Agrosilvopastoral systems in the Cerrado: adequate management increases soil carbon stocks over time of adoption

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Abstract

Agrosilvopastoral systems have been recognized as promising strategies for increasing soil carbon (C) stocks. This study integrated assessments of the effects of management on soil C stocks in continuous pasture systems and different agroforestry arrangements in the Brazilian Cerrado, located in the municipalities of Sete Lagoas, Curvelo, and Francisco Sá. In Sete Lagoas, where systems were properly managed, the highest carbon stocks were observed in well-managed pasture (235.98 Mg ha^{-1}, 0–100 cm) and in agrosilvopastoral system (SASP), with values reaching 225.55 Mg ha^{-1} in the 13-year-old SASP. The 11- and 9-year-old SASP showed carbon stocks close to or higher than those of native vegetation (199.64 Mg ha^{-1}) and higher than the agropastoral system (167.87 Mg ha^{-1}), indicating that proper grass and eucalyptus management promoted carbon accumulation throughout the soil profile. In contrast, in Curvelo, carbon stocks in the SASP (122.6 Mg ha^{-1}, 0–100 cm) did not differ from those in nominal pasture (111.8 Mg ha^{-1}), indicating no increase in soil C due to inadequate management of forages and trees. A similar pattern was observed in Francisco Sá, where the SASP presented 89.9 Mg ha^{-1} (0–50 cm), a value statistically similar to nominal pasture (92.4 Mg ha^{-1}) and lower than native vegetation (115.4 Mg ha^{-1}). It is concluded that integrated agricultural production systems are promising for increasing soil carbon stocks over time in the Cerrado, provided they are properly managed at all stages and across all system components, including crops, forages, and trees.

Programme

10:30 to 11:00 on 05/27/2026
COMMON AREA
(https://eventos.galoa.com.br/som-2026/calendar/activity/21216)

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