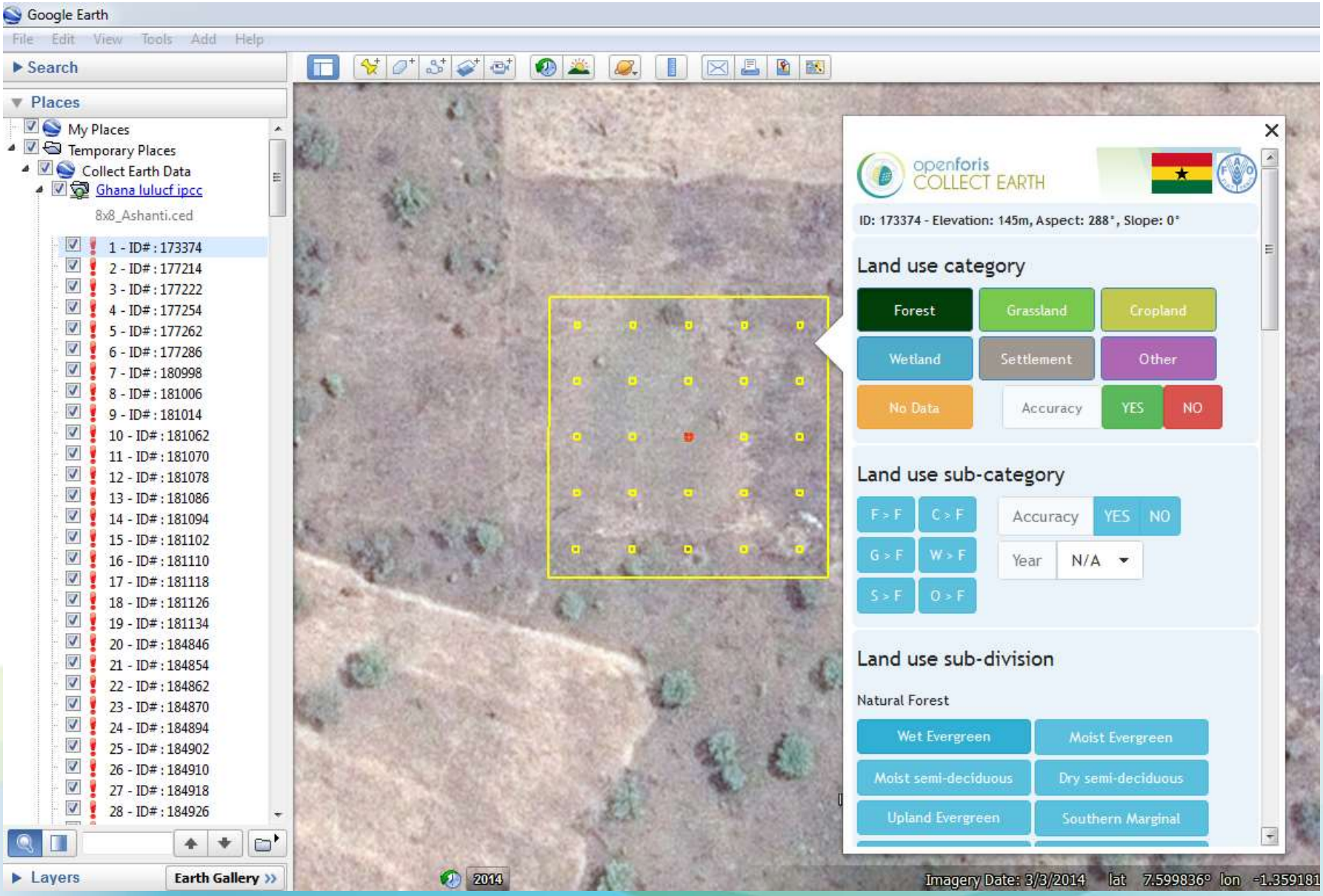
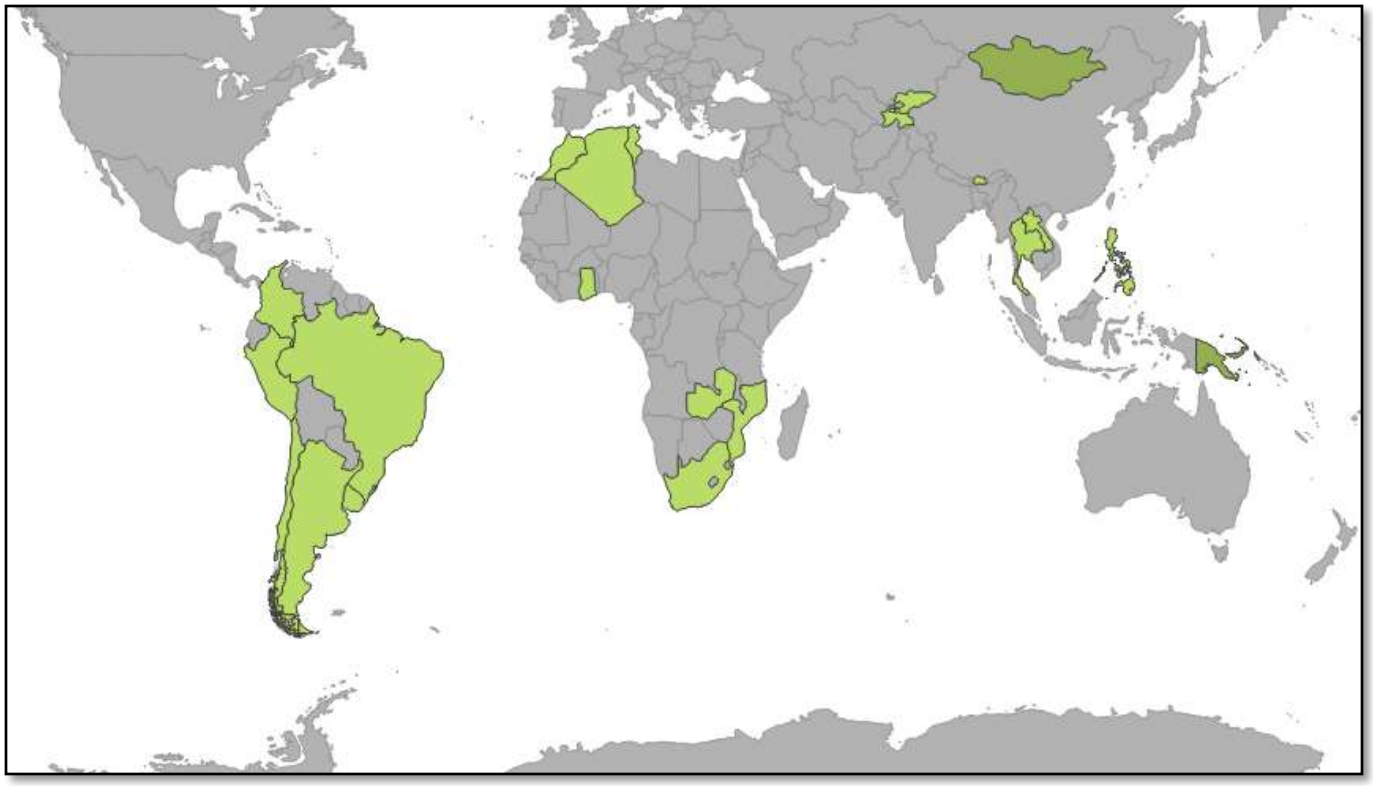

Google Earth
File Edit View Tools Add Help
Search
Places
My Places
Temporary Places
Collect Earth Data
Ghana lulucf ipcc
8x8_Ashanti.ced
1 - ID# : 173374
2 - ID# : 177214
3 - ID# : 177222
4 - ID# : 177254
5 - ID# : 177262
6 - ID# : 177286
7 - ID# : 180998
8 - ID# : 181006
9 - ID# : 181014
10 - ID# : 181062
11 - ID# : 181070
12 - ID# : 181078
13 - ID# : 181086
14 - ID# : 181094
15 - ID# : 181102
16 - ID# : 181110
17 - ID# : 181118
18 - ID# : 181126
19 - ID# : 181134
20 - ID# : 184846
21 - ID# : 184854
22 - ID# : 184862
23 - ID# : 184870
24 - ID# : 184894
25 - ID# : 184902
26 - ID# : 184910
27 - ID# : 184918
28 - ID# : 184926
Layers
Earth Gallery
openforis COLLECT EARTH
ID: 173374 - Elevation: 145m, Aspect: 288°, Slope: 0°
Land use category
Forest
Grassland
Cropland
Wetland
Settlement
Other
No Data
Accuracy
YES
NO
Land use sub-category
F > F
C > F
G > F
W > F
S > F
O > F
Accuracy
YES
NO
Year
N/A
Land use sub-division
Natural Forest
Wet Evergreen
Moist Evergreen
Moist semi-deciduous
Dry semi-deciduous
Upland Evergreen
Southern Marginal
2014
Imagery Date: 3/3/2014 lat 7.599836° lon -1.359181

Widely used: 21+ 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

Ghana LU scheme

IPCC LU

National land use sub-divisions

Forest land	Cropland	Grassland	Wetland	Settlement	Other land
F > F, C > F, G > F, W > F, S > F, O > F	C > C, F > C, G > C, W > C, S > C, O > C	G > G, C > G, F > G, W > G, S > G, O > G	W > W, C > W, G > W, F > W, S > W, O > W	S > S, C > S, G > S, W > S, F > S, O > S	O > O, C > O, G > O, W > O, S > O, F > O
Wet evergreen	Rice	Guinea savannah woodland	Lake	City / village	Rock / stone
Moist evergreen	Other cereals	Sudan savannah woodland	Permanent river	Road	Sand
Moist semi-deciduous	Root and tubers	Transition woodland	Seasonal river	Mining	Bare area
Dry semi-deciduous	Legumes	Bush / scrub	Swamp	Infrastructure	
Upland evergreen	Fruits	Grassland	Coastal water body		
Southern marginal	Vegetables				
Mangrove forest	Cacao				
Riparian	Oil palm				
Swamp forest	Coffee				
Teak plantation	Other industrial crops				
Rubber plantation					
Terminalia plantation					
Other plantation					

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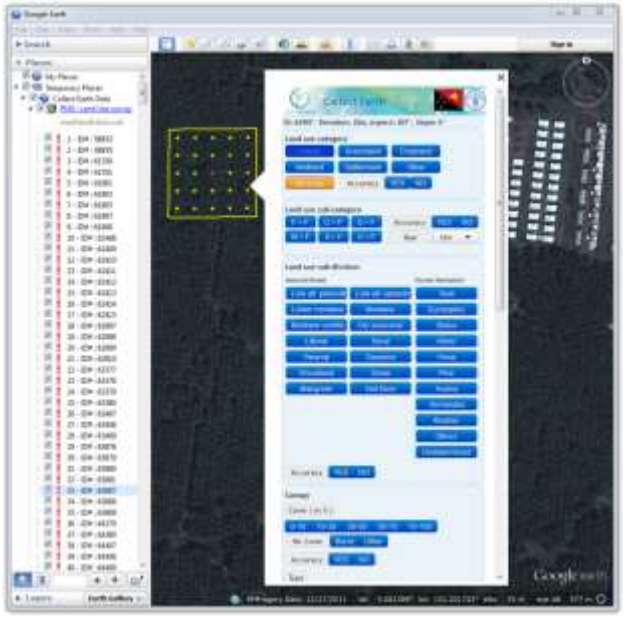
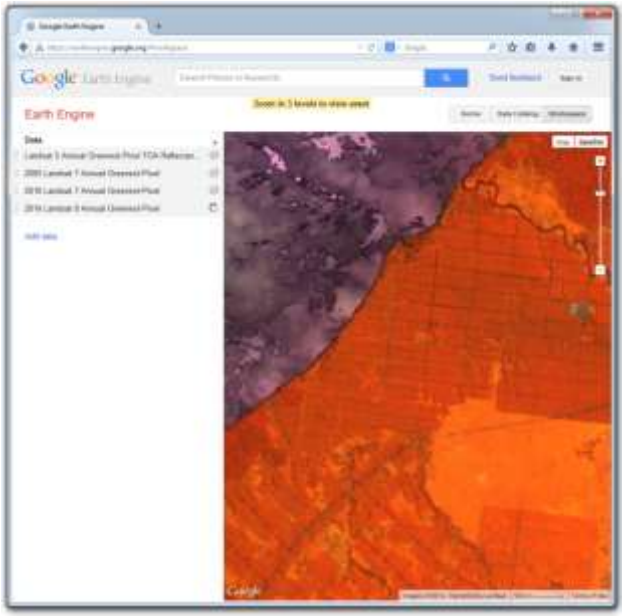
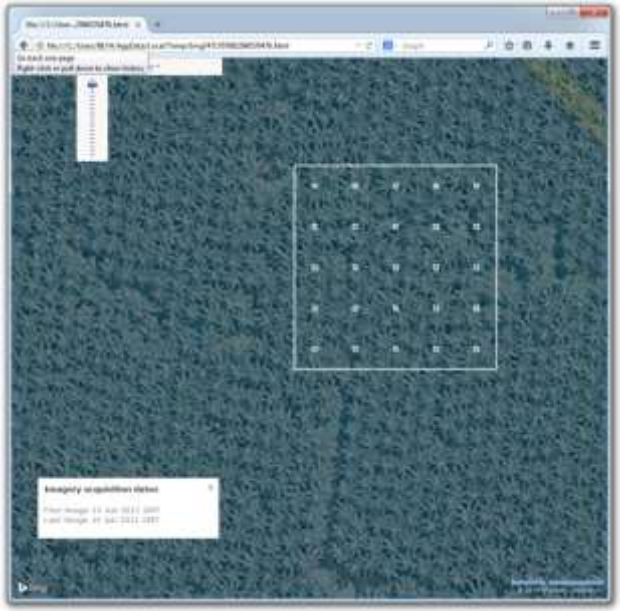
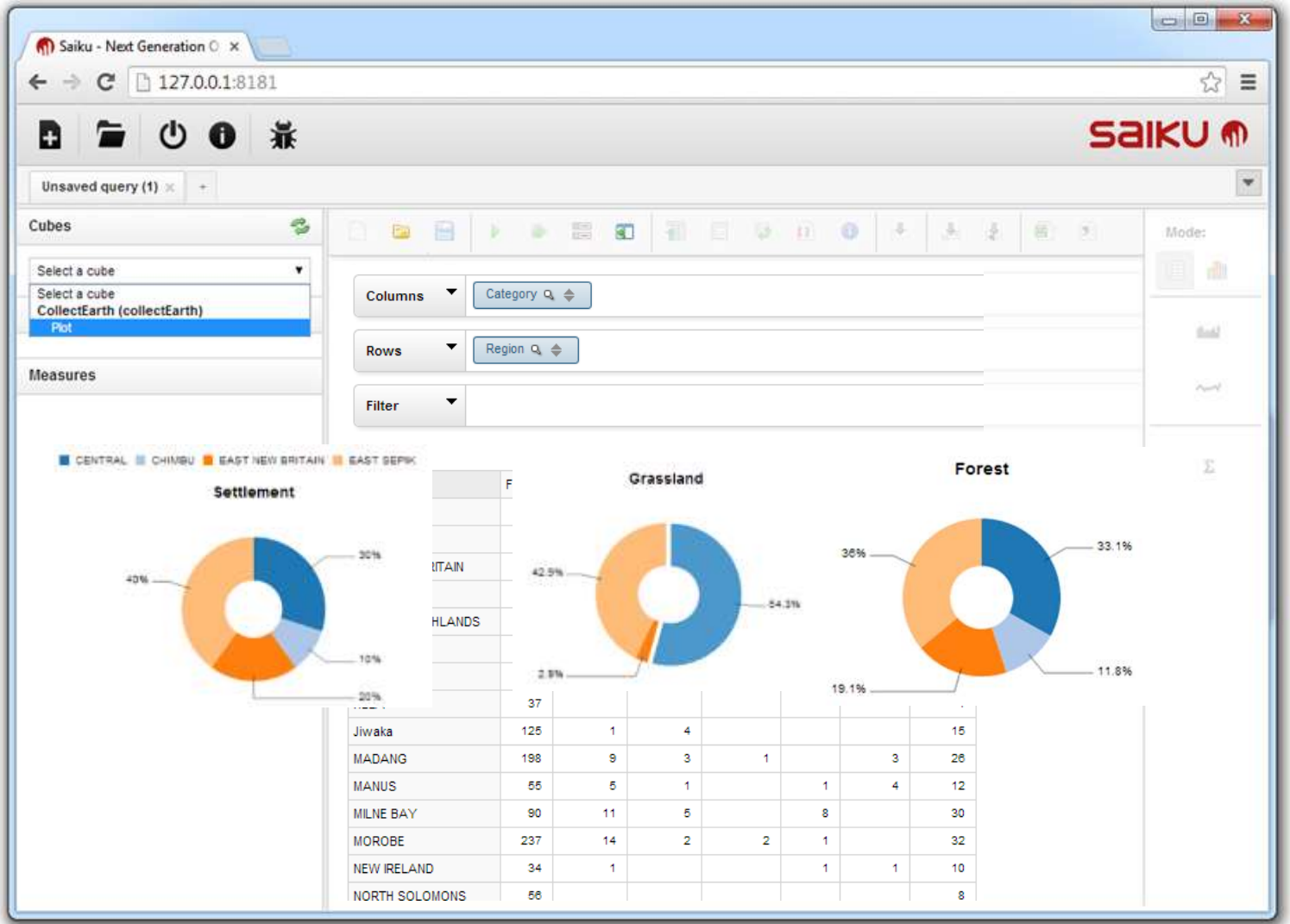
Geo-synchronized







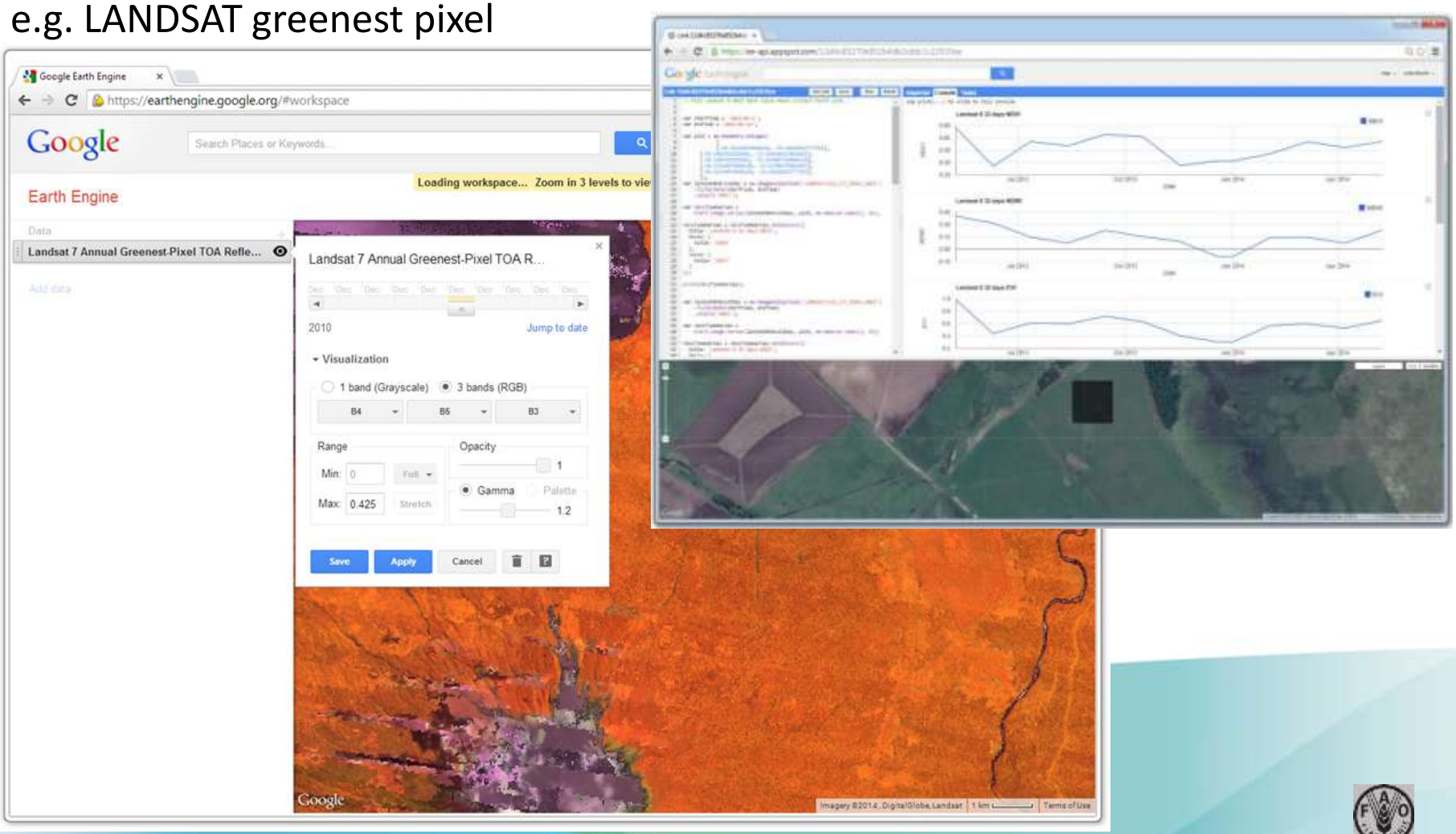
Easy data analysis and charts



Advanced features

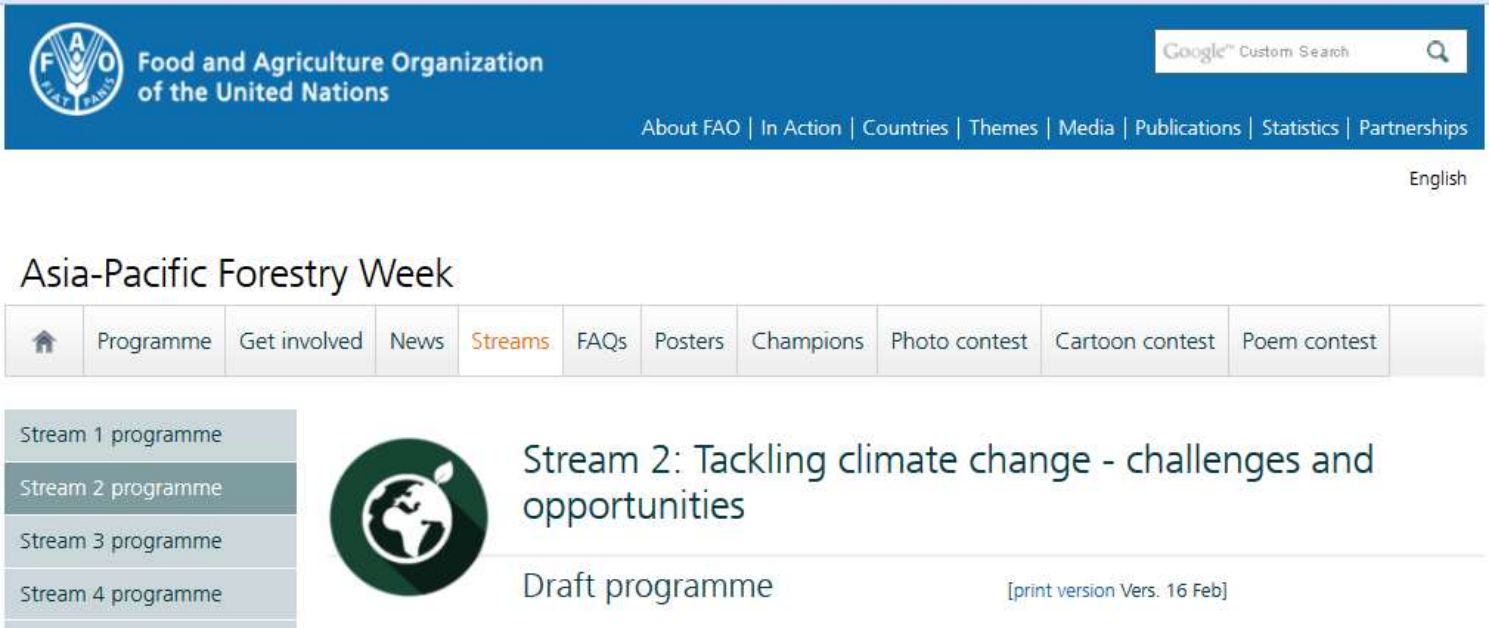
With Google Earth Engine
e.g. LANDSAT greenest pixel

e.g. analysis of NDVI or EVI over time

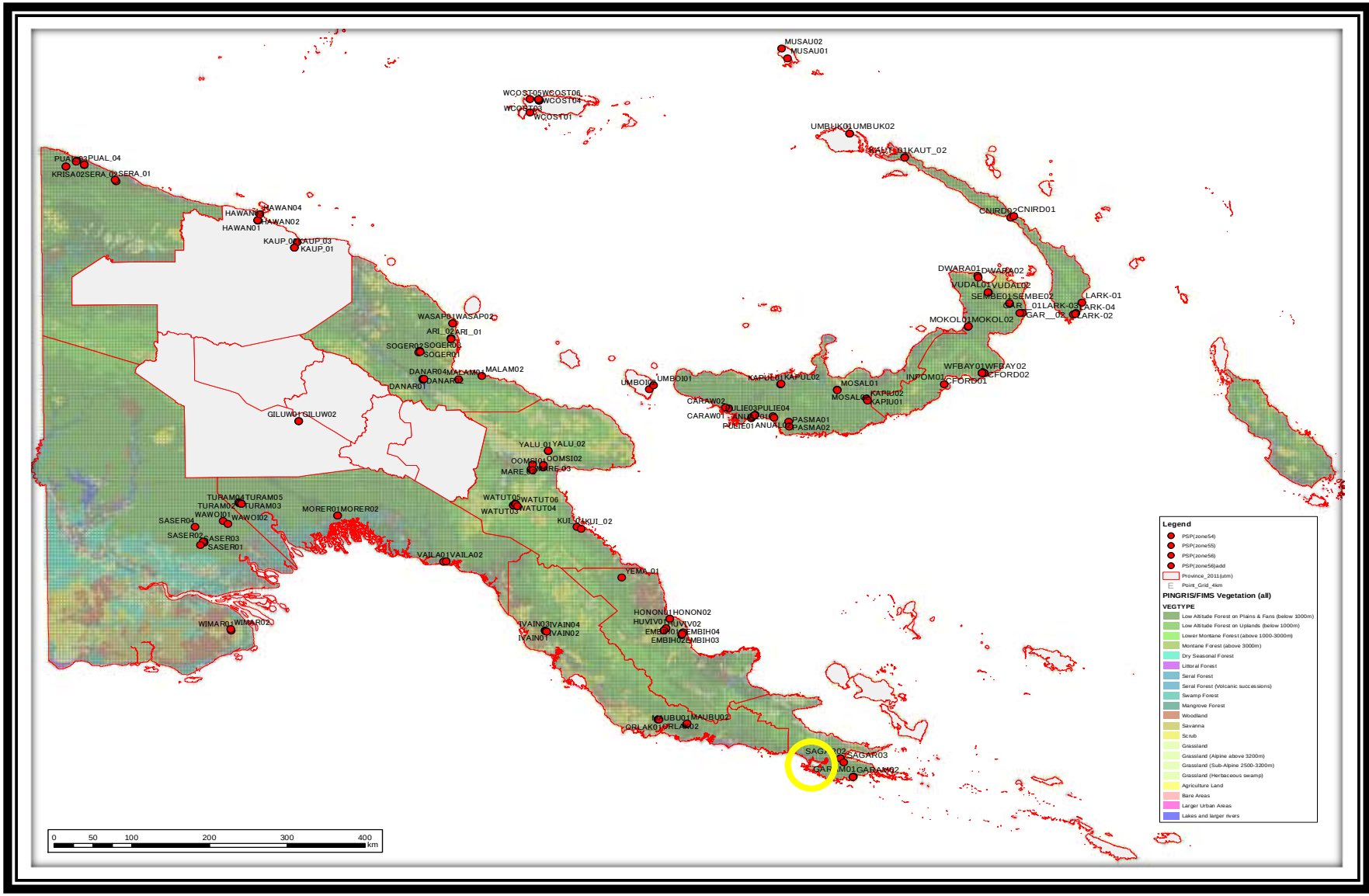


Example of using Collect-Earth

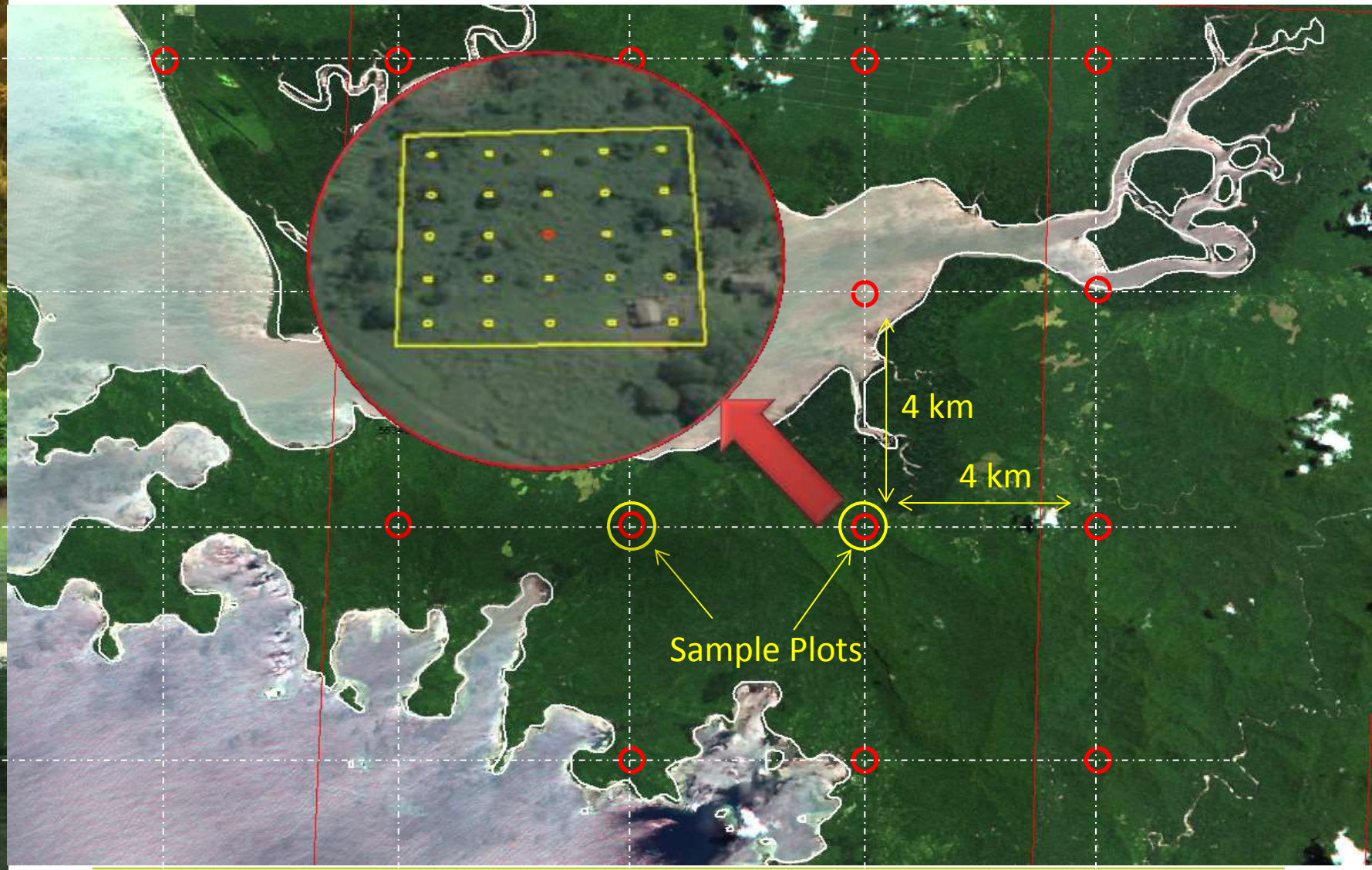
[Forest and land use in PNG 2013, Gewa Gamoga](http://www.fao.org/about/meetings/asia-pacific-forestry-week/streams/stream-2-programme/en/)



4x4 km systematic grid over all PNG - 25,279 "plots"



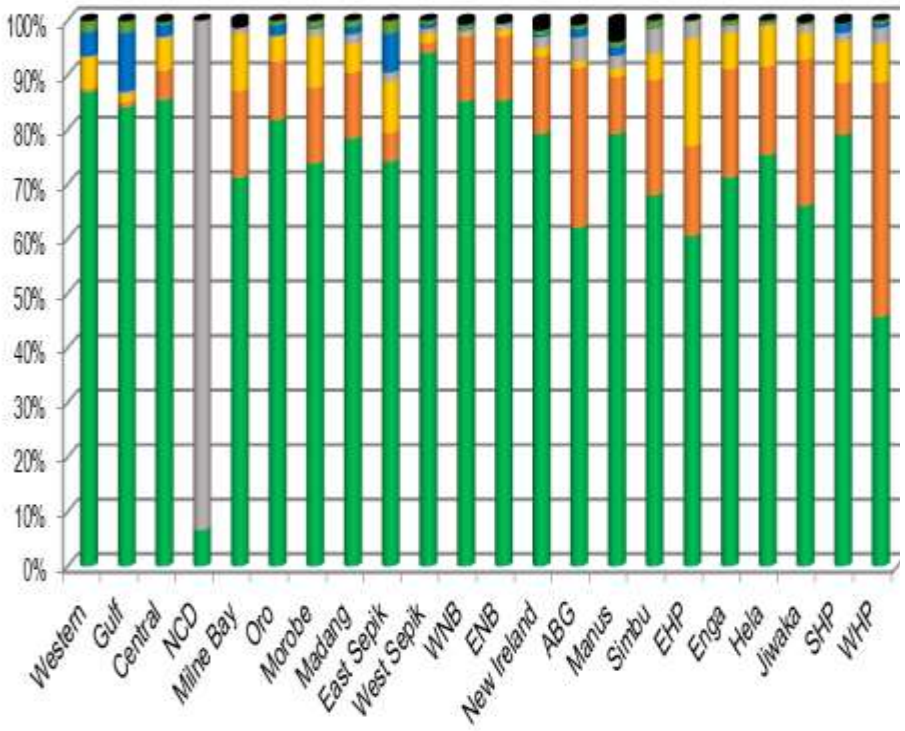
Landscape detail of Rapid Eye image coverage with sample plots distribution

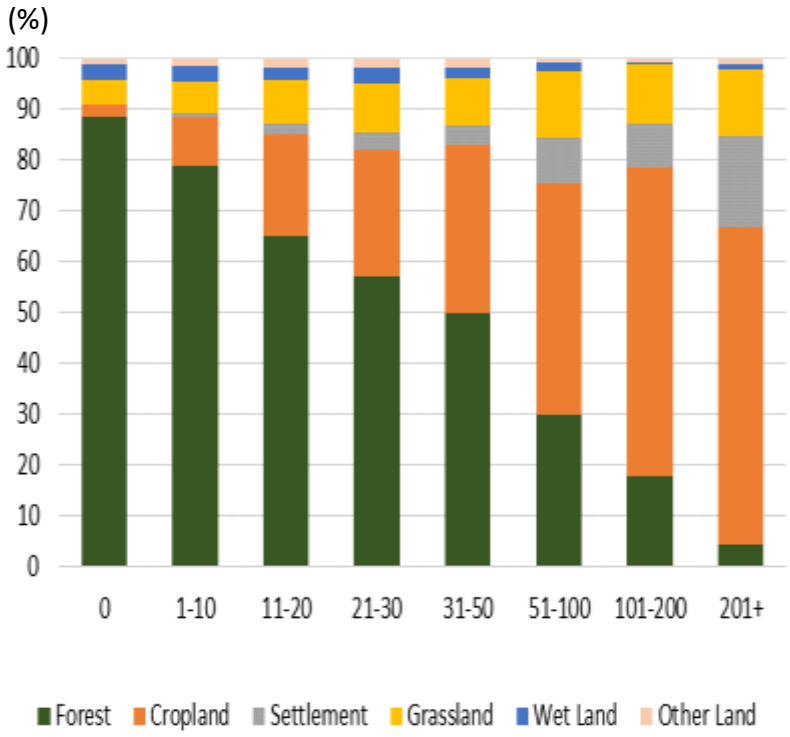


Results: Land use in Provinces

1.More cropland in WHP & ABG
2.Subsistence Agriculture is common in all provinces except WNB were Palm Oil is prevalent

1. There is strong correlation between the proportions of land use and population density .
2. With increase of population density;
   - settlement & cropland increase
   - forest decrease



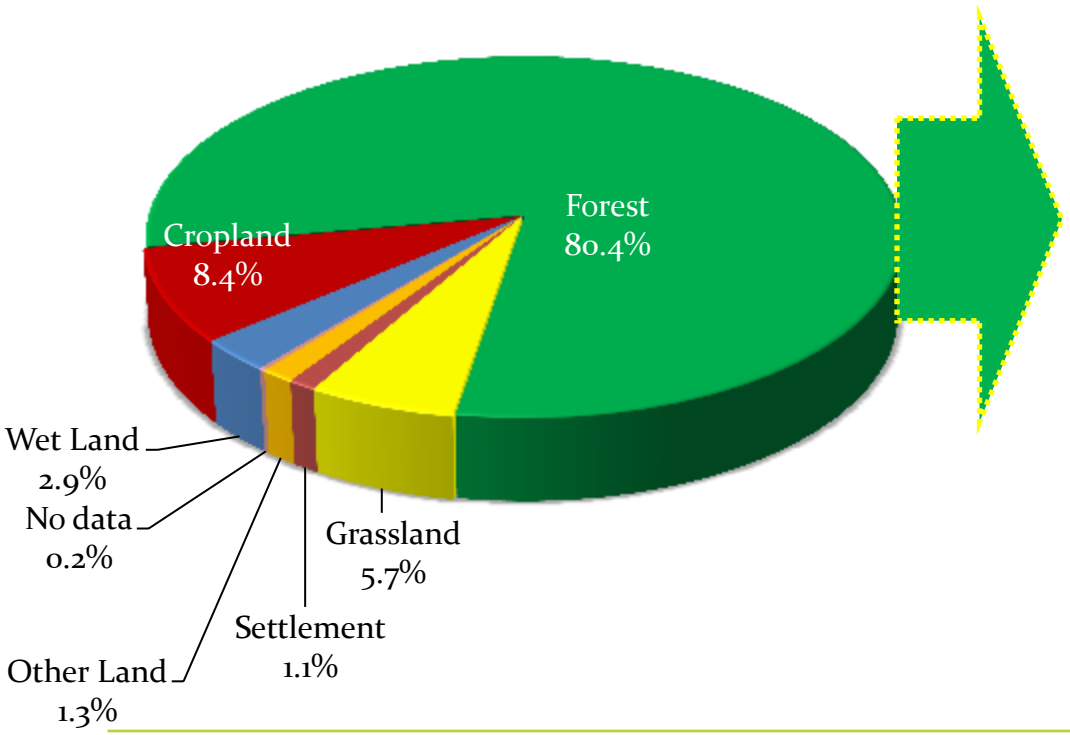


Land use composition in each province in PNG.

Key Message

PNG now has the capacity to monitor:

1. PNG's Forest, Land Use & Land Use Change
2. REDD+ activities



This information is useful for:

1. Policy & Measures
2. Forest Stratification for future NFI
3. REL/RL

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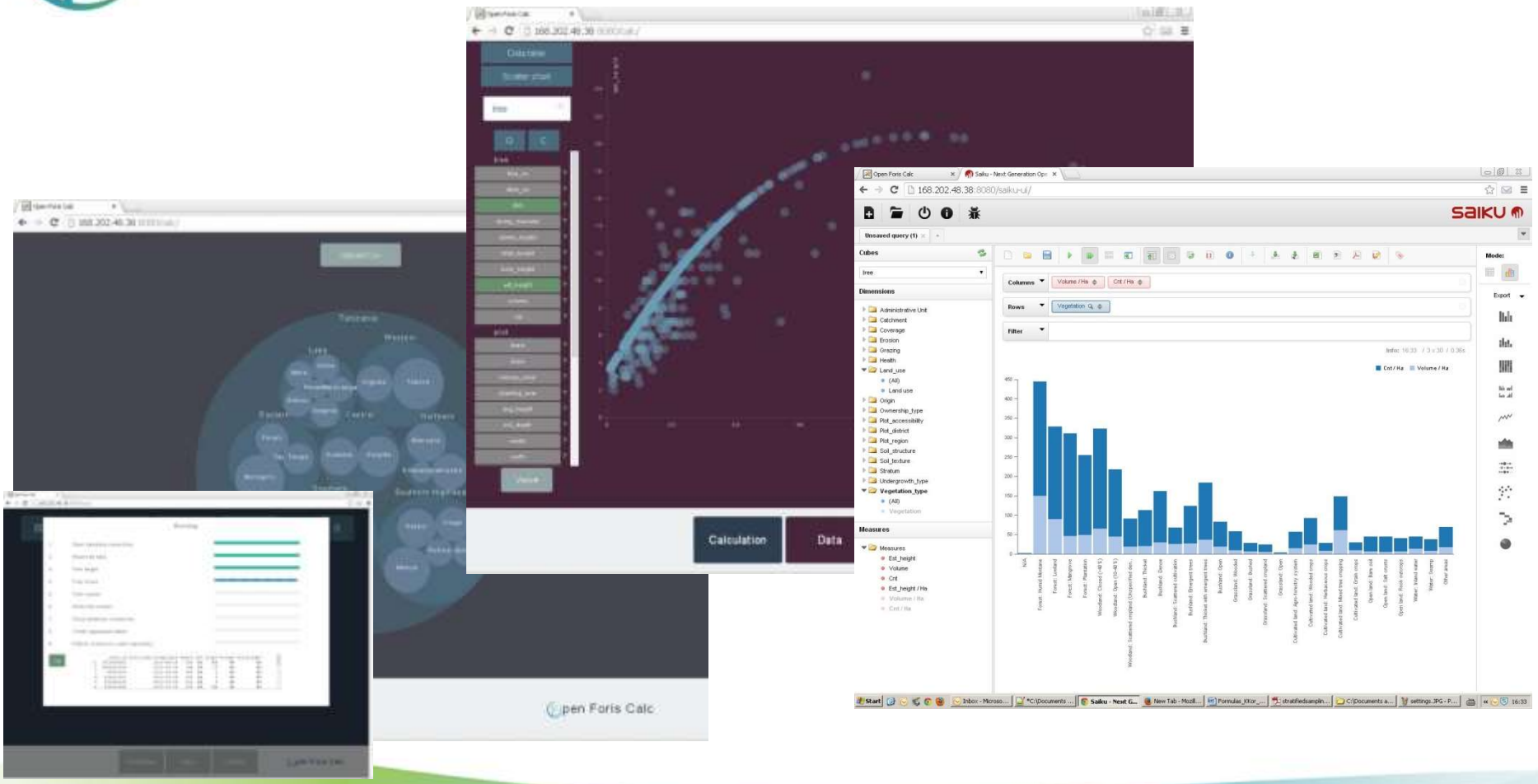
openforis Calc



Easy Import

Calc is a fully customizable tool for facilitated data analysis. You can import data directly from Collect, import external equations and build complex processing chains.

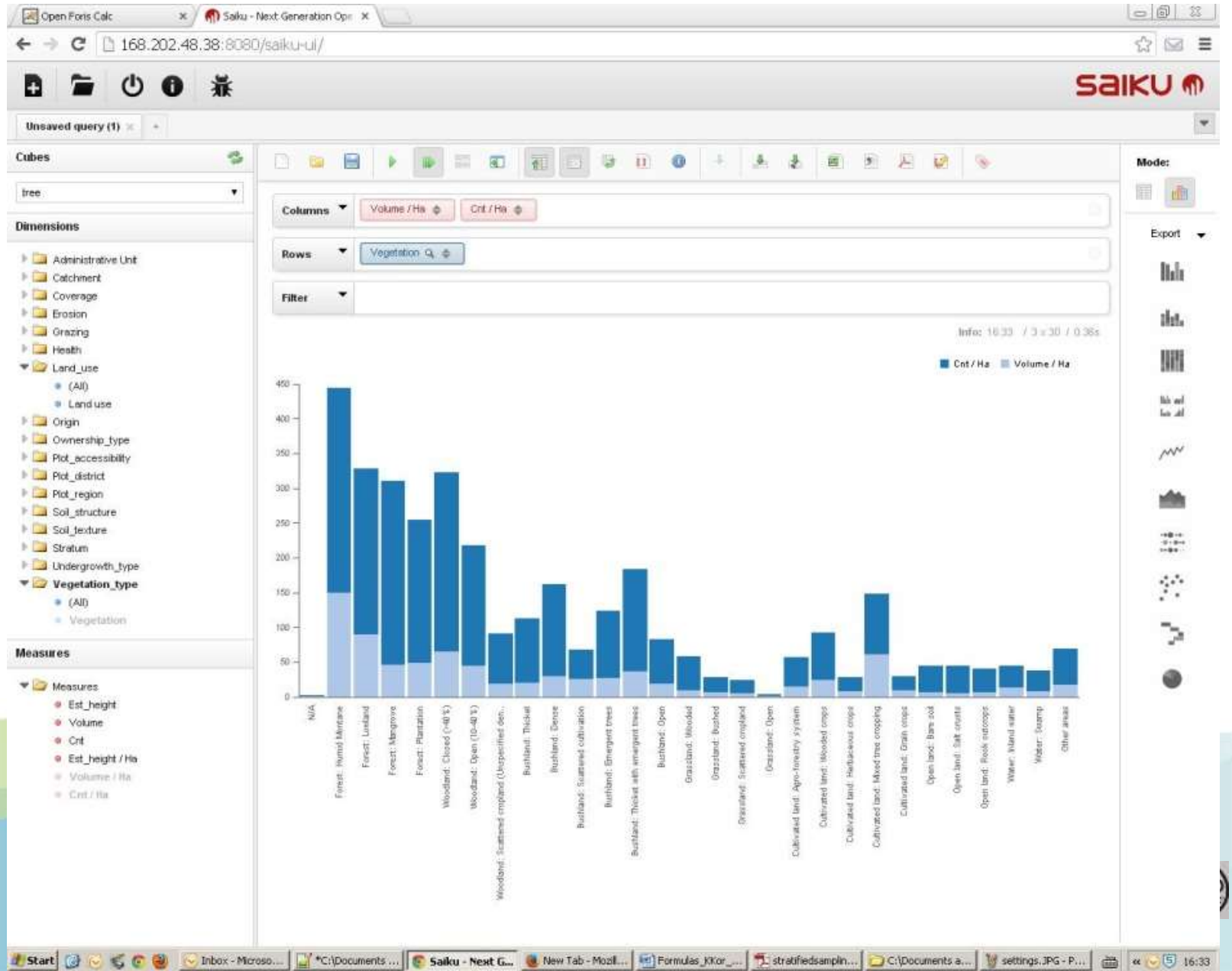
For experts and end-users

Calc is designed for both experts and end-users. Whereas the experts can build the processing chains, end users can just hit play and repeat the calculation processes.

Reporting

Calc results can be presented using Saiku Analytics. This allows easy reporting and presenting the results in both tabular and graphical form.

Easy data analysis and charts



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openforis GEOSPATIAL TOOLKIT

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What does the Geospatial toolkit do?

- for automating processes

- ~ 70 programs / scripts written in C,C++, awk, bash, perl and python
- Image arithmetics, classification, segmentation, sample generation, raster2vector, histogram, gap-filling, filtering, knn, change detection, pixel value extractor, ...

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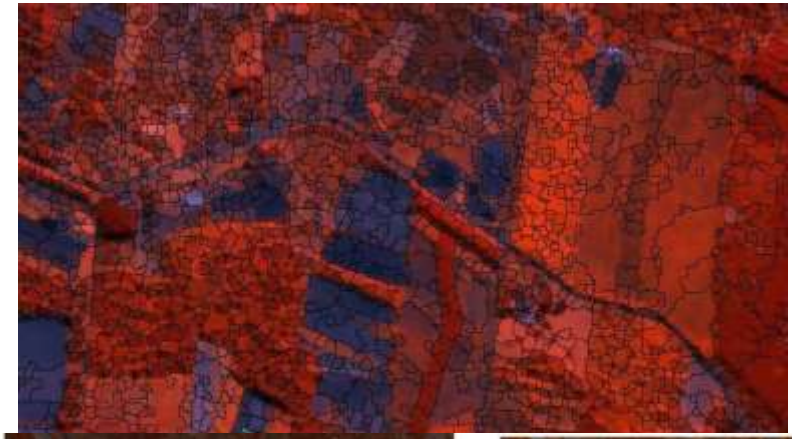

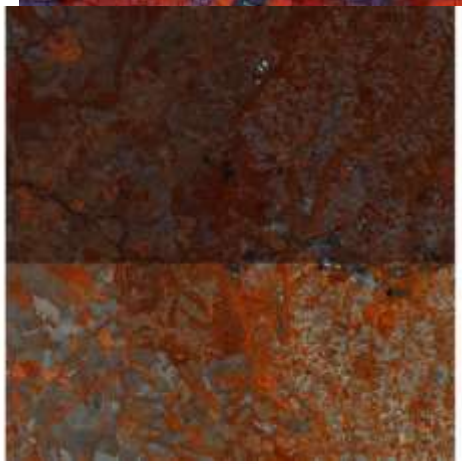

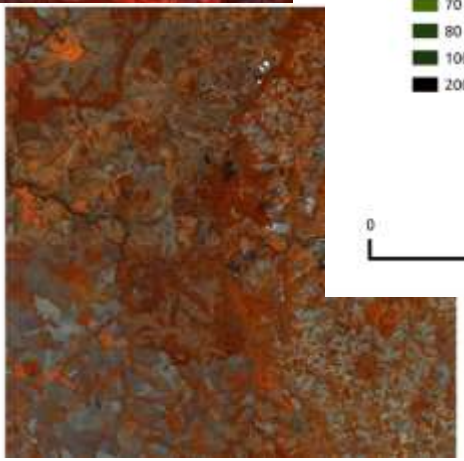

NAFORMA

m3/ha
0
10
20
30
40
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80
100
200 -

MULTI-SOURCE PILOT - Volume

Efficient image analysis
a collection of professional image processing tools which allow automatic processing of different kinds of images.

From pre-processing to mapping
tools for every image processing phases from pre-processing to calculation of forest resources of given area.

On low cost-hardware and on the cloud
When combined with a cloud computing interface, can b used to process massive amounts of data.

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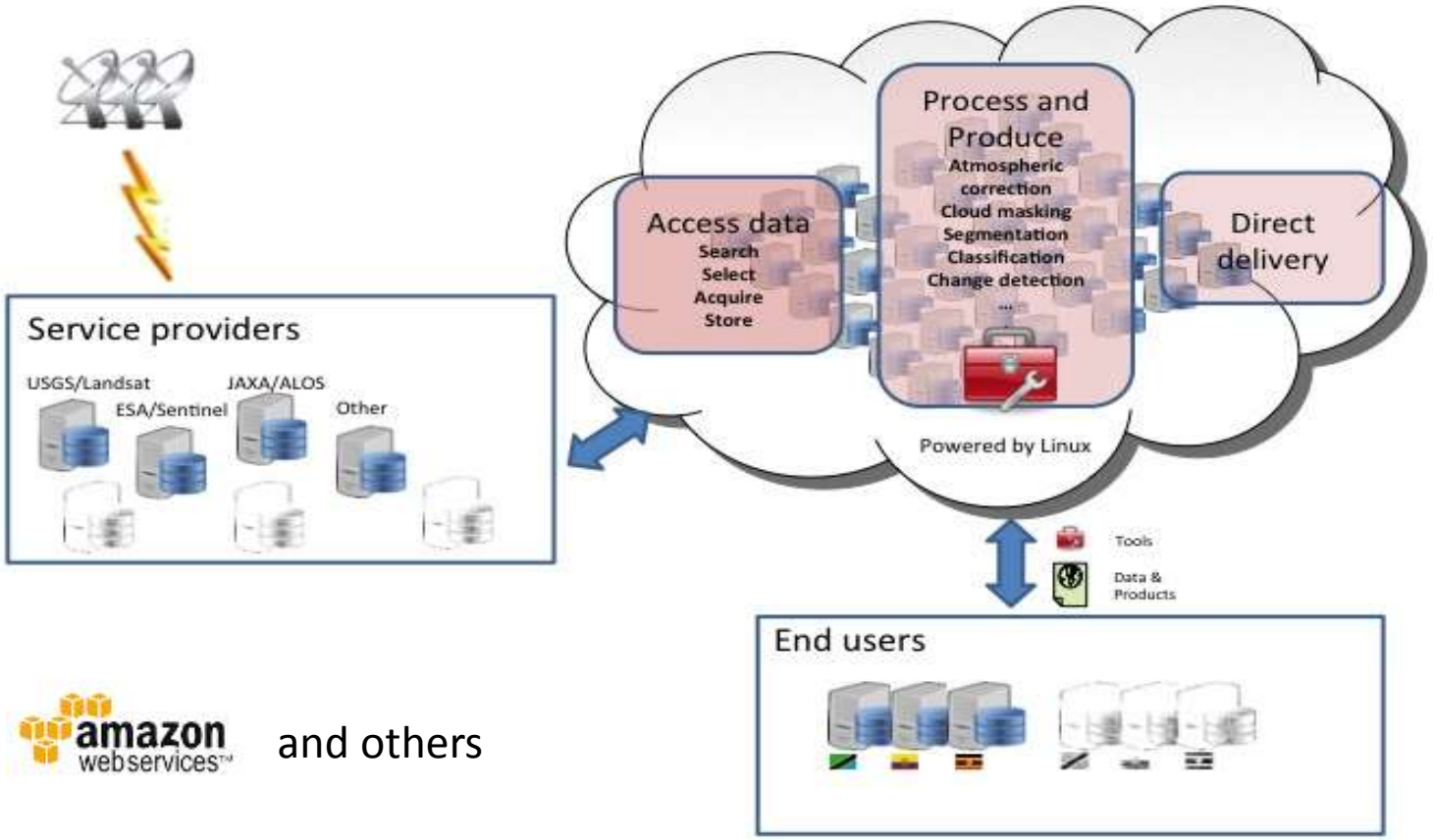
Food and Agriculture Organization of the United Nations

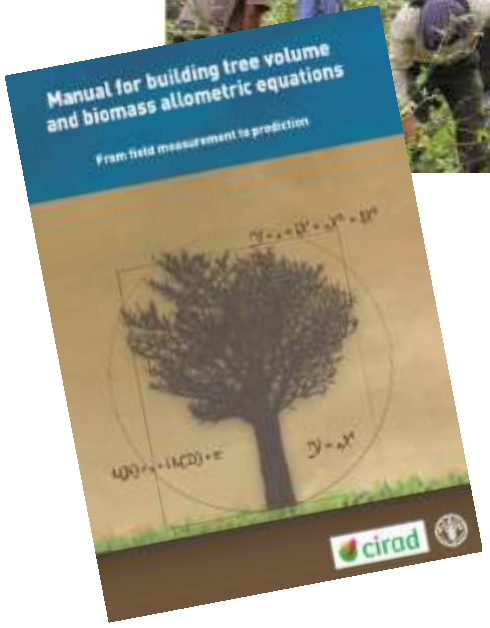
SEPAL
SYSTEM FOR EARTH OBSERVATION DATA ACCESS, PROCESSING & ANALYSIS FOR LAND MONITORING

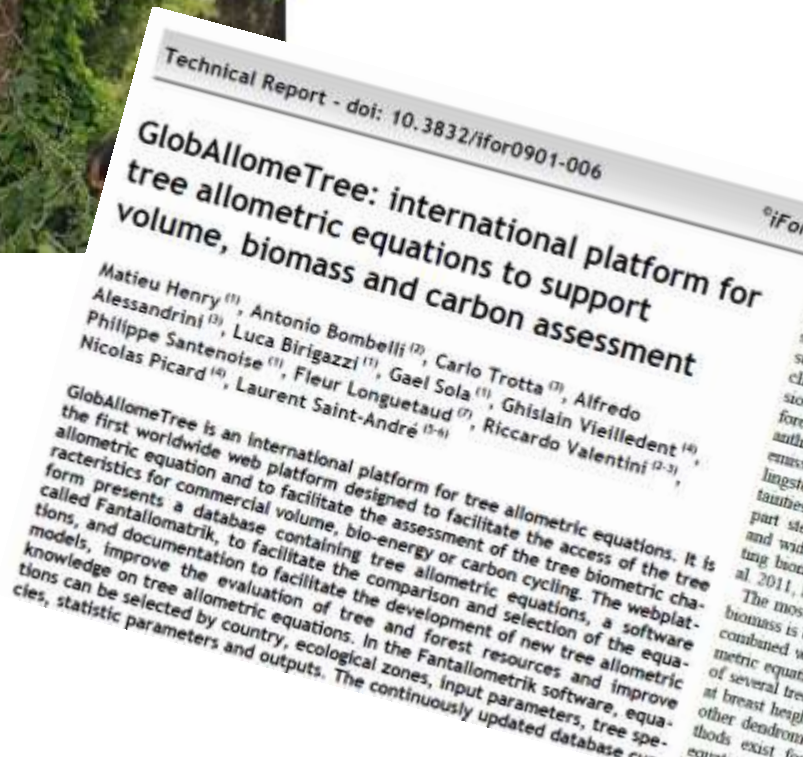
Satellite data storage and processing system in the “cloud”



amazon web services™ and others

http://www.globallometree.org/





Resource partners

Supported by:

Federal Ministry for the
Environment, Nature Conservation,
Building and Nuclear Safety

based on a decision of the German Bundestag

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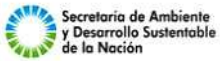
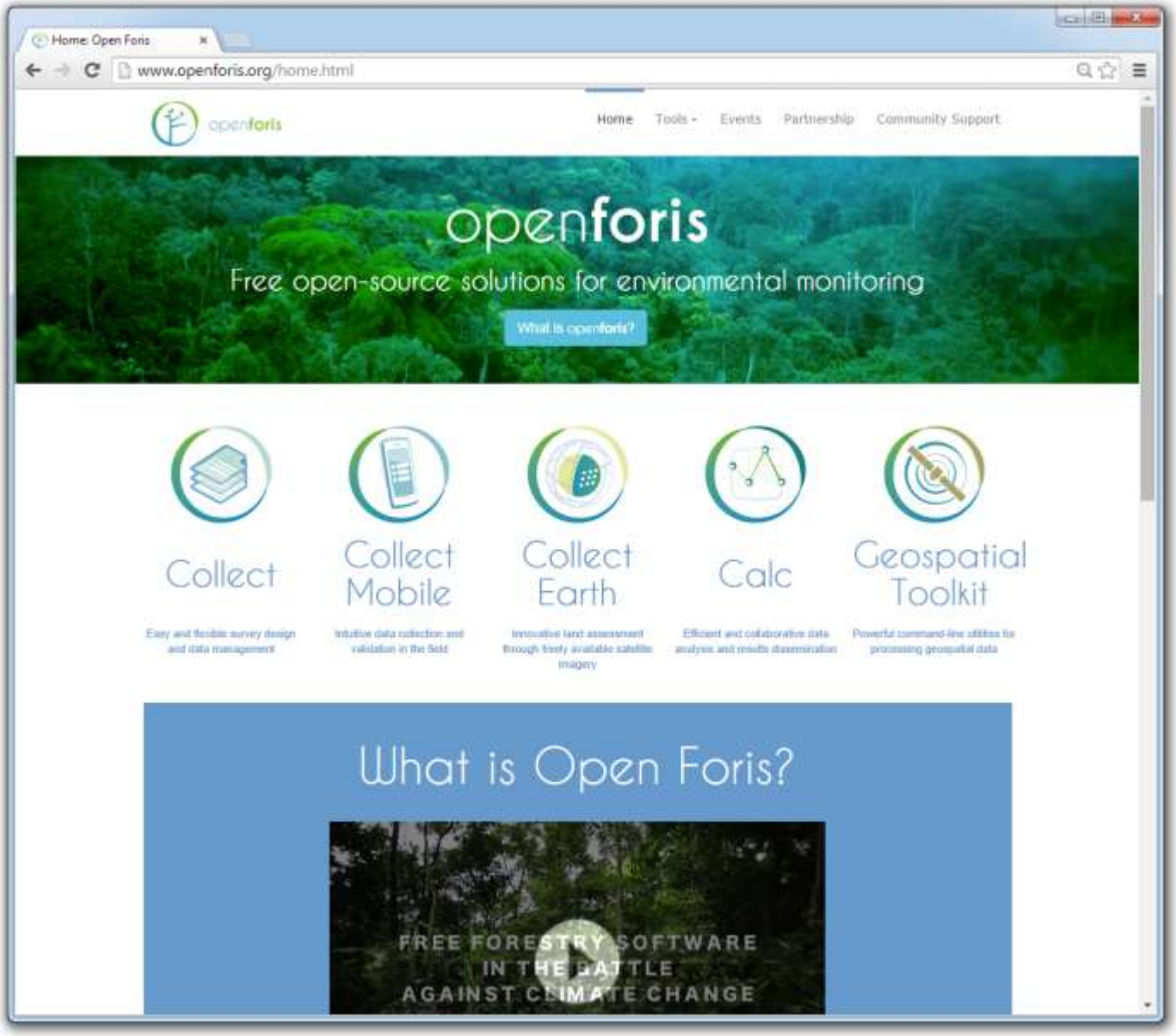
Contributors/Users



ENVIRONMENTAL
PROTECTION
AGENCY, GHANA

More info: www.openforis.org