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Silvopastoral systems in Brazil's Cerrado: Motivations and abilities of farmers

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Abstract

The Cerrado is one of the world's most biodiverse ecosystems and an important agricultural frontier. Rapid agrarian transformation, driven by agricultural intensification and expansion, has reinforced its role in global food production while simultaneously generating environmental and socio-economic challenges, which put the Cerrado under increasing pressure. In this context, sustainable food systems offer pathways to address environmental issues while supporting food security and rural incomes. One such approach are silvopastoral systems (SPS), a traditional land use practice in the Cerrado.

We collected data from 204 households in two rural regions in the Cerrado, Rio Pardo and Urucuia. Through the MOTA (Motivation and Ability) framework, we quantified farmers' motivations and abilities to use SPS. We separated the analysis across regions, SPS adoption status, and farm sizes. The results show that farm size is the main factor influencing ability: smallholders have lower levels of ability, especially in terms of income, knowledge, and machinery. Regional differences are also evident, with lower income and knowledge levels in Rio Pardo, and lower access to machinery, workforce, and external funding in Urucuia/Arinos. When separating SPS adopters and non-adopters, motivation shows as the key difference between the groups. These findings suggest that promoting SPS should focus on strengthening motivation and shaping farmers' perceptions, rather than solely capacity building. At the same time, ability differences reflect underlying structural inequalities, indicating that socially just SPS promotion must address both motivation and ability.

The MOTA framework proved valuable for comparing different farmer groups and identifying the central role of motivation in shaping SPS adoption. Building on this, further research could explore the underlying perceptions and decision-making processes that shape farmers' motivations.

Keywords: Agrarian transformation, agroforestry, Cerrado, ecosystem services, MOTA, motivation and abilities, silvopastotal systems

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