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Understanding novel value chains and webs of the macauba palm, an alternative oil crop in Brazil

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Abstract

The macauba palm (Acrocomia aculeata) is being introduced in Brazil as a new perennial crop for the production of oils and biobased materials for the bioeconomy. Technical advancements for the cultivation and processing and the implementation by business organisations are fostering a rapid formation of value chains. This work provides a panorama of the current developments of macauba value chains and webs in Brazil. We applied a value chain and web design framework to characterise key design variables – biomass production, processing, products and markets – and identified value chain typologies. In our analysis, key stakeholders participating in macauba value chains were identified, allowing for the understanding of actors' relationships and development strategies. A set of attributes of value chain design variables were found. At primary production, we identified out-grower schemes for the cultivation of macauba in smallholders' farms and large-scale plantation as main cultivation strategies. Cropping systems are being oriented to silvopastoral systems on smallholders' farms, while monoculture systems at large-scale are being initially piloted. At processing level, a variety of pre-treatment and processing pathways are being investigated, tailored to the characteristics of acrocomia fruits and ranging from post-harvest processes and oil extraction to fractionation and by-product valorisation. Technologies differ in their scale, readiness and complexity. At the product and market levels, we found that the use of acrocomia oils, fruit fractions and compounds for novel products is oriented to a variety of biobased sectors, encompassing food, chemistry and bioenergy, both in national and international markets. In addition, carbon sequestration is also integrated in business models. Based on the characterised design variables, two main typologies are identified for emerging macauba value chains: decentralised value chains that integrate smallholder farmers, cultivate through agroforestry systems, process low fruit volumes and target of specialty products and centralised value chains that cultivate and process at large scale in sole-cropping systems and produce commodities. In addition, traditional macauba value chains that use fruits from wild stands for food and cosmetic products reach local markets. Understanding value chains, their challenges and opportunities can help to steer macauba value chains in a sustainable direction.

Keywords: Agroforestry, biodiversity, bioeconomy, novel crops, palms, perennial crops, value chain, value web, vegetable oil

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