

National Forest Information

FAO NATIONAL COUNTRY SUPPORT AND THE OPEN FORIS INITIATIVE

**2nd International Workshop on forest inventory
statistics, Kromeriz, Czech Republic
24th-26th May 2016**

FAO Forestry

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www.fao.org/forestry

IN THIS PRESENTATION



- **FAO supporting Forest Monitoring**
Mandate
- **FAO's national forest monitoring and assessment programme**
Brief introduction
- **The Voluntary Guidelines on National Forest Monitoring**
- **The Open Foris Initiative**





When the FAO was established, one of its core functions was to collect, analyze and disseminate information on agriculture, ***forestry*** and fisheries.

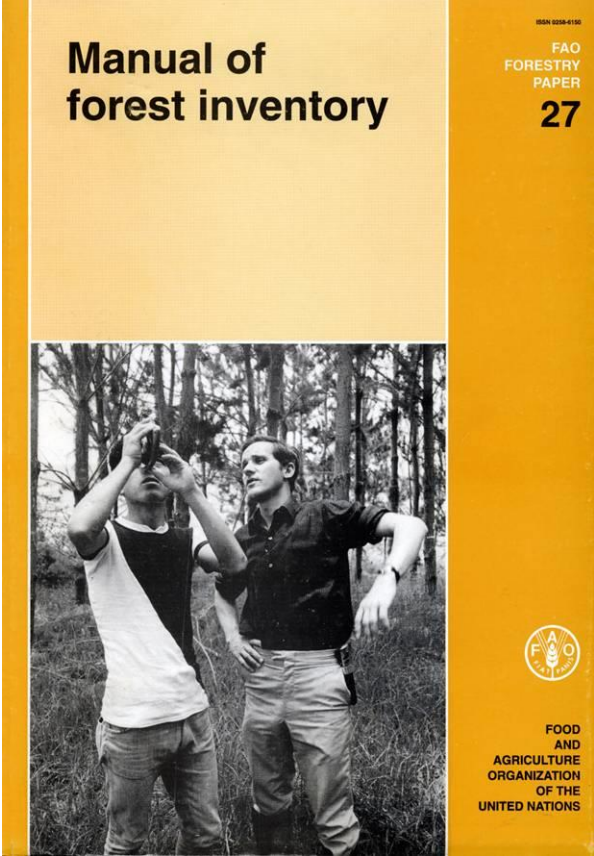
This is still the case and stems from the simple but powerful belief that ***better information leads to better decisions, which lead to better actions.***





FAO mandate

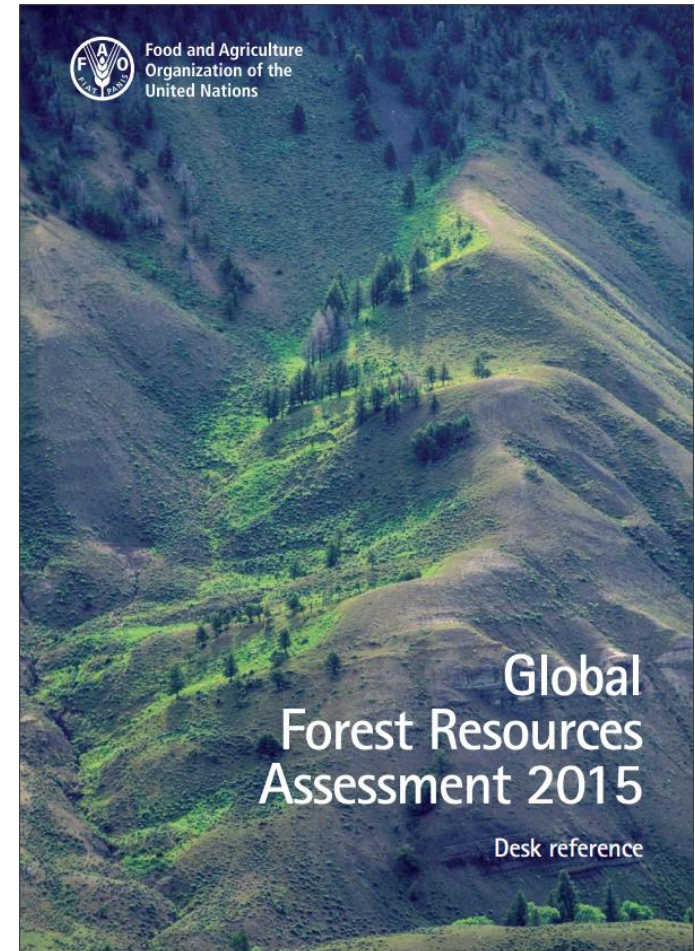
- Long history at FAO (from the 50's)



FAO has been monitoring the world's forests at 5 to 10 year intervals since 1946.

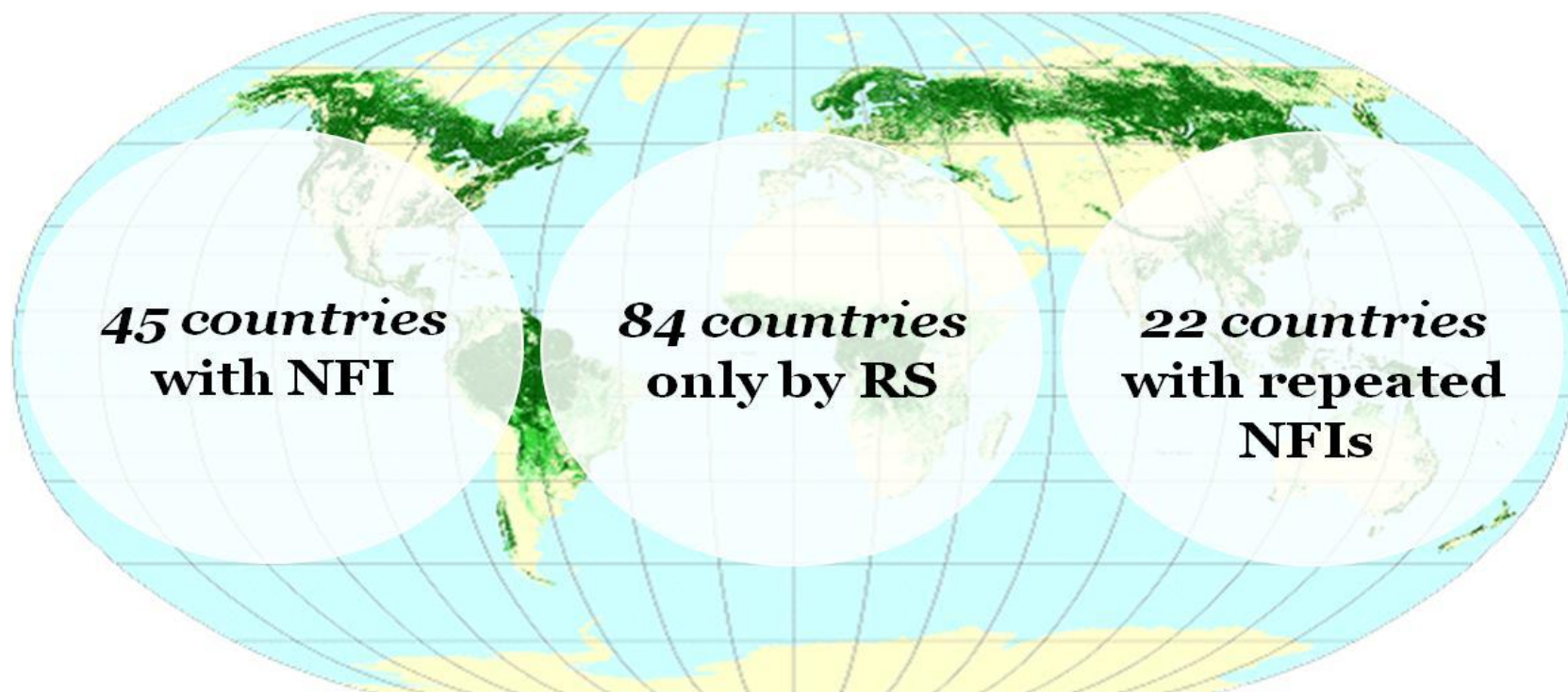
The Global Forest Resources Assessments (FRA) are now produced every five years in an attempt to provide a consistent approach to describing the world's forests and how they are changing.

The Assessment is based on two primary sources of data: Country Reports prepared by National Correspondents and remote sensing that is conducted by FAO together with national focal points and regional partners.





Existing knowledge on forests and their benefits is inadequate



Data status on forests (FRA 2010)

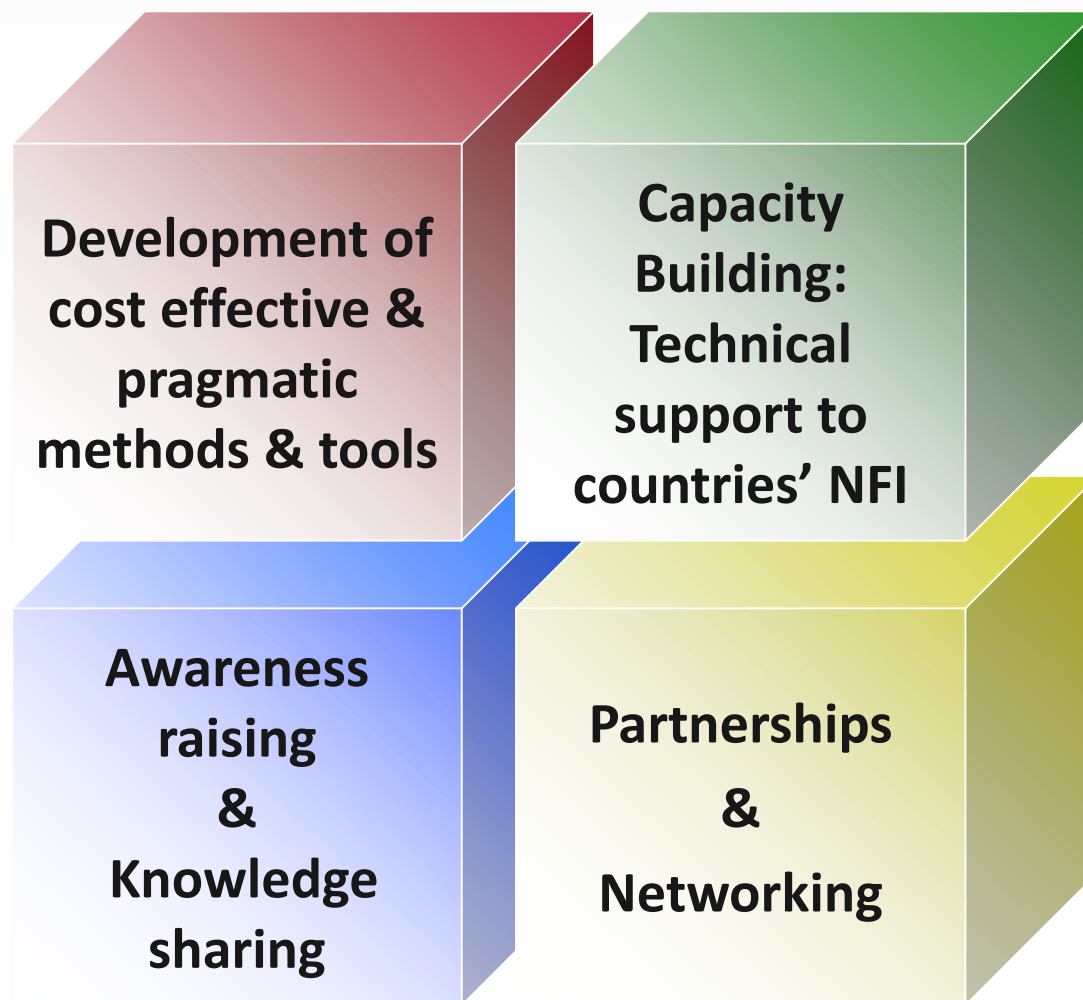
Brief introduction

- **The National Forest Monitoring and assessment programme was created in 2000 with the aim of:**

**Strengthen national capacities
for long term
forest monitoring and assessment**



MAIN WORKING AREAS





VOLUNTARY GUIDELINES ON NATIONAL FOREST MONITORING

- During the Twenty-First Session of the Committee on Forestry (COFO21), held in September 2012, member countries recommended that FAO continue to support countries to strengthen national forest information systems and requested FAO to “work in close collaboration with member countries and relevant organizations to prepare a set of voluntary guidelines on national forest monitoring, which takes into account the requirements for REDD+ reporting and is in line with the principles and goals of the Forest Instrument”.



VOLUNTARY GUIDELINES ON NATIONAL FOREST MONITORING

- The aim of these Voluntary Guidelines is to assist with the creation and operation of NFMSs. The guidelines include good practice principles, guidelines and a general framework
- The voluntary guidelines is intended as a technical reference for governmental bodies in charge of forest monitoring, educational and research institutions, the public and private sectors, and members of civil society concerned with national forest monitoring



VOLUNTARY GUIDELINES ON NATIONAL FOREST MONITORING

- The Voluntary Guidelines are based on the experiences and lessons learned of FAO member countries and past and present FAO forest monitoring projects and initiatives, as well as inputs provided at a number of international workshops and technical meetings held between 2012 and 2015. Valuable contributions and advice have also been received from a number of institutional partners and stakeholders.



- **National forest inventory (NFI)** is commonly used to describe the technical process of data compilation and analysis of forest resources from a multitude of data sources, including field inventories and remote sensing, to estimate relevant forest characteristics at particular points in time.
- **National forest monitoring (NFM)** is a much more comprehensive process that includes the assessment, evaluation, interpretation and reporting of data and the derivation of information, usually from repeated inventories, that allows for the monitoring of change and trends over time





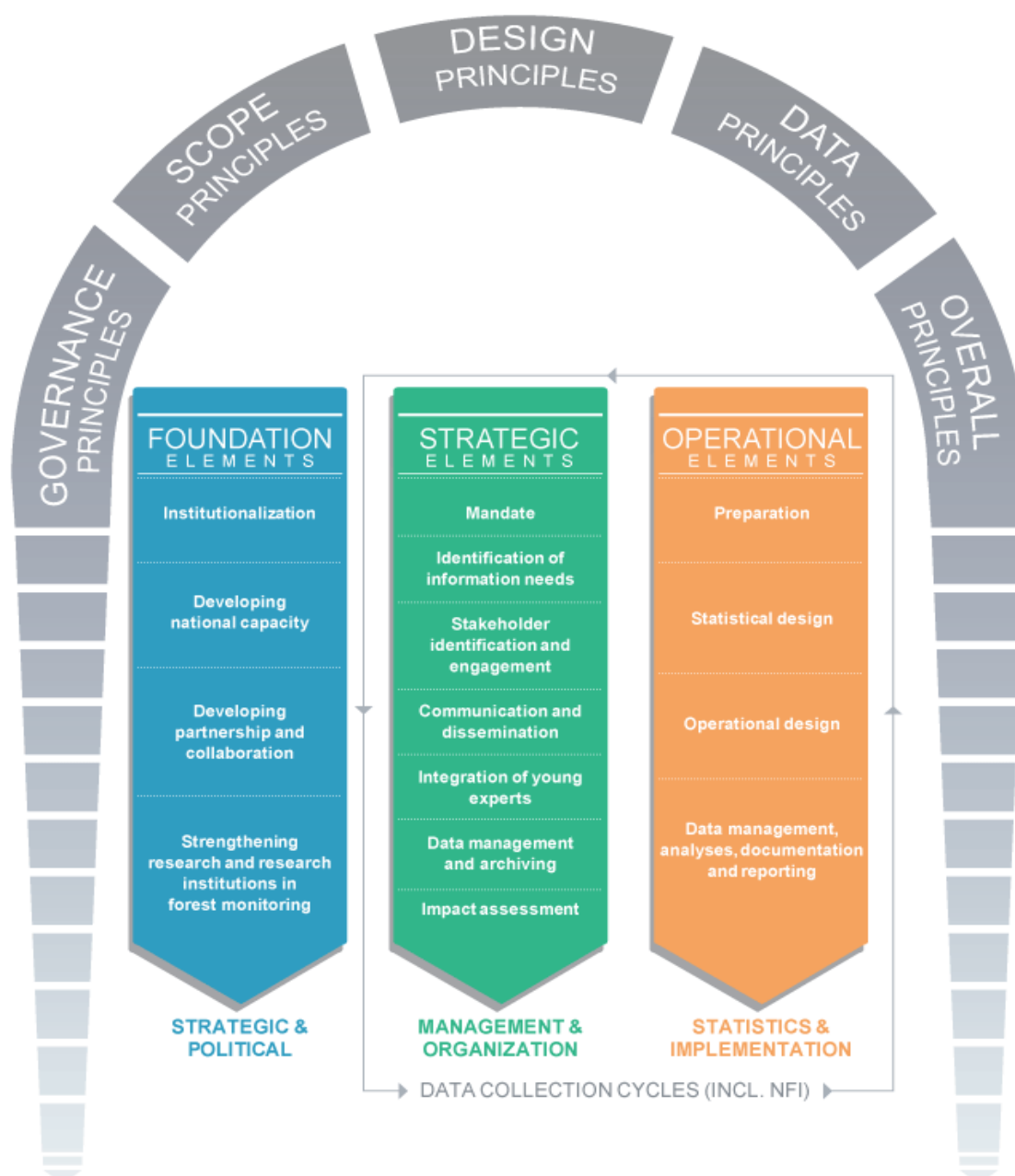
National forest monitoring system (NFMS),

comprises the people, institutions and resources that implement national forest monitoring at the country level in collaboration with other stakeholders. Generally, a NFMS is led by a governing body responsible for its conceptualization, planning and execution within a clear and well-defined mandate, based on the principles and elements introduced in the FAO voluntary guidelines on NFM



Principles of the Voluntary Guidelines on National Forest Monitoring

Governance principles	Principle 1: Country ownership and responsibility
	Principle 2: Legal and policy basis
	Principle 3: Landscape view
	Principle 4: Institutionalization of NFM
	Principle 5: Research infrastructure and capacity building
Scope principles	Principle 6: Participatory discussion process
	Principle 7: Satisfaction of national information needs
Design principles	Principle 8: Integration of and consistency with existing information sources
	Principle 9: Flexible approach
	Principle 10: Multi-purpose approach
	Principle 11: Feasibility including cost-efficiency
Data principles	Principle 12: A well-defined data and information-sharing policy
Overall principles	Principle 13: Credibility through transparency and quality
	Principle 14: Collaboration at the international level





Element

Element Description

4.1. Mandate

The implementation of a NFMS requires a clear political mandate, which can only be issued by a government body. Mandates also usually imply the definition of a vision, goals, targets and available resources, including budget, personnel and infrastructure among others. In some cases, legal regulations are also necessary, for example, to facilitate access to private land to conduct field inventories.

The NFMS mandate shall include:

Basic components

- a. The scope, goals and targets of the NFMS, which should be specific and measurable – covering both the short and long-term.
- b. A clear designation of responsibilities and functions for all entities involved in achieving the objectives and targets of the NFMS, with normally a single principal coordinating entity.
- c. If the NFMS is implemented in a decentralized manner, a principal entity can harmonize, coordinate and maintain consistency between decentralized entities.
- d. Explicit commitments to impartiality, freedom from undue influence or potential conflicts of interest that may lead to biased/compromised results.
- e. Specification of the means, including resources (human, financing, infrastructure etc) for implementing the NFMS.



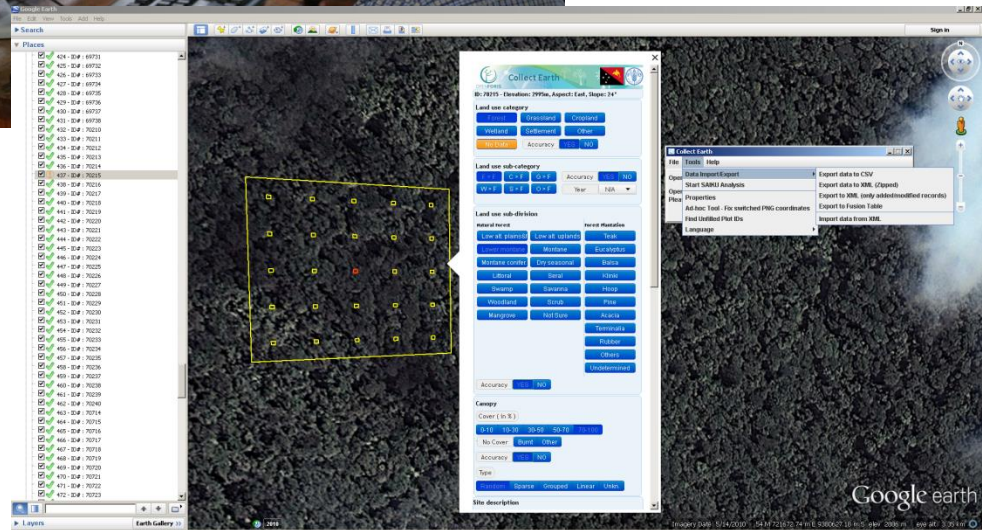
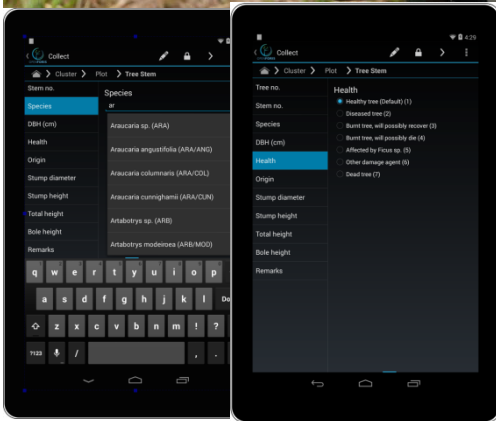


OPEN FORIS INITIATIVE



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

www.openforis.org



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
- Data entry interface generated automatically
- Standard workflow: entry, cleansing, analysis
- Server / desktop

LC classes, admin regions, admin regions, ..
Species lists

Survey Designer

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:

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):

List heading (en):

Field number (en):

General info



Quality assurance field

Task	Person	Date
Form filled out	<input type="text"/>	<input type="text"/> / <input type="text"/> / <input type="text"/>
Form checked	<input type="text"/>	<input type="text"/> / <input type="text"/> / <input type="text"/>
Data entered	<input type="text"/>	<input type="text"/> / <input type="text"/> / <input type="text"/>
Data cleaned	<input type="text"/>	<input type="text"/> / <input type="text"/> / <input type="text"/>

Id

Wrong Coordinate

Measurement

Region

District

Crew no.

Map sheet

Add

Accessibility

- Field-data collection using Collect survey
- On-the-fly validation
- Export collected data to Collect Desktop
- Android 4+ devices
- Support large, complex, surveys
- Simple and efficient to use
- Optimize for field use
- Use device camera and GPS
- Focus on data quality
- Data safety
- Validation in the field
- Integrated code and species lists
- Easy backups
- No transcription of handwritten forms





COLLECT EARTH



CUTTING EDGE OPEN SOURCE ANALYTICS



Stand-alone or server based

- **Stand-alone**

- Collect Earth uses a single-file database (SQLite) to store/fetch the data
- The data can be exported into XML
- A user can gather data from several operators (through the XML files) and import it into his Collect Earth instance to combine it

- **Server-based**

- Collect Earth uses a server database (PostgreSQL)
- All operators connect to the same database
- Collected data available to all operators

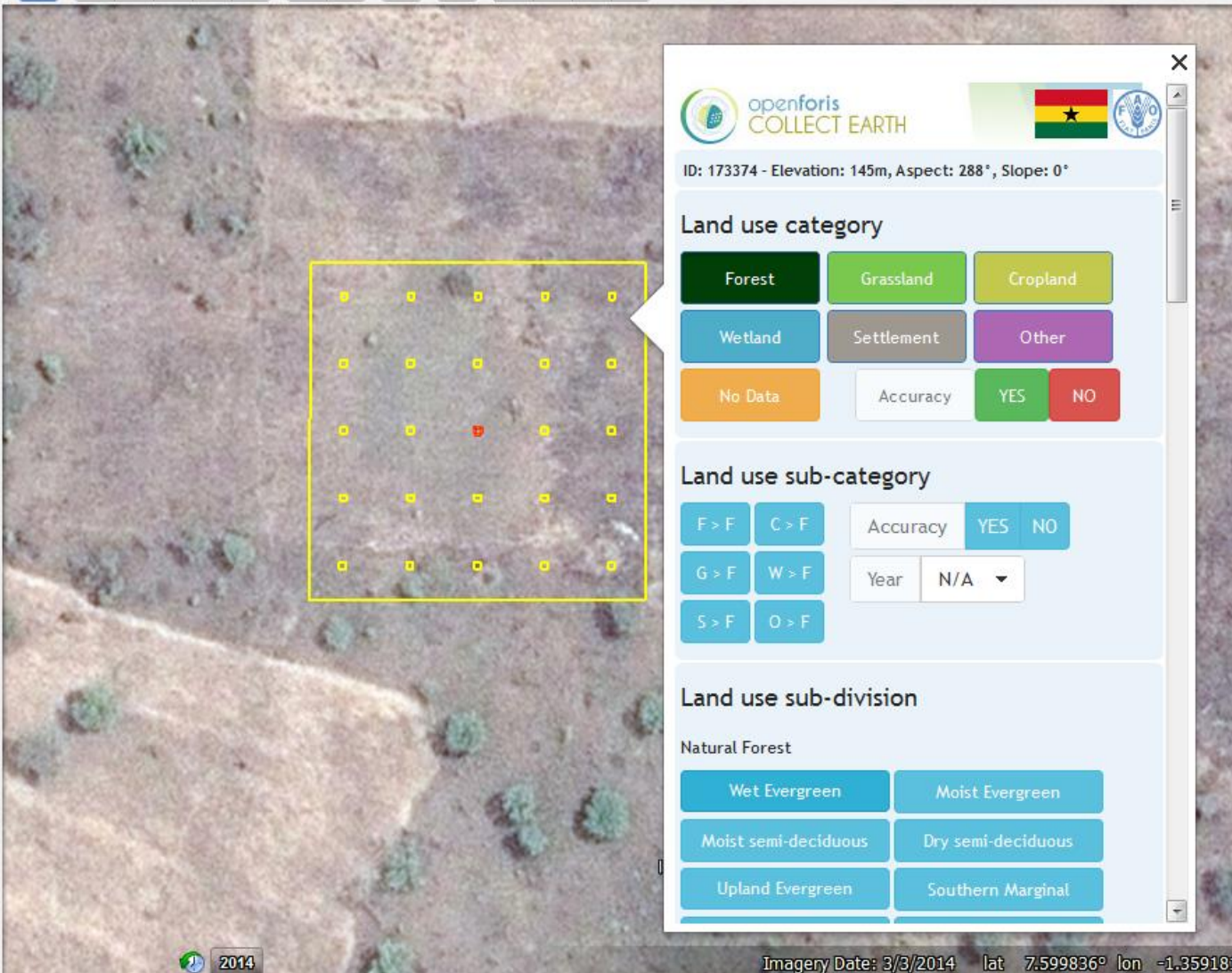
Google Earth

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



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	Accuracy	YES NO
G > F	W > F	Year	N/A
S > F	O > F		

Land use sub-division

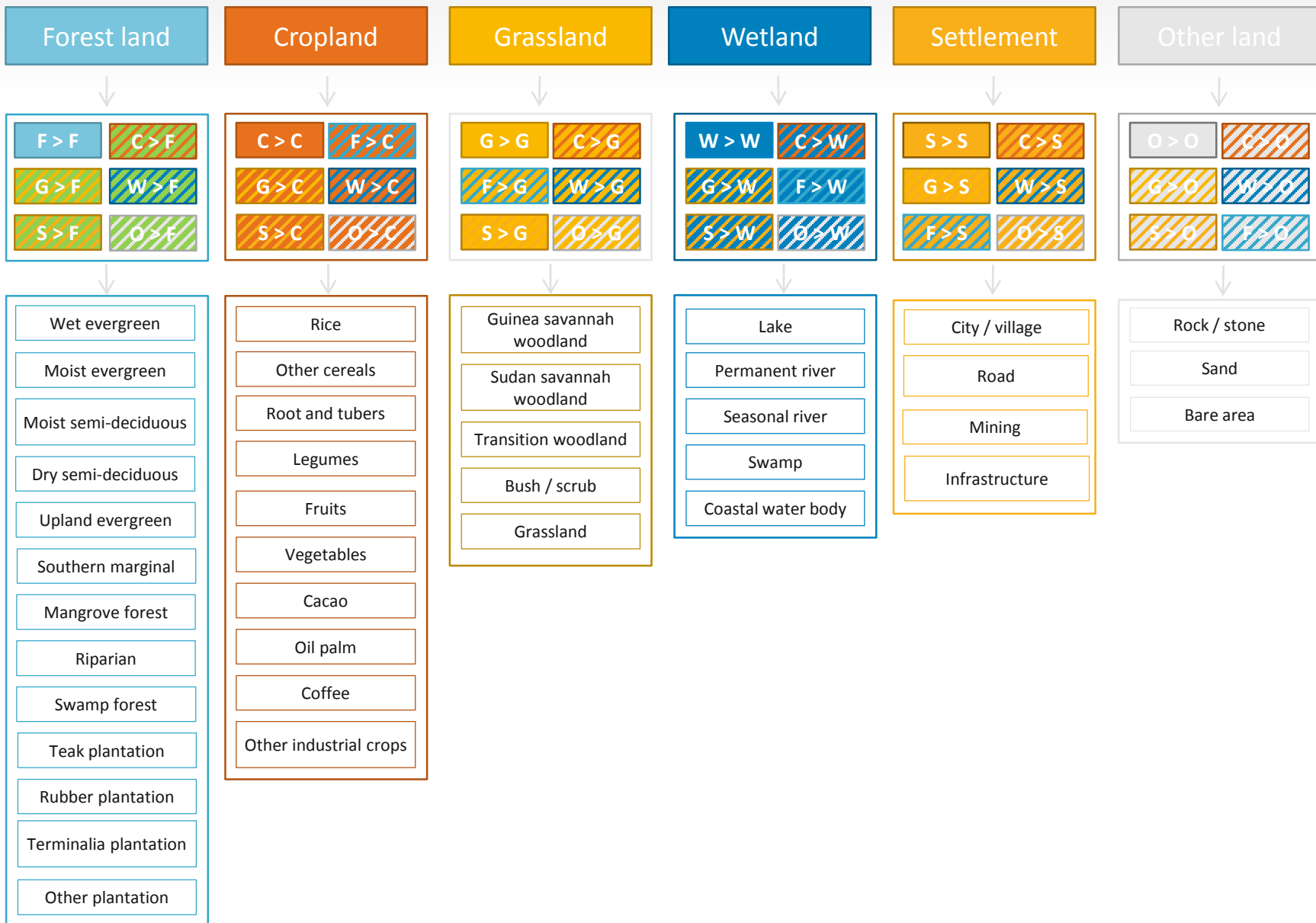
Natural Forest

Wet Evergreen	Moist Evergreen
Moist semi-deciduous	Dry semi-deciduous
Upland Evergreen	Southern Marginal

Imagery Date: 3/3/2014 lat 7.599836° lon -1.359181

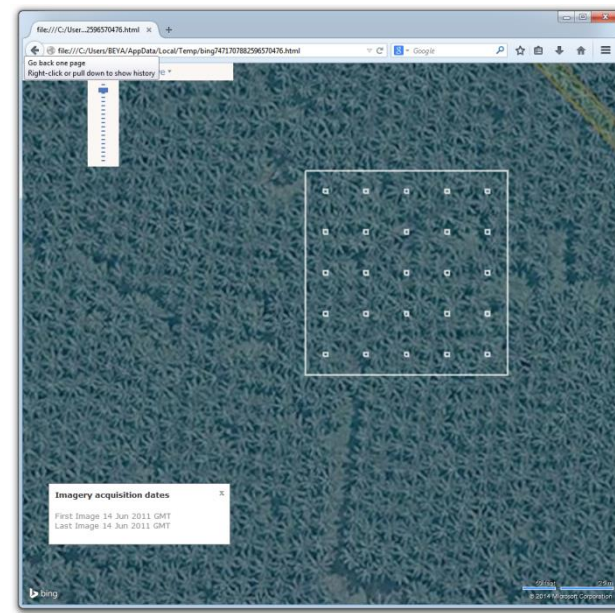
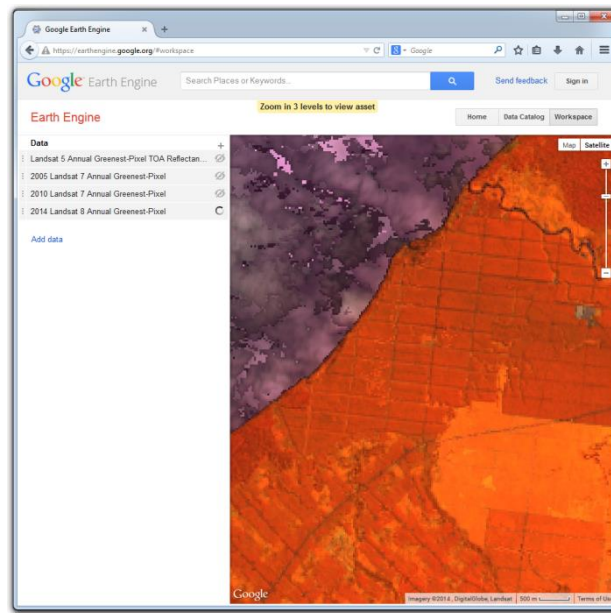
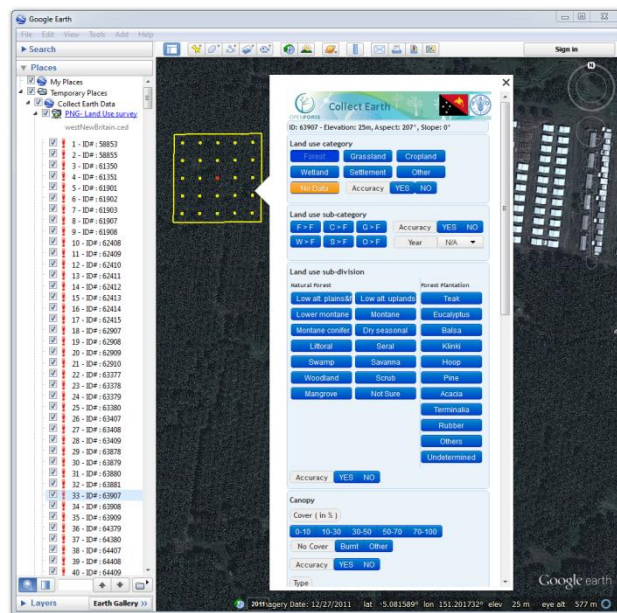
Ghana LU scheme

IPCC LU



National land use sub-divisions

Geo-synchronized



Business intelligence

Saiku - Next Generation

127.0.0.1:8181

SAIKU

Unsaved query (1)

Cubes

- Select a cube
- Select a cube
- CollectEarth (collectEarth)
- Plot

Measures

Columns: Category

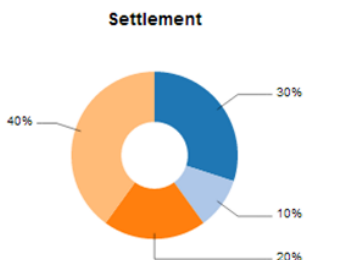
Rows: Region

Filter

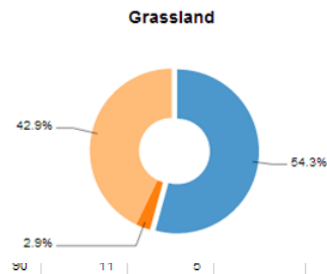
Region	Forest	Grassland	Settlement	Other Land	No data	Wet Land	Cropland
CENTRAL	104	19	3	2	1	7	18
CHIMBU	37		1				10
EAST NEW BRITAIN	60	1	2				7
EAST NEW GUINEA							
HELANDS							
MOROBE	237	14	2	2	1		32
NEW IRELAND	34	1			1	1	10
NORTH SOLOMONS	66						8

Legend: CENTRAL (Blue), CHIMBU (Light Blue), EAST NEW BRITAIN (Orange), EAST SEPIK (Dark Orange)

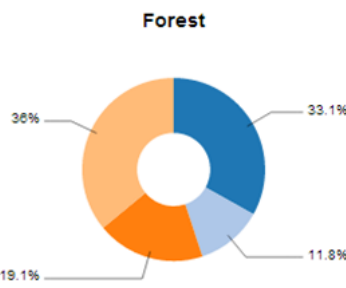
Settlement

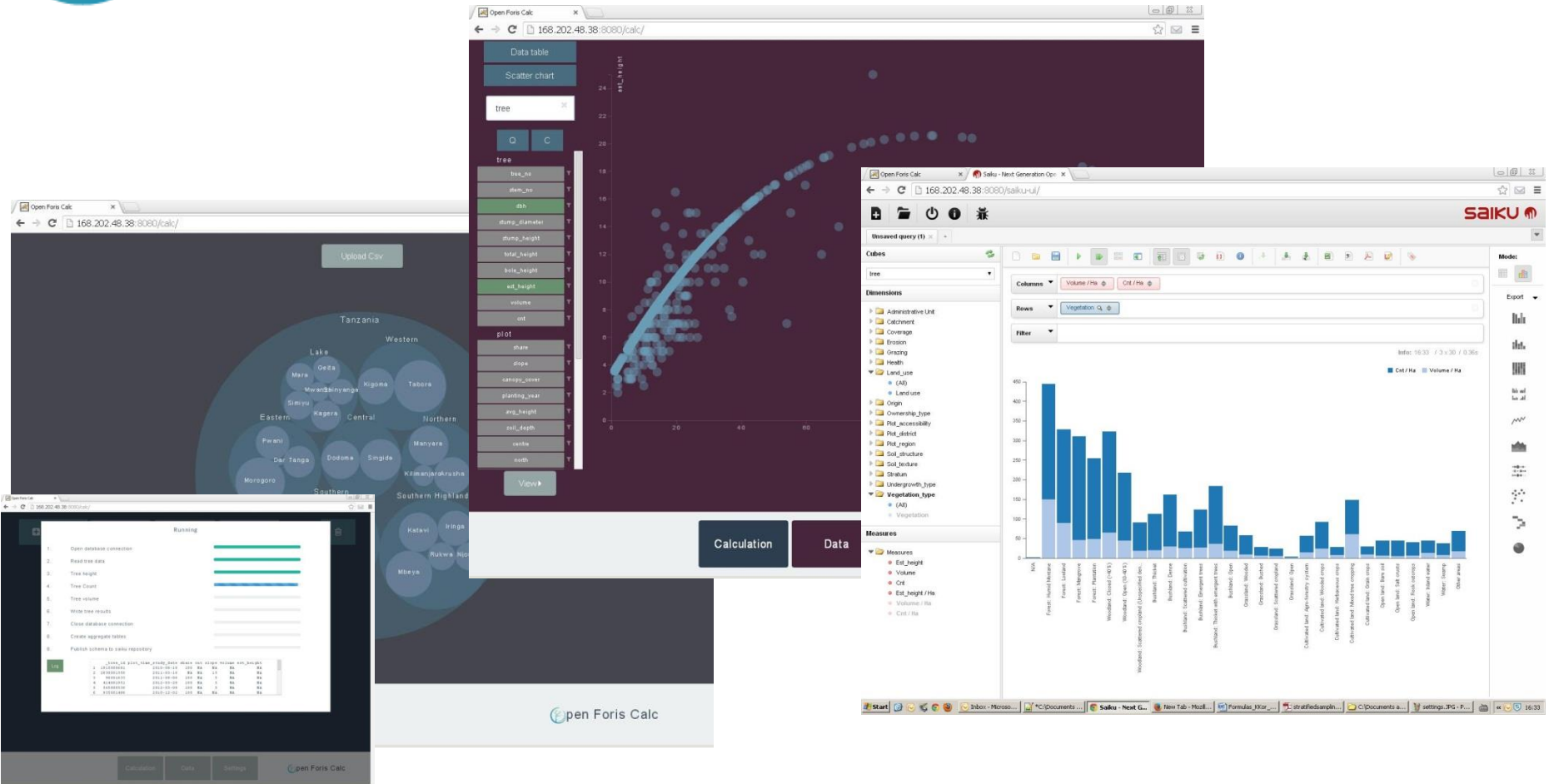


Grassland



Forest





➤ **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.





		Stand - Major forest status <input type="checkbox"/>	Stand - FRA class <input type="checkbox"/>	Stand - IPCC class <input type="checkbox"/>	
		Tree - Count <input type="checkbox"/>	Tree - Basal area <input type="checkbox"/>	Tree - Est. height <input type="checkbox"/>	
		Tree - Bole volume <input type="checkbox"/>	Tree - AG Biomass <input type="checkbox"/>	Tree - BG Biomass <input type="checkbox"/>	Tree - Total biomass <input type="checkbox"/>
		DW - Biomass <input type="checkbox"/>	DW - Carbon <input type="checkbox"/>	Stump - Count <input type="checkbox"/>	Stump - DBH estimate <input type="checkbox"/>
		Stump - Tree AG biomass <input type="checkbox"/>	Stump - BG Biomass <input type="checkbox"/>	Stump - Total biomass <input type="checkbox"/>	Stump - Removal volume <input type="checkbox"/>
		Bamboo - BG Biomass <input type="checkbox"/>	Bamboo - Biomass <input type="checkbox"/>	Bamboo - Carbon <input type="checkbox"/>	Liana - Count <input type="checkbox"/>

Edit

Test/Execute

Type

R script

External equation

Category

Caption

Tree - Volume

Entity

tree

Variable

tree_est_volume

Script

```
1 # Basic volume model, source: CHIDUMAYO 2012, p. 22
2
3 tree$tree_est_volume <- with( tree, 0.67 *pi * (0.01 * tree_dbh / 2)^2 * tree_est_height );
4
```

Aggregate
function

— Available only for those entities that won't be aggregated using the sampling design
— Sum will be applied by default if none of the functions is selected

sum

min

max

avg

count

distinct-count



+
▶ 60

€

🗑️

⚙️

	<input type="checkbox"/> Stand - Major forest status	<input type="checkbox"/> Stand - FRA class	<input type="checkbox"/> Stand - IPCC class	<input type="checkbox"/> Tree - DBH class (04)	<input type="checkbox"/> Tree - DBH class (20)	<input type="checkbox"/> Plot - Major Forest Status	
	<input type="checkbox"/> Tree - Count	<input type="checkbox"/> Tree - Basal area	<input type="checkbox"/> Tree - Est. height	<input type="checkbox"/> Tree - Height class (02)	<input type="checkbox"/> Tree - Bole height	<input type="checkbox"/> Tree - Volume	
<input type="checkbox"/> Tree - Bole volume	<input type="checkbox"/> Tree - AG Biomass	<input type="checkbox"/> Tree - BG Biomass	<input type="checkbox"/> Tree - Total biomass	<input type="checkbox"/> Tree - AG Carbon	<input type="checkbox"/> Tree - BG Carbon	<input type="checkbox"/> Tree- C,SpAbund.,Graphs	<input type="checkbox"/> DW - Volume
<input type="checkbox"/> DW - Biomass	<input type="checkbox"/> DW - Carbon	<input type="checkbox"/> Stump - Count	<input type="checkbox"/> Stump - DBH estimate	<input type="checkbox"/> Stump - D0.15	<input type="checkbox"/> Stump - Volume	<input type="checkbox"/> Stump - AG Biomass	<input type="checkbox"/> Stump - Height before felling
<input type="checkbox"/> Stump - Tree AG biomass	<input type="checkbox"/> Stump - BG Biomass	<input type="checkbox"/> Stump - Total biomass	<input type="checkbox"/> Stump - Removal volume	<input type="checkbox"/> Stump - Carbon	<input type="checkbox"/> Stump - Removal biomass	<input type="checkbox"/> Bamboo - Count	<input type="checkbox"/> Bamboo - AG Biomass
<input type="checkbox"/> Bamboo - BG Biomass	<input type="checkbox"/> Bamboo - Biomass	<input type="checkbox"/> Bamboo - Carbon	<input type="checkbox"/> Liana - Count	<input type="checkbox"/> Liana - Volume	<input type="checkbox"/> Liana - Biomass	<input type="checkbox"/> Liana - Carbon	<input type="checkbox"/> Regen - Count total
<input type="checkbox"/> Regen - Basal area	<input type="checkbox"/> Regen - Volume	<input type="checkbox"/> Regen - AG Biomass	<input type="checkbox"/> Regen - BG Biomass	<input type="checkbox"/> Regen - Biomass	<input type="checkbox"/> Regen - AG Carbon	<input type="checkbox"/> Regen - BG Carbon	<input type="checkbox"/> Regen - Carbon
<input type="checkbox"/> Plot - Count	<input type="checkbox"/> Plot - Count (Accessible)	<input type="checkbox"/> Plot - Canopy closure	<input type="checkbox"/> Plot - Basal area	<input type="checkbox"/> Plot Volume	<input type="checkbox"/> Plot - Biodiv. Sp. count	<input type="checkbox"/> Plot - Biodiv. Shannon	<input type="checkbox"/> Plot-Biod.Simpson & KML



Unsaved query (1)

Cubes: tree

Dimensions

- Administrative Unit
- Catchment
- Coverage
- Erosion
- Grazing
- Health
- Land_use
 - (All)
 - Land use
- Origin
- Ownership_type
- Plot_accessibility
- Plot_district
- Plot_region
- Soil_structure
- Soil_texture
- Stratum
- Undergrowth_type
- Vegetation_type
 - (All)
 - Vegetation

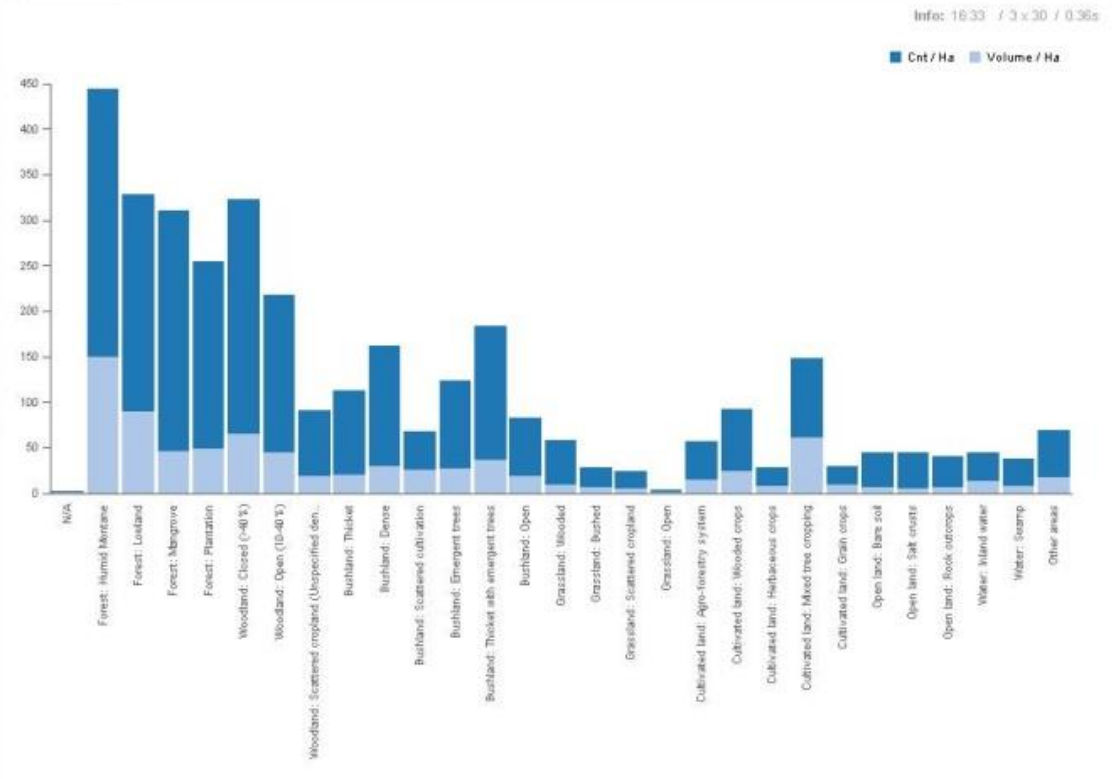
Measures

- Measures
 - Est_height
 - Volume
 - Cnt
 - Est_height / Ha
 - Volume / Ha
 - Cnt / Ha

Columns: Volume / Ha, Cnt / Ha

Rows: Vegetation

Filter:



Mode:



Export

- Bar chart
- Line chart
- Area chart
- Stacked bar chart
- Line with markers
- Area with markers
- Scatter plot
- Table
- Print

•On the advantages of Calc:

- Open-source software (no license fees)
- Excellent linkage between R and Saiku, meaning that queries can rapidly be visualized, facilitating data analysis
- Allows user to visualize how the calculations are done according to the implemented sampling design (visually links meta data to database)
- Uses R Studio, which is also open source and one of the most widely used statistical software
- Transparent. Demystifies the work behind the calculation – the user is able to see all of the metadata and the processing chains utilized
- Allows for greater institutional memory
- Workspace easily shared
- Helps user organize outputs by automatically generating a folder with all R scripts which one can then customize

On the developments to come:

- Greater automatization/streamlining of tool - with click of button user gets to R Studio
- Examples to be included on how to calculate error estimations for different sampling strategies
- Repository of workspaces will be developed to be used as templates (with standardized variable names) meaning that a country can automatically process results for most basic outputs
- .csv files will be able to be imported into Calc
- Allometric feature to be added which helps user to select the most suitable allometric equation available for a given dataset



thank you!