

I SEMINAR ON NATURE BASED SOLUTIONS IN AGRICULTURE AND FORESTRY:

Strategies for Carbon Capture and Reduction
of GHG Emissions in Brazil



September 4th and 5th, 2023



Research Centre for
Greenhouse Gas Innovation



PROGRAMME AND BOOK OF ABSTRACTS

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EFFECTS OF LAND USE CHANGE AND MANAGEMENT PRACTICES ON SOIL CARBON STORAGE IN PASTURES

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Keywords: annual crops; integrated production system; livestock.

Impact: Improvement in the carbon accounting of production systems in Brazil that involve the change of land use from native forest to pasture, as well as the evolution of extensive pasture to an intensive integrated system or the conversion into areas for grain production.

Highlights: Conversion of natural vegetation to extensive pasture deplete soil carbon stock. Conversion of extensive pasture to cropland decrease soil carbon stock. Reversal of SOC losses occurs when good management practices are adopted.

Abstract: The land use change is identified as one of the main factors responsible for the emission of greenhouse gases in Brazil. However, mainly in the already consolidated production areas and respecting the current environmental legislation, it is possible to revert part of the carbon (C) loss by improving the productive management of crops and pastures. The objective of this research is to determine factors of loss and gain of soil C considering the natural vegetation (Atlantic Forest biome) converted into extensive pasture that can later be intensified through an integrated production system with mahogany or can be used in grain production area. The approach used was to pair areas of the same type of soil, classified as Oxisol, and different uses or management; samplings were carried out to determine the soil bulk density and the C content, for later obtaining the soil C stock in each area. Undisturbed samples for soil bulk density were collected from four pits in each area, for depths 0-5, 5-10, 10-20, 20-30, 30-40, 40-60, 60-80 and 80-100 cm; soil C content was determined for the same mentioned depths, but from composite samples collected with an auger around each pit. It is expected to determine the land use change conversion factor from natural vegetation to extensive pasture and from extensive pasture to grain crop field; in the case of intensification of production by adopting an integrated system with mahogany, it is expected to obtain the pasture management factor, changing from a system with a lower level of intensity to

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another with a higher level of intensity. These results may help future planning in the context of changing the land use and land cover, as knowledge of carbon dynamics in areas subjected to this is essential for making decisions consistent with sustainability and mitigation of greenhouse gases in livestock. This work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel – Brazil (CAPES) and the Research Center for Greenhouse Gas Innovation (RCGI).