

Is the *Acrocomia* palm an option for degraded lands in smallholder' farms?

A cost-benefit analysis

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Introduction:

- Global vegetable oil production has nearly quadrupled in the last 30 years (1990: 57.7 Mt; 2022: 212 Mt).
- The high dependance on specific crops for vegetable oil production, like the African oil palm *Elaeis guineensis*, and the environmental impact generated indicate the need to diversify vegetable oils through more sustainable alternatives. Only in 2022, African oil palm contributed to roughly 37% of world vegetable oil production (78.87 Mt).
- Novel-crops, such as *Acrocomia* can pose an alternative as oil bearing crop in Latin America, while providing environmental benefits.
- There are currently private initiatives fostering acrocomia cultivation in Brazil, through strategies such as outgrower schemes with small-holder farmers. Around 470 hectares in the region of Minas Gerais, Brazil.

Research questions:

- Is it a valuable diversification strategy for small-scale farmers? What are their incentives towards its adoption? What are critical factors to enable its economic viability?

Results:

- *Acrocomia* cultivation in 1ha of degraded pasture land over a 20-year project period yields a NPV of USD \$889.30.
- Sensitivity analysis shows that the outgrower scheme is viable with discount rates up to 7%.
- NPV is robust to yield fluctuations of up to 15%.
- A Monte Carlo simulation, incorporating randomized variables such as yield, discount rate, and the ratio of usable grassland, indicates an average NPV of USD \$743.77.
- Income diversification and conservationism are main drivers for farmers to engage in acrocomia cultivation.



Figure 1. a) Acrocomia plantation, b) Acrocomia plantation, c) Small-scale farmer interview.

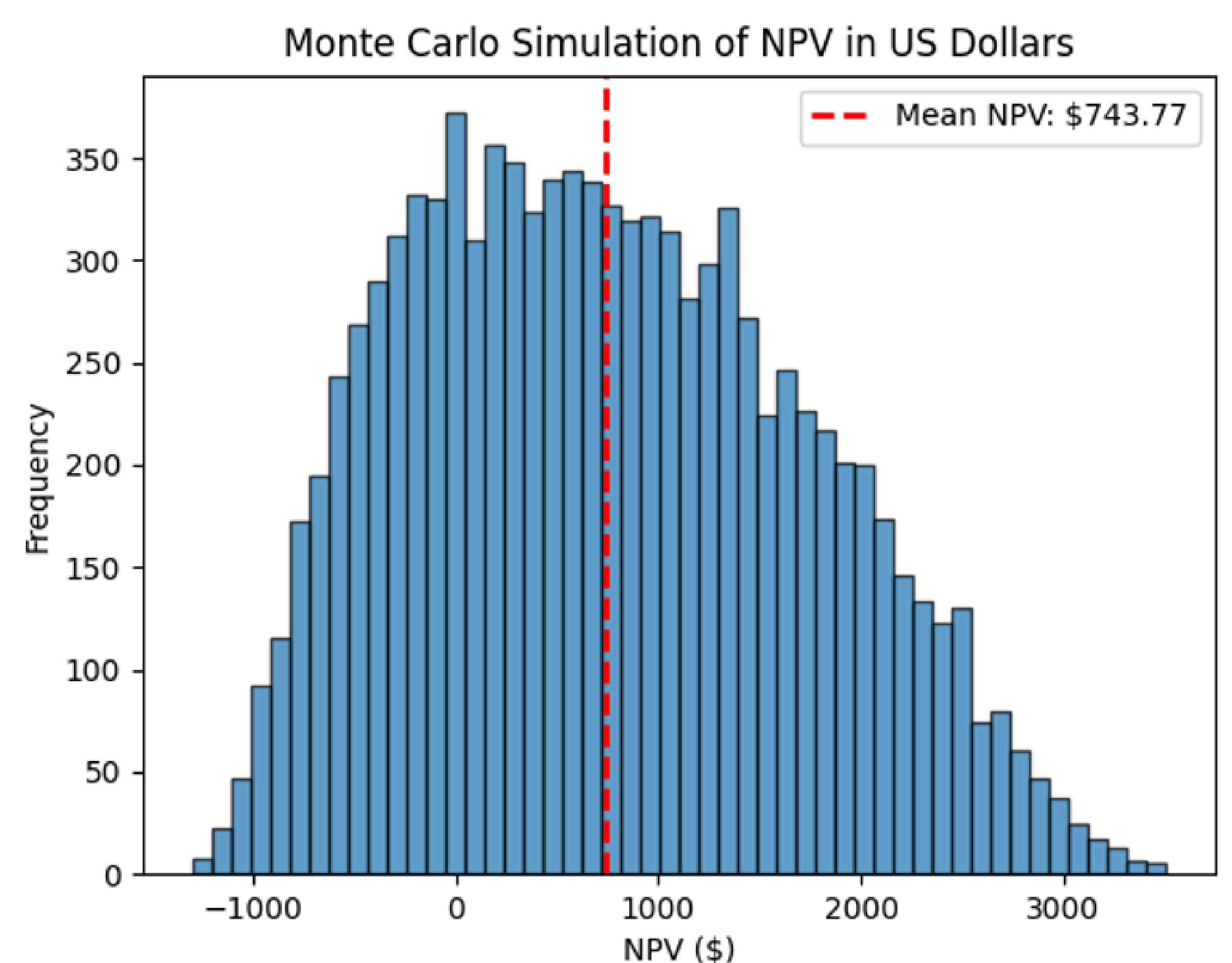


Figure 2. Monte Carlo simulation of the acrocomia implementation randomizing yield, discount rate, and ratio of degraded pasture available per hectare.

Materials and Methods:

- A socioeconomic study conducted in the region of Patos de Minas, Minas Gerais, Brazil with 14 small-scale farmers (i.e. dairy, livestock) engaging in an outgrower acrocomia cultivation scheme.
- In practice, farmers provide inputs such as land and labor with an acrocomia cultivation company, which in exchange provides the seedlings, land preparation, and inputs for plant maintenance.
- The contractual agreement has a duration of 20 years, in which the harvest is divided equally, 50% is delivered to the company in kind, and the remaining 50% is sold to the company at market price.
- *Acrocomia* is planted on degraded land.
- Field visits, semi-structured interviews, and questionnaires were employed for data collection, while secondary data sources were retrieved to provide additional support.
- A cost benefit analysis, as well as a Monte Carlo simulation rounded up the study.
- The study design assessed the profitability of implementing acrocomia with small-scale farmers, using a base scenario of one hectare of degraded land.

Conclusions:

- *Acrocomia* represents a promising diversification strategy for small-scale farmers already engaged in agricultural activities such as livestock breeding and dairy production. During the productive stage, after around year 6 of implantation, it can generate an additional income of approximately USD \$590 per hectare.
- The combination with livestock is particularly beneficial, as the palms provide both shelter and fodder for the cattle. However, the management requirements during the first five years of palm establishment may pose challenges.
- Its current acceptance is partly driven by farmers' conservation-oriented values and their commitment to preserving the land for future generations, as reflected in interview responses.
- However, in order to guarantee its profitability and long-term success, critical factors such as access to labor during harvest and a standardized fruit selling price are essential for ensuring economic viability.

Find out more about the project at:
www.acroalliance.info



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