Advanced Geospatial Analytics for Resource Assessment and Resilience

1 Overview

Organization:	Yazidhi Bamutaze, Bernard Barasa & Miguel Alvarez
Trainer:	Miguel Alvarez
Assistance:	Jesse Kisembe and Daniel Kisitu
Date and time:	March 20th–24th, 2018 9:00–12:00 (classes) 14:00–17:00 (coaching)
Place:	GIS Laboratory, Meteorology Unit, 1st floor, Block A College of Computing and IT Makerere University, Kampala, Uganda

2 Description

The **R** programming language is distributed as a freeware and an open source tool which is increasingly applied in sciences for data handling and statistical analyses among other uses. Several extensions (called packages in R) have been developed for handling and analysing GIS data, representing an appealing alternative to expensive commercial software.

In this course you will learn some applications of **R** on handling and analysing **GIS** data. It will implement a quick introduction to R syntax, the work with vector data imported from ESRI shapefiles, GPX and KML files, as well as the work with raster data sets as well as export and transformation among those formats. An overview on display of data (e.g. to prepare figures for publications) will be provided, as well. Those activities will be focused on the analysis of environmental data.

3 Potential Candidates

This activity is offered for students and researchers working in geography, ecology, environmental sciences and other associated areas. Some previous experience working with R will be desiderable. The maximum number of participants will be 25.

Personal data sets and analysis projects can be discussed with the trainers during the coaching sessions.

4 Intended Schedule

20th March:	**Get Ready!** Objectives and expected outcomes Handling Resource and Resilience Data in GIS Introduction to the R syntax Common ways for importing and exporting data on R
21st March:	**Resource Data in a non-spatial World** Mathematical, logical and statistical functions Displaying results in R plots
22nd March:	**Vector Data – The Clue of Mapping** Which geometry for which information Importing and exporting spatial vectors in R Manipulation of information stored in vectors
23rd March:	**Variables over the Surface** Resources and environmental information into raster files Importing and exporting rasters in R Quantification and modelling relationships between environment, resources and resilience
24th March:	**The Very Last Session** Raster files and modelling (continuation) Summing up Course evaluation and award of certificates

5 Supporting and Partner Institutions

This activity is jointly organized by the **University of Bonn** (https://www.uni-bonn.de) in Germany and the **Makerere University** (https://www.mak.ac.ug) in Uganda, which is also hosting the course.

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6 Bibliographic References

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[2] Bivand et al. (2008). *Applied spatial datan analysis with R.* Springer. PDF Online
[3] Borcard et al. (2011). *Numerical ecology with R.* Springer.
[4] Hengl (2009). *A practical guide to geostatistical mapping.* University of Amsterdam. PDF Online
[5] Murrell (2006). *R graphics.* Chapman & Hall.
[6] Obe & Hsu (2015). *PostGIS in action.* Manning.
[7] Paradis (2005). *R for beginners.* Université Montpellier. PDF Online
[8] Pebesma & Bivand (2005). Classes and methods for spatial data in R. *R News* 5(2): 9–13.
[9] Robinson (2010). *IcebreakR.* University of Melbourne. PDF Online

[10] Venables et al. (2013). *An introduction to R.* R Development Core Team. PDF Online
[11] Verzani (2001). *SimpleR – using R for introductory statistics.* R Development Core Team. PDF Online

7 Links

R project: https://www.r-project.org

RStudio (Editor): https://www.rstudio.com/products/rstudio

R project: https://www.r-project.org

Quantum GIS: http://www.qgis.org/en/site

Google Earth: https://www.google.com/intl/en/earth

Color Chart: http://research.stowers-institute.org/efg/R/Color/Chart

R Graphic Gallery: http://research.stowers-institute.org/efg/R

R Reference Card: http://cran.r-project.org/doc/contrib/Short-refcard.pdf

R Reference Card for Data Mining: http://cran.r-project.org/. . .-data-mining.pdf