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"Filling gaps and removing traps
for sustainable resource management"

# Macaw Palm Mixed Cropping – What Are Suitable Cropping Options?

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**Abstract**

Macaw palm (*Acrocomia sp.*) is an oil-bearing palm that gained a lot of interest in recent years due to its excellent bio-economic potential. Macaw palm has various traditional uses for food, animal feed, fibre and medicine. It is not competing with rainforest and fertile land and therefore a sustainable alternative to the African oil palm (*Elaeis guineensis*). The oils from the fruit pulp and kernel increased the importance of macaw palm because of their high nutritive value but also as source of biofuels. Macaw palm grows under a wide range of climatic conditions, from subtropical to tropical regions. It has a great potential for integration into silvopastoral and agrosilvocultural systems.

The aim of this study was to investigate (i) if macaw palm is suitable for integration into agroforestry and/or silvopastoral systems (ii) which spacing of the palm trees guarantees the best light conditions for such systems. Microclimate and photosynthetic active radiation (PAR) interception of *A. aculeata* were measured in three systems (alley cropped with coffee, a silvopastoral system and a sole stand) in the Zona de Mata region of Minas Gerais, Brazil.

Isotope discrimination was used as an indicator for water stress. The measured $\delta^{13}$C values of coffee under shade trees or macaw palms were around the usual 28‰ for C3 plants, but under full sun, coffee's $\delta^{13}$C ranged between 26 and 27‰, indicating slight water stress. Air temperature, relative humidity and soil temperature fluctuations were lower in the intercropped plots than in the full sun coffee plots. The maximum PAR increased with spacing from 540 to 1333 $\mu$mol m$^{-2}$s$^{-1}$ in the 5 m by 4 m and 7 m by 4 m plot, respectively, allowing to grow other crops in between.

Macaw palm coffee intercropping and macaw palm silvopastoral systems can be considered a viable mitigation option for regions with climate change impact as it provides a prolonged harvesting window and a more diversified income for farmers. By integrating macaw palm lots into pastures, C4 grasses can establish between and shade areas for cattle are provided - a win-win situation for cattle raising without compromising macaw palm growth.

**Keywords:** Bioeconomy, climate change mitigation, surrogate for palm oil

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