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[C1.5-1] Validation of Soil Carbon Sequestration

Soil Organic Carbon Stocks under Pasture Atlantic Forest in Rio de Janeiro State, BrazilJoyce Monteiro^{1*}, Mauricio Coelho¹, Ademir Fontana¹, Helga Hissa², Ana Carolina Goulart³ and Marcelo Costa²¹ *Embrapa, Brazil*² *Secretary of agriculture and livestock of the state of Rio de Janeiro (SEAPEC), Brazil*³ *Federal Rural University of Rio de Janeiro (UFRRJ), Brazil*

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The replacement of forest for other uses causes important changes in the soil carbon stock and also in the global cycling of this element. The objective of this study is to perform a comparative analysis of the soil carbon stock under pasture (*Brachiaria* spp) and semideciduous broadleaf Atlantic Forest fragments. The studies areas are located in two different municipalities in the state of Rio de Janeiro in southeast Brazil. The first study area is located in the municipality of São José de Uba (21° 21' 27' S - 41° 56' 33' W) in the Northwestern of Rio de Janeiro state in the which has a hot and humid tropical climate and clearly defined seasons (Aw in the Kopen classification) in Chromic LIXISOLS. The second study area is located in the Trajano de Moraes (22°03'48'S - 42°03'59'W) in mountain regions in the which has dry subtropical climate humid with dry winters and rainy summers (Cwa in the Kopen classification) in Haplic FERRALSOLS. Data collection was carried out in January 2011 in the rainy summer season in Sao Jose de Uba area and in July 2011 in the winter dry season in the Trajano de Moraes area. Were selected contiguous and physiographical representative areas under forest and pasture. For this study in each area a number of three transects with 50 m each one were demarcated, situated at upper, middle and backslope from slope. In each transect three small trench around 1.0 m depth, 15 m distant from each other, with a total of the nine small trench in each area to quantify the carbon stock were opened. At small trench samples at depths of 0-10, 10-20, 20-30, 30-50 and 50-100 cm were collected, and carried out chemical analysis, particle size and density in order to quantify carbon stock in soils. Evaluating in terms of volume of soil (Mg ha⁻¹) and correcting the levels of carbon in the variations detected in soil density for different depths, we observed a significant difference in carbon stock with the highest values for pasture. In Sao Jose de Uba area, the soil carbon stock is 70.8 Mg ha⁻¹ under forest and 83.2 Mg ha⁻¹ under pasture. In Trajano de Moraes area the soil carbon stock is 99.10 Mg ha⁻¹ under forest and 132.83 Mg ha⁻¹ under pasture. Despite environmental differences and the time of sampling in both areas the soil carbon stock under pasture was higher than under forests. The differences observed between the results of carbon stock in forest and pasture could be related to a number of factors, including the type of natural vegetation and its successional stage, characteristics and intrinsic and extrinsic variations among soil environments, the type forage plants, time and sampling protocol. The data analysis also showed the importance of topossequence studies, since the soil attributes usually vary depending on position on the slope, and the carbon stock is no exception, reducing their value in the direction of shoulder to footslope in the both areas. It was observed that for the conditions of this study, the assessment of carbon stocks only in backslope is an economic information and technically viable, allowing the reduction of sampling density without significant damage to the quality of information.

Keywords : Land use soil, carbon stock, topossequence