



Exploring the potential offered by legacy soil databases for ecosystem services mapping of Central African soils

Ann Verdoodt (1,3), Geert Baert (2,3), and Eric Van Ranst (3)

(1) Department of Soil Management, Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium
(Ann.Verdoodt@UGent.be), (2) Department of Applied Biosciences, Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium (Geert.Baert@UGent.be), (3) Department of Geology and Soil Science, Faculty of Sciences, Ghent University, Belgium (Eric.VanRanst@UGent.be)

Central African soil resources are characterised by a large variability, ranging from stony, shallow or sandy soils with poor life-sustaining capabilities to highly weathered soils that recycle and support large amounts of biomass. Socio-economic drivers within this largely rural region foster inappropriate land use and management, threaten soil quality and finally culminate into a declining soil productivity and increasing food insecurity. For the development of sustainable land use strategies targeting development planning and natural hazard mitigation, decision makers often rely on legacy soil maps and soil profile databases. Recent development cooperation financed projects led to the design of soil information systems for Rwanda, D.R. Congo, and (ongoing) Burundi. A major challenge is to exploit these existing soil databases and convert them into soil inference systems through an optimal combination of digital soil mapping techniques, land evaluation tools, and biogeochemical models. This presentation aims at (1) highlighting some key characteristics of typical Central African soils, (2) assessing the positional, geographic and semantic quality of the soil information systems, and (3) revealing its potential impacts on the use of these datasets for thematic mapping of soil ecosystem services (e.g. organic carbon storage, pH buffering capacity). Soil map quality is assessed considering positional and semantic quality, as well as geographic completeness. Descriptive statistics, decision tree classification and linear regression techniques are used to mine the soil profile databases. Geo-matching as well as class-matching approaches are considered when developing thematic maps. Variability in inherent as well as dynamic soil properties within the soil taxonomic units is highlighted. It is hypothesized that within-unit variation in soil properties highly affects the use and interpretation of thematic maps for ecosystem services mapping. Results will mainly be based on analyses done in Rwanda, but can be complemented with ongoing research results or prospects for Burundi.