Proceedings of the basic training workshop on the development of soil organic carbon map using R software

Bangladesh Forest Department
28 October – 10 November 2016

UN-REDD PROGRAMME

The UN-REDD Programme, implemented by FAO, UNDP and UNEP, has two components: (i) assisting in developing countries to prepare and implement national REDD strategies and mechanisms; (ii) supporting the development of normative solutions and standardized approaches based on sound science for a REDD instrument linked with the UNFCCC. The programme helps empower countries to manage their REDD processes and will facilitate access to financial and technical assistance tailored to the specific needs of the countries.

The application of UNDP, UNEP and FAO rights-based and participatory approaches will also help ensure the rights of indigenous and forest-dwelling people are protected and the active involvement of local communities and relevant stakeholders and institutions in the design and implementation of REDD plans.

The programme is implemented through the UN Joint Programmes modalities, enabling rapid initiation of programme implementation and channelling of funds for REDD efforts, building on the in-country presence of UN agencies as a crucial support structure for countries. The UN-REDD Programme encourage coordinated and collaborative UN support to countries, thus maximizing efficiencies and effectiveness of the organizations' collective input, consistent with the "One UN" approach advocated by UN members.

The UN-REDD Bangladesh National Program is implemented by the Bangladesh Forest Department under the leadership of Ministry of Environment and Forests. United Nations Development Program (UNDP) and Food and Agriculture Organization (FAO) are the two implementing partners.

CONTACTS:

Rakibul Hassan Mukul
Project Director
UNREDD National Programme
Email: lalpiprey@gmail.com

Matieu Henry
Chief Technical Advisor
Food & Agriculture Organization of the United Nations (FAO)
Email: matieu.henry@fao.org

Suggested Citation**:** **Poultouchidou, A.** 2016. Proceedings of the basic training workshop on the development of soil organic carbon map using R software. 28 October and 10 November 2016, Dhaka, Bangladesh Forest Department, Food and Agriculture Organization of the United Nations.

.

Disclaimer

This report is designed to reflect the activities and progress related to UNJP/BGD/057/UNJ UN-REDD Bangladesh National Programme. It does not reflect the official position of the supporting international agencies including FAO and UNDP should not be used for official purposes. Should readers find any errors in the document or would like to provide comments for improving the quality they are encouraged to contact one of above contacts.

EXECUTIVE SUMMARY

The Food and Agriculture Organization of the United Nations (FAO) under the UN-REDD Programme and in collaboration with the Forest Department provided a basic short training for two days on the development of soil organic map using R software.

In total four participants (3 female and 1 male) who were staff of the GIS lab of the Bangladesh Soil and Resource Development Institute in Dhaka attended the training.

Given that the participants were not received a training on R before, the training was focused to introduce the participants to some basic functions of R which are important for the analysis of spatial data. The script which was used for the training was based on global data derived from the Harmonized World Soil Database.

CONTENTS

1. INTRODUCTION

Soil organic carbon is considered as a key indicator for soil quality and productivity and is critical for climate change mitigation and food security especially in a country like Bangladesh where the decline

in soil organic matter and soil degradation are considered common problems for the sustainable development of the agriculture sector.

The aim of this training was to introduce participants to some basic functions of R which are important for the analysis of spatial data. R is a free software for statistical computing and graphics and has an increasing number of packages for handling and analysing spatial data which allow the software to behave as a Geographical Information System. In addition, R has a number of advantages compared with more traditional GIS software. Specifically, the command line interface of R allows rapid description of workflow and reproducibility; the graphics are sophisticated and customisable which allow the user to visualize the data in a better way. Also, provides a concise and consistent method to select data, it provides a wide range of functions through additional packages that allow for better manipulation of the data and also provides an integrated processing, analysis and modelling framework.

2. OBJECTIVES

The objective of the training was to familiarize participants with some basic function of R when handling spatial data and to develop a map of soil organic carbon based on global data from the Harmonised World Soil Database using different packages of R including: maps, mapdata, maptools, rgdal, raster, sp, rgeos, ggplot2 and tmap.

3. SUMMARY OF THE TRAINING

3.1 Summary of the first day

The first part of this training was carried on 28 October 2016 and the duration was for three hours. During this training participants installed R studio on the computers of the GIS lab of SRDI and got familiar with the following functions of R:

 # rm(list=ls()): which is a function to remove all variables from the workspace
 # setwd("G:/SOC/SRDI_HWSD"): which is a function to set your working directory where your files are stored
 # getwd: which is used to return an absolute file path representing the current working directory of the R process
 # install.packages(): which is a function to install packages in R.
#library(): which is a function to load the package into R before you can use a package**.**

The following packages were installed and loaded on R during the first day of the traning:

```
library(maps)
library(mapdata)
library(maptools)
library(rgdal)
library(raster)
library(sp)
```

```
library(rgeos)
library(ggplot2)
library(tmap)
```

3.2 Summary of the second day

The second part of this training was carried out on the 10th November 2016 and the focus of this session was to train participants on how to import, read, plot spatial data on R. The participants practiced the following function of R:

#read.csv(): is a function which is used to read csv files in R

#readOGR (dsn = "", layer = ""): is a function to read shape files

#plot():is a function which is used to plot shapes data.

During the second session of the training participants were also introduced to some other basic functions of R such as on how to check data stored in a data frames using the following functions:

#names():is a function which is used to check the names of the columns of the data frame

#dim(): is a function which is used to get the dimensions (number of columns and number of rows) in a dataframe

APPENDIX 1. PARTICIPANT LIST

No.	Name	Gender	Designation	Organization
1	Dilruba Karim	F	Senior Scientific Officer	SRDI

2	Farzana Shahrin	F	Senior Scientific Officer	SRDI
3	Neelima Akter Kohinoor	F	Senior Scientific Officer	SRDI
4	Mohammed Ruhul Islam	M	Scientific Officer	SRDI