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"Management of land use systems for enhanced food security: conflicts, controversies and resolutions"

Economic Costs of Implementation and Potential Carbon Sequestration of Agrosilvopastoral Systems in the Brazilian Cerrado

Carl-Friedrich Gaese[1], Davi Jose Bungenstab[2], Aziz Galvao[3], Mariana Pereira[4], Roberto G. Almeida[2], Andre Dominghetti Ferreira[2], Flavia Araujo Matos[5], Joao Ajonas[3]

[1] *Cologne University of Applied Sciences, Technology and Resource Management in the Topics and Subtropics, Germany*

[2] *EMBRAPA Beef Cattle, Integrated Production Systems, Brazil*

[3] *University of Viçosa, Economics, Brazil*

[4] *Federal University of Mato Grosso do Sul, Animal Science, Brazil*

[5] *Universidade Federal da Grande Dourados, Agronomic Sciences, Brazil*

Abstract

Mato Grosso do Sul State in Brazil had a major agricultural expansion in the 70's, with sown pastures displacing local Savannah (Cerrado Biome) for cattle grazing and soybeans. Currently, pastures show severe signs of degradation, with expensive reclamation alternatives, sometimes reaching over 20 % of land price. This leaves farmers stagnated, leading to further degradation and environmental losses. Recent studies show increased demand for biofuels, wood and grains, displacing cattle ranching to more vulnerable areas, like the Pantanal wetlands and Amazon. Therefore, alternatives for improving farm profitability could help to prevent herd displacement, while improving environmental conditions. Agrosilvopastoral systems show to be a promising alternative for these fragile poor soils areas of the Cerrado and farmers have been showing interest on such systems. However, there is a lack on specific information, especially regarding economic and environmental aspects, for a safe decision-making, what evidently prevents farmers from adopting these technologies. Important aspects are the correlation between the scale of farms (small and large sector) and the labour costs in the different production systems, particularly regarding to agrosilvopastoral systems. A question is therefore raised, if agrosilvopastoral land use systems are feasible also for small farms with higher availability of labour. The proposed work, based on results from literature, running experiments and local farms, will compare different agrosilvopastoral systems in regards to costs of implementation, potential for beef production, profitability, greenhouse gases emissions and carbon sequestration on trees. Systems studied are based on eucalyptus trees, beef cattle and palisadegrass, with or without integrated grain crops. Scientific question is which combination of tree densities, which in their turn influence cattle stocking rates, allow the best economic results and the best additional carbon sequestration potential on trees per area. Preliminary results show that higher tree densities increase initial costs and reduce cattle stocking rates but increase the gross revenue in the total period, therefore purpose of wood production seem to have strong influence on final results.

Keywords: Agrosilvopastoral systems, decision-making, economics, environment

Contact Address: Davi Jose Bungenstab, EMBRAPA Beef Cattle, Integrated Production Systems, Av Radio Maria 830, 79106550 Campo Grande, Brazil, e-mail: davi.bungenstab@embrapa.br