Economic analysis of silvopastoral systems eligible for the Carbon Neutral Brazilian Beef protocol [(1)]

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Economic analyses of two silvopastoral systems eligible for the Carbon Neutral Brazilian Beef (CNBB) protocol and one typical monoculture sown pasture (PM) were undertaken. Experiments were established in the Brazilian Savanna (Quartzarenic Neossol) in 2015. The trees (Eucalyptus urograndis) arrangements were 28x2 m (single lines) with 178 trees/ha (SP-178) and 28x2x3 m (triple lines) with 441 trees/ha (SP-441). Charcoal and timber production estimates were 16.5 and 65.9 m^3, respectively, for SP-178, and 62.6 and 75.1 m^3 for SP-441. Rearing Nellore steers were fattened on Urochloa brizantha (BRS Piatã) between rows. Fertilization with 20-00-20 occurred every four years (cycles), resulting in decreasing beef production throughout cycles, with an annual average of 241, 223 and 291 kg of live weight for SP-178, SP-441 and PM, respectively. Investment analysis based on a 12-year cash-flow was undertaken, using 2018 average prices, experimental and estimated data. SP-441 was economically better than SP-178, which, in turn, was better than PM. The net present value (US$) and the payback period (years) were 1,062 and 11.3, 1,126 and 11.3, and 632 and 5.7 for SP-178, SP-441 and PM, respectively. CO2eq estimated balance was positive for SPs systems, but negative for PM, with accumulated CO2eq sequestrations by the trunk of 6.5 and 2.8 t ha^{-1} $year^{-1}$ for SP-441 and SP-178, respectively, over four years. Combined economic-environmental analysis suggests both SP systems are eligible for CNBB. SP-441 showed higher potential for CNBB than SP-178, but the latter might be more appealing for beef farmers and should be further investigated.

Index Terms: economic viability; Eucalyptus urograndis; integrated farming systems; low carbon livestock

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