

Tutorial for activity data workshop

Uganda 6-10 May 2019

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## Background and context

The World Bank has provided financial support to the Ministry of Water and Environment (MWE) of Uganda for REDD+ Readiness to Support the Institutionalization of National Forest Monitoring System for REDD+ in Uganda. FAO has been selected to provide technical assistance (UTF/UGA/052/UGA) to the following:

* Updated data series to produce activity data for 2017/2018;
* Improvements made to forest reference level (i.e. estimation of emissions from forest degradation, inclusion of soil and litter pools and improved estimation of emissions due to fire);
* Strengthened institutional capacities and systems in order to institutionalize NFMS/MRV, including carrying out a pilot to explore the potential role of communities in MRV (e.g. verifying NFI and AD results).

For the remote sensing technical work, one of the key planned activities is to provide support to the National Forest Authority (NFA) GIS Unit in a deforestation and degradation assessment at the national scale. The methodology agreed upon during the workshop will provide the basis for updating activity data estimates in the FRL.

In 2018 and 2019 the NFA team, supported by FAO, working on creating an updated land cover map for 2017. In order to derive a map of forest change between 2015 and 2017, two land cover maps were compared using post-classification change detection (also referred to as map subtraction). A probability-based sample was drawn over the map classes and each sample was assigned a land cover and forest cover change class using visual interpretation of medium to very high resolution imagery.

The forest cover change assessment was done before the 2017 map was finalized and must be repeated after the finalization of the forest classes of the 2017 land cover map. It will also be necessary to determine if additional reference points will be required, and a quality control/quality assessment procedure for visual interpretation of sample data will be introduced. Discussion and analysis of the results of the forest change assessment are needed to contextualize the statistics.

In 2017, the NFA team was introduced to the breaks for additive seasonal and trend (BFAST) algorithms. BFAST, a type of time series analysis, can be used to identify changes in vegetated areas, such as forest degradation, deforestation and increases in forest cover. In 2019, the NFA team has been investigating the performance of BFAST in tropical high forests in the Albertine area. This effort will be expanded to the national level, applying the parameterization agreed upon to tropical high forest at the national scale. Additional investigation needs to be applied to woodland areas, as a first step the same parameters for tropical high forests can be applied to a small test area of woodlands. BFAST does not provide information on land cover, therefore a land cover map and/or a forest mask an essential input to constrain the analysis to only forested areas in 2015 and 2017.

The two approaches for forest change mapping, post-classification and time series analysis will be discussed and compared.

## Objectives and expected results

The main objective is to provide support to the NFA GIS Unit in creating and developing a suitable methodology for the deforestation and degradation analysis. Additionally information on the transitions between the 6 IPCC classes will be assessed. This workshop will support the generation of activity data for the updated FRL, which is envisaged to be submitted in 2020.

Expected outputs:

* Updated 2015-2017 change map from post-classification approach
* Forest change map from BFAST spatial output
* Analysis of reference data and change maps and evaluation of the results using IPCC classes
* QA/QC procedure framework for visual interpretation of sample data
* Discussion on the two approaches for change detection
* Work plan for activity data completion by August/September 2019

REQUIREMENTS  
All necessary data for the completion of this tutorial is available at <https://github.com/yfinegold/uga_activity_data>

Background information on the OpenForis initiative [www.openforis.org](http://www.openforis.org/)

You can request Access to SEPAL with the following

1/ have-open a GMAIL account (in order to access Google Earth Engine functionality)

2/ get the account registered and white listed in Google Earth Engine <https://earthengine.google.com/signup/>

3/ open an account in SEPAL <https://tinyurl.com/sepal-access>

For a swift use of SEPAL, you should also install a FTP SSH client such as FileZilla (<https://filezilla-project.org/>) on your computer to allow for upload and download of data from and to the platform.

All materials in this tutorial are linked to the individual Standard Operating Procedures (SOP) that can be found under the [docs/](https://github.com/yfinegold/uga_activity_data/tree/master/docs) section of the repository.

Workshop Activities

**Day 1**

Clone the repository

This step refers to **sop\_sepal\_terminal**

The address of the repository is <https://github.com/yfinegold/uga_activity_data>

Create a tiling system

This step refers to **sop\_sepal\_rstudio**

Run **scripts/FNF\_mask.R** to create a forest/non-forest mask from the union of the 2015 and 2017 land cover maps

Run **scripts/uga\_activity\_data/bfast\_processing/tiling\_system.R** to create a tiling system covering the areas in the country with forest cover.

Download the KML results (under the **data/bfast/tiling** folder) using RStudio by navigating to the file and checking the file with your name, clicking on More... then Export or using FileZilla (**sop\_sepal\_filezilla**)

Convert the KML into a Fusion Table

This step refers to **sop\_sepal\_fusion\_table**

**Day 2**

Download time series at national scale

This step refers to **sop\_sepal\_generate\_ts**

Use the fusion table corresponding to your name

For example: 16ADAWOJt3IsMvUq7TOFonB7PEquaQUog6OC86CTh

Use only Landsat 8

Use 01-01-2013 as start date and 01-01-2018 as end date

Use NDMI as index

Analyze the time series

Start an instance #13

Follow the steps in **sop\_sepal\_analyze\_ts**

Leave all parameters as default