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“Bridging the gap between increasing knowledge and decreasing resources”

An Agro-Silvo-Pastoral Production System in Brazil

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Abstract

Extensive beef production with grazing cattle kept exclusively on sown pasture is one of the main economic activities in Central-Brazil. Poorly managed systems, besides the evident inefficient use of local natural resources, lead to environmental degradation. Alternatives for recovering such areas are being developed, among them, some complex integrated production systems. EMBRAPA beef cattle leads technology research for beef cattle husbandry in Brazil, for such, a 12 years agro-silvo-pastoral experiment was implemented in 2009 to identify the most appropriate combinations of species and cultivars, tree densities and stocking rates, as well as cultivation techniques for local conditions. An 18 ha trial combining *Brachiaria* pastures with Eucalyptus trees (227 trees per ha) having soybeans cultivation periodically to improve pastures was implemented at EMBRAPA beef cattle experimental station in Campo Grande-MS, Brazil. Preliminary results available from the on-going experiment show that the system is able to keep stocking rates above average of previous traditional pastures (1.3 versus 0.8 AU ha⁻¹). Forage availability and quality is above regional averages, reaching 4.964 kg DM ha⁻¹ and crude protein content of 8.97%, also above regional averages, resulting in cattle live-weight gains of 172 kg ha⁻¹ year⁻¹ against regional averages of 70 kg ha⁻¹ year⁻¹. Grain crop production between months 38 to 42 using no-tillage seeding over *Brachiaria* grass between tree rows resulted in soybean yields of 2880 kg ha⁻¹, which are close to regional averages (3200 kg*ha⁻¹). Forest production results showed DBH of 16 cm and 38 m³ ha⁻¹ at month 36. Estimated carbon storage by the system for the same period was 40 metric tons of CO₂ equivalents per ha.

These results show that despite being more complex and therefore not applicable to all situations as a general solution for improving sustainability of cattle husbandry in Central-Brazil, agro-silvo-pastoral systems, when properly implemented and well managed, can result in beef production yields high above regional averages while generating extra incomes for farmers through cash crops and forestry.

Keywords: Beef cattle, *Brachiaria*, Eucalyptus, integrated systems, soy bean