UK-PACT NIGERIA

THE FOREST POSITIVES - TRAINING

SEPT. 5TH – 9TH 2022. AT CHIDA HOTEL ABUJA

TRAINING IN GOOGLE EARTH ENGINE (GEE) AND R FOR SEGREGATING COMMODITIES FROM FOREST AND OTHER LAND COVER CLASSES

CURRICULUM AND TRAINING REQUIREMENTS

Module 1 - Basics to Earth Engine and Github

Lead: Ernest Opoku Kwarteng

- Overview of GEE
- Introduction to JavaScript
- GEE objects, strings, lists, Arrays
- Interaction to GitHub interface
- Hands-on exercises

Module 2 - ImageCollections and FeatureCollections

Lead: Ernest Opoku Kwarteng

- Introduction to the concept of image and feature collections in GEE
- Filtering, reducing, mosaicking, cloud masking, clipping and working with image collections
- Accessing and displaying satellite imagery through the GEE Code Editor
- Asset management (importing and exporting data)
- Hands-on exercises

Module 3 - Basics to R studio for Satellite Image analysis and classification

Lead: George Ashiagbor

- Overview of R Studio
- Introduction to R for image analysis
- R objects, strings, lists, Arrays
- Hands-on exercises

Module 4 - Exploring Spatial Indices in GEE and R Studio

Lead: George Ashiagbor and Ernest Opoku Kwarteng

- Exploring spectral indices (NDVI, NDBI, LSWI, TC-G, TC-B, TC-W)
- Stacking spectral indices and spectral bands
- Hands-on exercise

Module 5 – Random Forest Image Classification in GEE & R-studio

Lead: George Ashiagbor and Ernest Opoku Kwarteng

- Introduction to Machine Learning and Classification in GEE and R
- Supervised classification in GEE and R
- Accuracy assessment in GEE and R
- Map generation in QGIS
- Hands-on exercise

Module 6 – Classification Scheme and Training Data collection

Lead: Yakubu Mohammed

- Introduction to classification schemes
- Harmonized classification schemes
- Collection of training data
- Field protocols for training and validation data collection
- Hands-on exercise

TRAINING REQUIREMENTS

All participants will have to: (1) Install Rstudio and selected packages, (2) Sign-up for Google Earth Engine (GEE), and (3) QGIS or any other preferred GIS software (if already available)

A) Install Rstudio and selected packages

1. Click on the link Download the RStudio IDE - RStudio to download RStudio
2. Rstudio requires R.
3. So follow the installation link to download and install the most current version, then install prior to installing Rstudio
4. Install RTools

   RTools is not an R package. It is a separate software that you need to download and install in your system (not in R) like you would do with any other software on Windows. Click on the link https://cran.rstudio.com/bin/windows/Rtools/ to install the compatible version for your Rstudio

5. Install the following packages:

   sp
   raster
   rgdal
   ggplot2
   lattice
   caret
   sf

   when required, other packages will be installed

B) Signing up for Google Earth Engine

1. You can skip this step if you already have a Google Earth Engine account.
2. Visit https://signup.earthengine.google.com/ and sign-up with your Google account. You can use your existing Gmail account to sign-up. However, it usually takes 1-2 days for approval. Hence do this step as soon as possible.

3. Kindly go through this link before you complete the sign-up form. It will help you get the right answers to some of the questions on the sign-up form to get your account approved.
4. Tips to ensure a smooth sign-up process:

    - Use the Google Chrome browser.
    - When signing up for Earth Engine, please log out of all Google accounts and ensure you are logged into only the one account that you want to be associated with Earth Engine.

C) Computer hardware and software

1. Google Earth Engine runs from an internet browser. Therefore, no specific software needs to be installed. However, for best performance, the Chrome browser is recommended. Furthermore, an internet connection is required because all work is done online.
2. Install QGIS

D) Prerequisites

1. Fundamental understanding of basic remote sensing
2. Prior understanding of the basic concepts of programming is not required but may be helpful