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## Cracking the Brazil Nut Puzzle : Can Nut Gathering and Timber Harvesting Coexist ?

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### Abstract

Non-timber forest products (NTFPs) can provide a livelihood for forest communities in the tropics. Yet, forests are becoming more accessible to logging companies. Thus, it is vital to develop forest management practices that do not jeopardise NTFPs. Brazil nut, *Bertholletia excelsa*, is an important species, due to its high market value, and the need for the near intact forest for production. We aimed to evaluate which forest management practices might promote brazil nut production, which might lead to declines and thus to develop best practice guidelines. We conducted a systematic review in 2019 to capture publications detailing factors that influence brazil nut yield per tree and assess how forestry practices could improve timber production without compromising current nut yield levels. We also sought to assess how the social and policy contexts influence practices. Both endogenous and exogenous factors impacted brazil nut yield per tree. The main yield influencing factors such as size, crown position, liana load, yearly variation, genetics, climate, soil, and pollination, were well researched. Tree size was the most important endogenous factor with trees exceeding 40 cm diameter at breast height (DBH) factor being productive in 98 % of cases whereas smaller trees were rarely productive. However, at DBH exceeding 100 cm, crown-size was the more important trait determining productivity. An emergent rather than a suppressed crown was an essential criterion for productivity. Higher productivity was achieved on soils with higher cation exchange capacities. Liana cutting greatly increased yield. Shifting cultivation improved yield compared to in logging gaps, given increased light and nutrient availability. Although coexistence appears feasible in theory, in practice institutional barriers such as overlapping land tenure and lack of transparency have prevented the sensible integration of the two livelihood strategies on the same plot to date.

**Keywords:** Brazil nut, multiple forest uses, NTFP, Para nut, reduced-impact logging