AFACI - Training Session

Training on National Soil Databases and Soil Property Mapping

15-19 November 2021 - Virtual (9am - 12pm | Rome GMT+2)

Project: Preparation of the Soil Atlas of Asia through the update of national soil maps and National Soil Information Systems for AFACI Countries
Project Output 2: National soil profile databases and gridded maps of soil properties and threats are produced
Activity 2.1: Regional workshop on creating/maintaining national soil databases and soil property mapping

Synopsis: The aim of this training is to support AFACI beneficiary countries in creating/maintaining their national soil databases and in soil property mapping using national soil profile databases. At the end of the training, countries will have clear requirements for their soil databases, as well as methodologies and tools for producing their national soil property maps.

The training session will focus on:

- Preparation and harmonization of soil national profile databases
- Preparation of auxiliary dataset to be used to predict selected soil properties
- Digital Soil Mapping approaches to produce national gridded maps of basic soil properties and threats
- Setting a timeline for deliverables (National Soil Profile Databases, National Gridded Soil Maps)

Registration: Registration is Required (link)

Lecturers: Ms Isabel Luotto, Mr Yi Peng, FAO UN Global Soil Partnership

Notes/Material

- **Training Material**
- **Software/Tools**
- **Slides**

Get Prepared

Participants should install the necessary software download the training data set and make their national soil profile data and site data ready (xlsx, csv, txt).

Agenda

DAY 1 (3h) - Opening, Introduction and Data Preparation

1. High-Level opening (Dr. Park Joungyoon, AFACI Senior Deputy Secretary General, AFACI Secretariat)- 15'
2. Introduction to the Global Soil Partnership (GSP) - 10'
3. Software, Tools - (R, RStudio, QGIS)- 10'
4. Introduction to Spatial Data, Basic Concepts, Data types, Handling of Spatial Data, Introduction to Digital Soil Mapping - 45'
5. R Basics: Interface, Objects, Commands, Expressions, Assignments 35'
6. Soil Profile Data Preparation: Exploratory Data Analysis; Detecting and Getting Rid of Outliers, NA Values -45'

DAY 2 (3h) - Covariate Preparation, Regression Kriging, Uncertainty

1. Environmental Covariates: selection and preparation of predictors - 45'

2. Environmental Covariates: preparing final table for modeling/mapping - 20’
3. Theory of Linear Modelling - 10’
4. Stepwise Multiple Linear Regression - 30’
5. Theory of Spatial Interpolation (Kriging) and Mapping with Regression Kriging - 45’
6. Mapping with Regression Kriging - 30’

DAY 3 (3h) – Random Forest, Map Quality Measures, Validation

1. Theory of Random Forest -45’
2. Mapping Soil Properties with Random Forest -45’
3. Map Quality Measures, Validation, Uncertainty -45’
4. Exporting, saving, styling outputs, comparison and Selection of the Final Map -45’

DAY 4 (3h) – Hands-on practice on mapping SOC (or any other soil property) using your own national data and/or mapping pH using the practice data set

Day 4 will consist of a hands-on practice day. Participants will be asked to divide into Zoom break-out rooms according to the country they represent. The participants will be asked to produce a national SOC map (or any other soil property depending on the available data) using the presented methodologies.

Participants who do not have available and/or usable data sets will be provided with a practice data set and asked to produce pH maps.

DAY 5 (3h)

1. Mapping salt-affected soils (pH, EC, ESP) - 40’
2. Setting a timeline and the modality for project deliverables (National Soil Profile Databases, National Gridded Soil Maps) - 40’
3. Preparations for the second session (Soil Organic Carbon Sequestration Modelling) - 30’
4. Closing