Geophysical Research Abstracts
Vol. 14, EGU2012-30, 2012
EGU General Assembly 2012

Soil Quality Indicators to Define Land Use in the Area of Native Forest of Entre Ríos, Argentina

M. G. Wilson (1), H. A. Tasi (1), A. Paz González (2), E. L. Díaz (3), and M. C. Sasal (1)

(1) INTA EEA Paraná. Ruta 11, km 12.5. 3101, Oro Verde, Entre Rios, Argentina, (2) University of Coruña. Faculty of Sciences. A Zapateira, 15071, Coruña, Spain, (3) University of Entre Ríos. FCA. 3101, Oro Verde, Entre Ríos, Argentina

The main economic activity in the area of native forest of the province of Entre Ríos (Argentina) has long been the agricultural and/or livestock production, especially cattle breeding. In recent years, the proportion of agricultural crops in the rotations, especially that of soybean, has increased, thus leading to an increase in the need for land clearing to incorporate new lands for agricultural use. Most of these lands are considered marginal for agricultural use. In addition rice farming with irrigation is a critical part of the Entre Ríos economy. Defining and assessing soil quality indicators (SQI) that show the evolution of the soil with different uses and management systems is a way to contribute to the knowledge of soil quality. The aims of this study were to characterize the current land use and land tenure in the area of native forest of Entre Ríos, as well as to identify and select variables sensitive to agricultural and/or livestock use of the most representative soils of this area (indicators of the dynamic quality of the soil) and define the most appropriate land use according to land suitability and behavior of these indicators. We identified the most representative soil subgroups (corresponding to the orders Vertisols, Mollisols and Alfisols) and defined the production systems livestock-agricultural, agricultural-livestock, agricultural without irrigation, and rice crop irrigated with water from groundwater and surface reservoirs. We also determined the physical, physico-chemical, chemical and microbiological variables of the soil, and characterized the quality of the water for irrigation. We selected the SQI using Principal Components Analysis, to form a minimum data set (MDS). The change in the use of the land responded to a favorable economic situation for agriculture that started in the 1990's. The leasing and sharecropping schemes and the incidental contracts have become increasingly important, predominating over the undivided property. We obtained the MDS for twelve combinations of soil subgroups and production systems. The MDS for each of them presented between six and nine SQI. The indicators showed greater variation in the MDS by production system than by unit of land. Total organic carbon content (TOC) and the structural stability index (Is) were included in all the MDS. The rice systems showed high dependence on the quality of the irrigation water. We also found high fragility of some soil subgroups. The results suggest that rotations including pastures in a high proportion should be considered, especially in Alfisols and Vertisols. The native forest is considered as the basis of sustainable production systems for the study area. Thus, the land that has already been cleared or is about to be cleared should consider an agricultural and/or livestock use according to its productive capacity and its limitations.