



ECONOMIC FEASIBILITY OF IMPLEMENTING HYBRID OIL PALM IN THE REGION OF MOJU-PA

VIABILIDADE ECONÔMICA PARA IMPLANTAÇÃO DE DENDEZEIRO HÍBRIDO NA REGIÃO DE MOJU-PA

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ABSTRACT

The objective of the present study was to analyze the economic feasibility of implementing interspecific hybrid oil palm (OxG) with assisted pollination on a 50-hectare property in the municipality of Moju-PA, Brazil. The study was divided into six stages. The first stage defined the project scope, followed by the second stage, in which project-related expenditures (cash outflows) were identified. In the third stage, revenues (cash inflows) were estimated. After identifying cash inflows and outflows, the fourth stage consisted of preparing the cash flow statement. In the fifth stage, the economic feasibility indicators were calculated for three distinct scenarios. Finally, in the sixth stage, the conclusions of the economic feasibility study were presented. The results of the study provide estimated values for expenditures (cash outflows), revenues (cash inflows), and the complete cash flow over a 30-year period (crop development cycle). In addition, the feasibility indicators were presented for each projected scenario. The oil palm implementation project in the region of Moju-PA was analyzed under three distinct economic scenarios (optimistic, intermediate, and pessimistic) proving to be feasible in the first two and unfeasible in the

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latter. The lack of historical data related to the crop, in order to better understand its market and production volatility, was identified as the main limitation of the study, making it difficult to develop more robust projections.

Keywords: Agribusiness; Investment; Oil palm.

RESUMO

O objetivo do presente estudo foi analisar a viabilidade econômica para implantação de dendezeiro híbrido interespecífico OxG, com polinização assistida, em uma propriedade de 50 hectares no município de Moju-PA. O presente estudo foi dividido em seis etapas. A primeira etapa foi responsável por definir o escopo do projeto, seguido pela segunda etapa, em que foi feito o levantamento dos gastos (saídas financeiras) relacionadas ao projeto. Na terceira etapa foi feito o levantamento das receitas (entradas financeiras). Após o levantamento de entradas e saídas financeiras, foi possível na quarta etapa elaborar o fluxo de caixa. Na quinta etapa foram calculados os indicadores econômicos de viabilidade do projeto para três cenários distintos. Por fim, na sexta etapa foi realizada a conclusão do estudo de viabilidade econômica. Os resultados do estudo apresentam os valores estimados para gastos (saídas financeiras), receitas (entradas financeiras) e o fluxo de caixa completo durante 30 anos (período de desenvolvimento da cultura). Além disso, também foram apresentados os resultados dos indicadores de viabilidade para cada cenário projetado. O projeto de implantação de dendezeiro na região de Moju-PA foi analisado em três cenários econômicos distintos, otimista, intermediário e pessimista, mostrando-se viável nos dois primeiros e inviável no último. A ausência de dados históricos relacionados a cultura, como forma de melhor compreender sua volatilidade de mercado e de produção, se demonstrou como principal limitação do estudo, dificultando o processo de projeções mais robustas.

Palavras-chave: Agronegócio; Investimento; Palma de óleo.

INTRODUCTION

The oil palm is a plant of African origin that has been used since ancient times as a source of food and energy. In the 1970s, its cultivation spread to Asia, mainly to Indonesia, Malaysia, and Thailand, which are the world's largest producers of palm oil, a product extracted from the fruit of this oilseed crop. According to the United States Department of Agriculture (USDA, 2025), these three countries account for 87% of global palm oil production, also known as dendê oil.





Brazil has great potential for expanding oil palm cultivation due to its climatic conditions, especially in the Amazon region and, to a lesser extent, in southern Bahia. According to estimates by the Brazilian Association of Palm Oil Producers (ABRAPALMA, 2018), the country has a planted area of 236 thousand hectares, with the State of Pará leading at 207 thousand hectares, representing approximately 88% of all plantations cultivated in the country.

In the State of Pará, although it is the largest palm oil producer in Brazil, the crop faced significant challenges before becoming established. Oil palm was introduced in Pará in the late 1940s, where it suffered from a disease known as fatal yellowing, which was very severe in the northeastern region of the state and devastated plantations in 1974. However, studies conducted by researcher George O'Neill Addison of the Agronomic Institute of the North (IAN), through the crossbreeding of two species (one originating from Africa (*Elaeis guineensis*) and another of Amazonian origin known as caiaué (*Elaeis oleifera*)) resulted in the interspecific hybrid HIE OxG, which emerged as a solution to the disease. According to Homma et al. (2017), this hybrid is more resistant to fatal yellowing.

Global demand for vegetable oil is expected to increase in the coming years, with estimates reaching 240 million tons by 2050 for food consumption alone (Corley, 2009). The current model of palm oil production expansion, particularly in the northern region of Brazil, may not be sufficient to meet future demand (Bentes & Homma, 2016). The Brazilian government offers various credit lines to encourage farmers interested in investing in oil palm plantation projects.

The most commonly used credit line by investors in this crop is Pronaf Eco Dendê (Banco do Brasil, 2025). Given the high global demand for palm oil extracted from oil palm fruit, many investors, including smallholders, have decided to invest in this crop. The costs of implementing an oil palm plantation project are significant and are only amortized between 7 and 9 years after establishment, naturally depending on input prices and the price of fresh fruit bunches (Santos et al., 2016).





As a perennial plant, the hybrid oil palm produces throughout the year, generating revenue over its productive lifespan, which is estimated at 30 to 35 years. According to Barcelos et al. (1987), among oilseed crops, oil palm has the highest productivity, reaching up to 7 t/ha of palm oil in major producing regions, provided that all required crop management practices are properly followed. This characteristic gives it significant economic and social importance in the regions where it is cultivated.

For the interspecific hybrid oil palm to achieve high productivity, it requires a production system recommended by Gomes Junior (2010), which includes proper phytosanitary management (integrated control of insects, pests, diseases, and weeds). It also requires a large supply of nutrients for soil fertilization and plant nutrition, as well as appropriate planting locations that comply with oil palm zoning studies (Ramalho Filho et al., 2010) and fatal yellowing zoning (Venturieri, 2012).

The interspecific oil palm also requires cultural practices (pruning, lowering, and crown cleaning) in accordance with the plant's growth cycles. Assisted pollination is essential for fruit development, and harvesting must occur at appropriate intervals according to seasonal patterns. According to Cunha and Lopes (2010), the cultivar yields 25 to 30 t ha⁻¹ year⁻¹ when assisted pollination or proper stimulation is performed, and less than 10 t ha⁻¹ year⁻¹ when assisted pollination or stimulation is not carried out.

Considering that the hybrid oil palm is highly resistant to fatal yellowing and begins producing fruit after 30 months (generating revenue year-round for approximately 30 to 35 years) the cultivation of the hybrid species appears to be advantageous. In light of this context, the objective of the present study was to analyze the economic feasibility of implementing interspecific hybrid OxG oil palm, with assisted pollination, on a 50-hectare property in the municipality of Moju, Pará, Brazil.

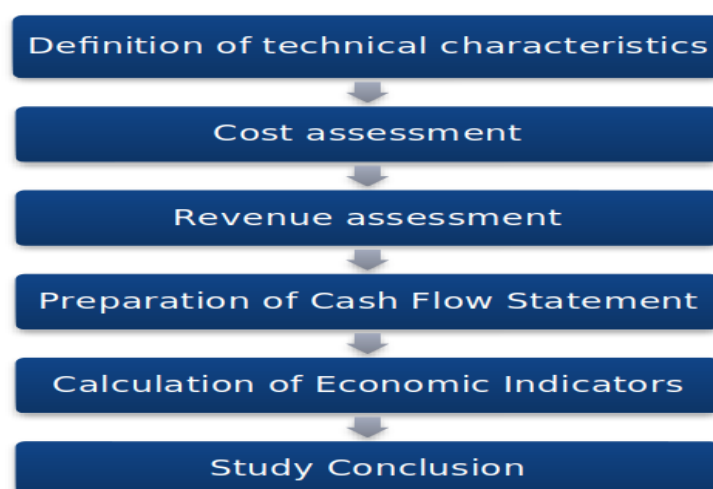




Materials and Methods

The present study was divided into six stages. The first stage was responsible for defining the project scope, followed by the second stage, in which the project-related expenses (cash outflows) were identified. In the third stage, revenues (cash inflows) were estimated. After identifying the financial inflows and outflows, it was possible, in the fourth stage, to prepare the cash flow. In the fifth stage, the economic feasibility indicators of the project were calculated for three distinct scenarios (pessimistic, intermediate, and optimistic). Finally, in the sixth stage, the conclusions of the economic feasibility study were presented. Figure 1 illustrates the sequence of stages in the development of this study.

Figure 1. Stages of study development



Source: Original research data

In the first stage, all items necessary for project implementation were identified. The investment project was defined for a thirty-year period, based on the crop's useful life. The data collection period for this study ranged from August to November 2023. During this



period, tax-exempt fixed-income investments yielded approximately 5% per year + IPCA (Brazilian inflation index). In defining the project scope, a Minimum Attractiveness Rate (MAR) of 6% per year was adopted. This value was defined based on long-term investments in the oil palm sector. Additionally, it is important to note that this MAR is real, not nominal. For this study, it was assumed that 100% of the investment capital was equity.

In the second stage, all project-related expenditures were identified, including: investments, fixed costs, variable costs, and expenses. All these costs were estimated based on prevailing prices in the region where the project would be implemented. In the third stage, revenue was estimated based on the purchase prices of Fresh Fruit Bunches (FFB) practiced by companies in the region that commercialize the product. This product generates palm oil, which is sold in domestic and international markets and serves as the basis for FFB pricing.

In the fourth stage, the cash flow was prepared for a 30-year period. During this period, all estimated project expenses (investments, costs, and expenses) and projected revenues were considered. This study calculated gross profit, net profit (after deducting applicable taxes, especially Personal Income Tax – IRPF), the final value of each year's cash flow (future value), accumulated cash flow, discounted cash flow, and accumulated discounted cash flow. The economic feasibility indicators used in this study were: Net Present Value (NPV); Internal Rate of Return (IRR); and Payback (simple and discounted). The calculation formulas for each indicator are presented below:

Net Present Value (NPV):

$$NPV = \sum_{t=0}^n \frac{FC_t}{(1+i)^t}$$

Where: NPV = Net Present Value; n = Project Analysis Period; t = Period; CF = Cash Flow; i = Minimum Attractive Rate of Return (MARR).





Internal Rate of Return (IRR):

$$\sum_{t=0}^n \frac{FC_t}{(1+i)^t} = 0$$

Where: n = Project Analysis Period; t = Period; CF = Cash Flow; i = Minimum Attractive Rate of Return (MARR).

Simple Payback Period:

$$\text{Payback} = \frac{\text{Initial Investment}}{\text{Gain per Period}}$$

Discounted Payback Period

$$DPB = \text{Period before full recovery} + \frac{\text{Unrecovered cost at the beginning of the year}}{CF}$$

Where: PB = Payback Period; CF = Cash Flow.

The indicators presented above were analyzed in this study under three economic scenarios (pessimistic, intermediate, and optimistic), considering variations in price and crop productivity. In the sixth and final stage, the results of the main economic indicators (NPV, IRR, Simple Payback Period, and Discounted Payback Period) were analyzed in order to assess whether they are favorable for carrying out the investment.

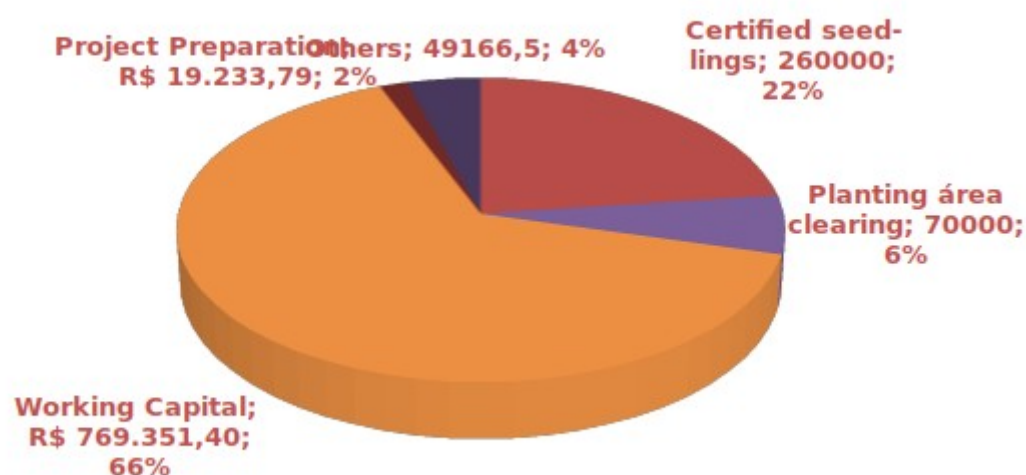




Results and Discussion

In this section, all results and information obtained during the development of the project are presented. Initially, the factors related to the project scope are described, followed by the presentation of investment items, costs, expenses, and revenues. Subsequently, the cash flows for the different projected economic scenarios are presented. Finally, the values obtained for the economic feasibility indicators for each scenario are discussed. In Figure 2, the distribution of the investment item values considered for this project can be observed.

Figure 2. Project Investments



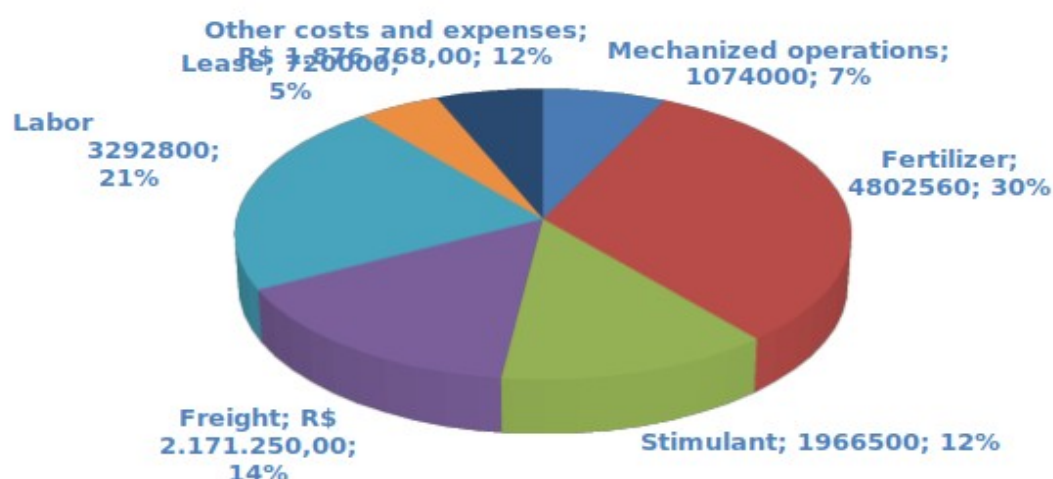
Source: Original research results

It can be observed that the largest investment item is working capital, which represents 65% of the total, due to the sum of the annual contributions required to maintain the plantation for three years without revenue generation. This occurs because oil palm cultivation only begins to produce in the third year after planting. In second place are the seedlings, which account for 23% of the investments, followed by land clearing, representing 6%, and finally other investments, which account for 4% of the total amount. The most



significant cost during the oil palm crop management period is fertilizers, which represent 32% of the total costs considered for the project. Next is the labor cost, which accounts for 22% of the total. Another significant cost is freight for delivering the production to the processing industry, representing 15% of total costs. The cost of stimulants accounts for 13%, and mechanized operations for cleaning and fruit harvesting represent 7%. The remaining costs are land leasing (6%) and other items (5%), which are less significant. In Figure 3, the costs and expenses involved in the oil palm implementation project and their respective absolute values can be observed.

Figure 3. Project Costs and Expenses



Source: Original research results

The project's revenue originates from a single source: the sale of oil palm fruit to local processing industries. For the sale of production and the consequent generation of revenue, three scenarios were simulated, taking into account price and annual production levels. Based



on price and production expectations, three cash flows were developed for a 30-year period, one for each production and price scenario, as shown in Tables 2, 3, and 4 in the Appendix.

The project's revenue derives from a single source: the sale of oil palm fruit to local processing industries. To estimate production sales and the resulting revenue generation, three scenarios were simulated, taking into account variations in price and annual yield. Based on the projected price and production levels, three cash flow statements were developed for a 30-year period, one for each production and price scenario, as presented in Tables 2, 3, and 4 in the Appendix.

The prices of oil palm fresh fruit bunches (FFB) are set in the market by the local industries that purchase the fruit. These prices are communicated monthly to producers and are typically calculated based on the average price per ton of palm oil quoted on the Rotterdam exchange, multiplied by the average U.S. dollar exchange rate of the previous month and by a pricing index ranging between 10% and 12% (Grupo BBF, 2023). The estimated production for the three scenarios was obtained from companies in the region, following criteria that involve weather conditions, fertilization, and crop management practices. The total revenue generated from product sales under the three proposed scenarios was calculated by multiplying the annual production quantity by the average annual selling price (since the product price varies monthly).

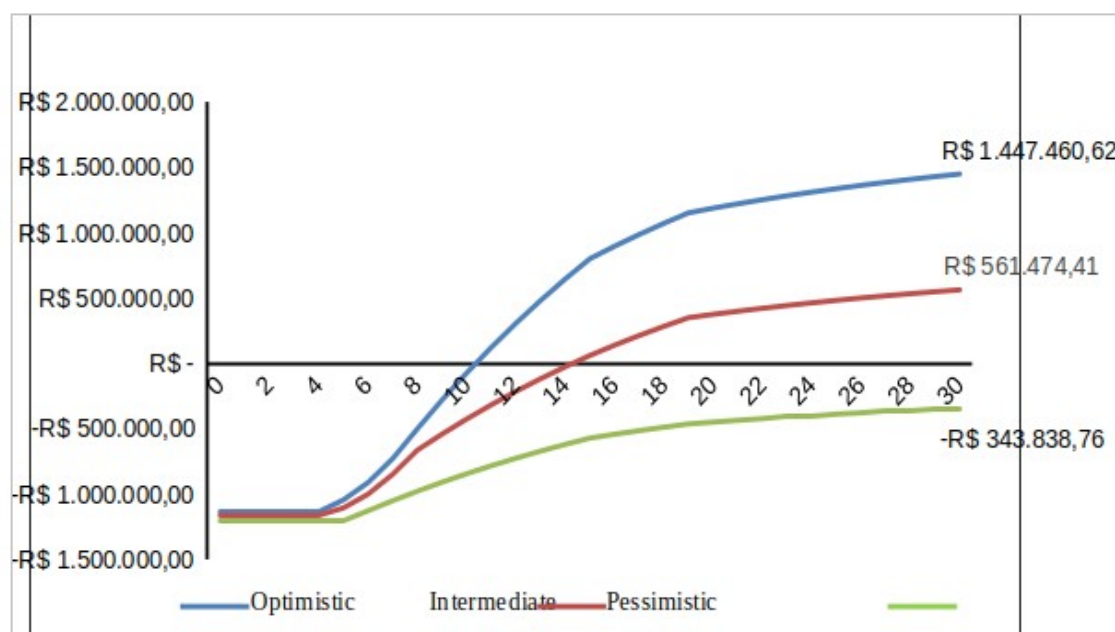
Based on the estimated costs and revenues, a cash flow statement was prepared, also including the annual values for gross profit, income tax, net profit (future value), cumulative cash flow, discounted cash flow (present value), and cumulative discounted cash flow. Using the data obtained from the cash flows, it was possible to calculate the economic indicators to assess the feasibility of the project under each proposed scenario. In Figure 4, the cumulative discounted cash flow for the pessimistic, intermediate, and optimistic scenarios can be observed. It is evident that in the optimistic and intermediate scenarios, the NPV is positive, indicating that the project is economically feasible. In contrast, in the pessimistic scenario, the NPV is negative, as shown by the curve represented by the green line, indicating that the project is not economically viable for the investor over the projected period. The point at





which the NPV curve crosses the horizontal axis represents the Payback Period for each proposed scenario.

Figure 4. Cumulative Discounted Cash Flow



Source: Original research results

Subsequently, the Internal Rate of Return (IRR) and the Payback Period (simple and discounted) were calculated for each scenario. Based on the results presented in Table 1 below, the following can be observed: an IRR of 13.64% in the optimistic scenario; an IRR of 9.42% in the intermediate scenario; and an IRR of 3.38% in the pessimistic scenario. The optimistic and intermediate scenarios exceeded the Minimum Attractive Rate of Return (MARR) of 6%, whereas the pessimistic scenario remained below this threshold. The Payback Period (both simple and discounted) is favorable in the optimistic and intermediate scenarios and unfavorable in the pessimistic scenario.



Table 1. Project Feasibility Indicators

Indicators	Optimistic Scenario	Intermediate Scenario	Pessimistic Scenario
MARR	6,0%	6,0%	6,0%
NPV	R\$ 1.447.460,62	R\$ 561.474,41	-R\$ 343.838,76
IRR	13,64%	9,42%	3,38%
Simple Payback	8,51	10,00	15,70
Discounted Payback	10,38	14,31	Unfeasible project

Source: Original research results.

Note: MARR – Minimum Attractive Rate of Return; NPV – Net Present Value; IRR – Internal Rate of Return.

CONCLUSION

The oil palm implementation project in the region of Moju, Pará (PA), was analyzed under three distinct economic scenarios (optimistic, intermediate, and pessimistic) proving to be feasible in the first two and unfeasible in the latter. The lack of historical data related to the crop, which would allow for a better understanding of its market and production volatility, proved to be the main limitation of the study, making it difficult to develop more robust projections. Future studies may assess the economic feasibility of this crop in different regions and/or consider new cultivars that may emerge.

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Appendix

Table 2 – Project cash flow between years 0 and 30 for the pessimistic scenario

(continue)

Description	Unit	Years of project											
		0	1	2	3	4	5	6...15	16	17	18	19	20...30
A – Investments													
Certified seedlings	R\$	260.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Planting area cleaning	R\$	70.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Soil preparation	R\$	15.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Staking	R\$	7.200,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Pueraria sowing	R\$	1.800,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Inputs	R\$	11.966,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Manual operations	R\$	12.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Environmental regularization	R\$	1.200,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Working capital	R\$	806.288,90	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Project Preparation	R\$	20.157,22	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Subtotal A – Investments	R\$	1.205.612,62	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B – Costs													
Mechanized operations	R\$	0,00	5.000,00	5.000,00	38.000,00	38.000,00	38.000,00	380.000,00	38.000,00	38.000,00	38.000,00	38.000,00	418.000,00
Cultural treatments	R\$	0,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	184.500,00	18.450,00	18.450,00	18.450,00	18.450,00	202.950,00
Fertilizer	R\$	0,00	60.032,00	90.048,00	120.064,00	128.640,00	150.080,00	1.916.736,00	171.520,00	171.520,00	171.520,00	171.520,00	1.650.880,00
Phytosanitary	R\$	0,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	52.000,00	5.200,00	5.200,00	5.200,00	5.200,00	57.200,00
Stimulant	R\$	0,00	0,00	34.500,00	69.000,00	69.000,00	69.000,00	690.000,00	69.000,00	69.000,00	69.000,00	69.000,00	759.000,00
Freight	R\$	0,00	0,00	0,00	15.000,00	41.250,00	67.500,00	825.000,00	75.000,00	75.000,00	75.000,00	75.000,00	742.500,00
Permanent workforce	R\$	0,00	0,00	0,00	117.600,00	117.600,00	117.600,00	1.176.000,00	117.600,00	117.600,00	117.600,00	117.600,00	1.293.600,00
Lease	R\$	0,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	240.000,00	24.000,00	24.000,00	24.000,00	24.000,00	264.000,00
Miscellaneous materials	R\$	0,00	3.030,00	3.030,00	7.930,00	7.930,00	7.930,00	79.300,00	7.930,00	7.930,00	7.930,00	7.930,00	87.230,00

Table 2 – Project cash flow between years 0 and 30 for the pessimistic scenario

(conclusion)

Description	Unit	Years of project											
		0	1	2	3	4	5	6...15	16	17	18	19	20...30
Subtotal B – Costs	R\$	0,00	115.712,00	180.228,00	415.244,00	450.070,00	497.760,00	5.543.536,00	526.700,00	526.700,00	526.700,00	526.700,00	5.475.360,00
C - Expenses													
Pró-labore	R\$	0,00	17.705,60	17.705,60	17.705,60	17.705,60	17.705,60	177.056,00	17.705,60	17.705,60	17.705,60	17.705,60	194.761,60
Technical Assistance	R\$	0,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	40.000,00	4.000,00	4.000,00	4.000,00	4.000,00	44.000,00
Accounting Office	R\$	0,00	9.600,00	9.600,00	9.600,00	9.600,00	9.600,00	96.000,00	9.600,00	9.600,00	9.600,00	9.600,00	105.600,00
Subtotal C – Expenses	R\$	0,00	31.305,60	31.305,60	31.305,60	31.305,60	31.305,60	313.056,00	31.305,60	31.305,60	31.305,60	31.305,60	344.361,60
Expenses (A+B+C)	R\$	1.205.612,62	147.017,60	211.533,60	446.549,60	481.375,60	529.065,60	5.856.592,00	558.005,60	558.005,60	558.005,60	558.005,60	5.819.721,60
Gross Revenue	R\$	0,00	0,00	0,00	130.000,00	357.500,00	585.000,00	7.150.000,00	650.000,00	650.000,00	650.000,00	650.000,00	6.435.000,00
Funrural	R\$	0,00	0,00	0,00	1.950,00	5.362,50	8.775,00	107.250,00	9.750,00	9.750,00	9.750,00	9.750,00	96.525,00
Gross operating profit	R\$	0,00	0,00	0,00	-318.499,60	-129.238,10	47.159,40	117.329,40	82.244,40	82.244,40	82.244,40	82.244,40	518.753,40
Taxes (IRPF)	R\$	0,00	0,00	0,00	0,00	0,00	928,32	33.069,06	7.528,80	7.528,80	7.528,80	7.528,80	10.211,52
Net profit	R\$	-1.205.612,62	0,00	0,00	0,00	0,00	46.231,08	84.260,34	74.715,60	74.715,60	74.715,60	74.715,60	508.541,88
Cash Flow (Future Value)													
Accumulated Cash Flow	R\$	-1.205.612,62	-1.205.612,62	-1.205.612,62	-1.205.612,62	-1.205.612,62	-1.159.381,54	-6.292,60	68.423,00	143.138,60	217.854,20	292.569,80	801.111,68
Discounted Cash Flow (Present Value)	R\$	-1.205.612,62	0,00	0,00	0,00	0,00	34.546,55	48.370,68	29.411,52	27.746,72	26.176,15	24.694,48	8.049,30
Accumulated Discounted Cash Flow (Present Value)	R\$	-1.205.612,62	-1.205.612,62	-1.205.612,62	-1.205.612,62	-1.205.612,62	-1.171.066,07	-537.832,30	-508.420,78	480.674,07	-454.497,92	-429.803,44	-309.292,21

Source: Original research results

Table 3 – Project cash flow between years 0 and 30 for the intermediate scenario

(continue)

Description	Unit	Years of project														
		0	1	2	3	4	5	6	7	8	9...15	16	17	18	19	20...30
A – Investment																
Certified Seedlings	R\$	260.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Planting area cleaning	R\$	70.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Soil preparation	R\$	15.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Staking	R\$	7.200,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Pueraria sowing	R\$	1.800,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Inputs	R\$	11.966,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Manual operations	R\$	12.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Environmental regularization	R\$	1.200,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Working capital	R\$	769.351,40	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Project Preparation	R\$	19.233,79	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Subtotal A – Investments	R\$	1.167.751,69	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B – Costs																
Mechanized operations	R\$	0,00	5.000,00	5.000,00	38.000,00	38.000,00	38.000,00	38.000,00	38.000,00	38.000,00	266.000,00	38.000,00	38.000,00	38.000,00	38.000,00	418.000,00
Cultural treatments	R\$	0,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	129.150,00	18.450,00	18.450,00	18.450,00	18.450,00	202.950,00
Fertilizer	R\$	0,00	60.032,00	90.048,00	120.064,00	128.640,00	150.080,00	180.096,00	192.960,00	192.960,00	1.350.720,00	171.520,00	171.520,00	171.520,00	171.520,00	1.650.880,00
Phytosanitary	R\$	0,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	36.400,00	5.200,00	5.200,00	5.200,00	5.200,00	57.200,00
Stimulant	R\$	0,00	0,00	34.500,00	69.000,00	69.000,00	69.000,00	69.000,00	69.000,00	69.000,00	483.000,00	69.000,00	69.000,00	69.000,00	69.000,00	759.000,00
Freight	R\$	0,00	0,00	0,00	15.000,00	41.250,00	67.500,00	82.500,00	97.500,00	108.750,00	656.250,00	90.000,00	90.000,00	90.000,00	90.000,00	742.500,00
Labor	R\$	0,00	0,00	0,00	117.600,00	117.600,00	117.600,00	117.600,00	117.600,00	117.600,00	823.200,00	117.600,00	117.600,00	117.600,00	117.600,00	1.293.600,00
Lease	R\$	0,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	168.000,00	24.000,00	24.000,00	24.000,00	24.000,00	264.000,00
Miscellaneous materials	R\$	0,00	3.030,00	3.030,00	7.930,00	7.930,00	7.930,00	7.930,00	7.930,00	7.930,00	55.510,00	7.930,00	7.930,00	7.930,00	7.930,00	87.230,00

Source: Original research results

Table 3 – Project cash flow between years 0 and 30 for the intermediate scenario

(conclusion)

		0	1	2	3	4	5	6	7	8	9...15	16	17	18	19	20...30
A – Investment																
Certified Seedlings	R\$	260.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Planting area cleaning	R\$	70.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Soil preparation	R\$	15.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Staking	R\$	7.200,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Pueraria sowing	R\$	1.800,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Inputs	R\$	11.966,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Manual operations	R\$	12.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Environmental regularization	R\$	1.200,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Working capital	R\$	732.413,90	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Project Preparation	R\$	18.310,35	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Subtotal A – Investments	R\$	1.129.890,75	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B – Costs																
Mechanized operations	R\$	0,00	5.000,00	5.000,00	38.000,00	38.000,00	38.000,00	38.000,00	38.000,00	38.000,00	266.000,00	38.000,00	38.000,00	38.000,00	38.000,00	418.000,00
Cultural treatments	R\$	0,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	18.450,00	129.150,00	18.450,00	18.450,00	18.450,00	18.450,00	202.950,00
Fertilizer	R\$	0,00	60.032,00	90.048,00	120.064,00	128.640,00	150.080,00	180.096,00	192.960,00	192.960,00	1.350.720,00	171.520,00	171.520,00	171.520,00	171.520,00	1.650.880,00
Phytosanitary	R\$	0,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	5.200,00	36.400,00	5.200,00	5.200,00	5.200,00	5.200,00	57.200,00
Stimulant	R\$	0,00	0,0	34.500,00	69.000,00	69.000,00	69.000,00	69.000,00	69.000,00	69.000,00	483.000,00	69.000,00	69.000,00	69.000,00	69.000,00	759.000,00
Freight	R\$	0,00	0,00	0,00	15.000,00	41.250,00	67.500,00	82.500,00	97.500,00	108.750,00	787.500,00	90.000,00	90.000,00	90.000,00	90.000,00	742.500,00
Labor	R\$	0,00	0,00	0,00	117.600,00	117.600,00	117.600,00	117.600,00	117.600,00	117.600,00	823.200,00	117.600,00	117.600,00	117.600,00	117.600,00	1.293.600,00
Lease	R\$	0,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	24.000,00	168.000,00	24.000,00	24.000,00	24.000,00	24.000,00	264.000,00
Miscellaneous materials	R\$	0,00	3.030,00	3.030,00	7.930,00	7.930,00	7.930,00	7.930,00	7.930,00	7.930,00	55.510,00	7.930,00	7.930,00	7.930,00	7.930,00	87.230,00

Table 4 – Project cash flow between years 0 and 30 for the optimistic scenario

Description	Unit	Anos de Projeto
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		0	1	2	3	4	5	6	7	8	9...15	16	17	18	19	20...30
Subtotal B – Costs	R\$	0,00	115.712,00	180.228,00	415.244,00	450.070,00	497.760,00	542.776,00	570.640,00	581.890,00	4.099.480,00	541.700,00	541.700,00	541.700,00	541.700,00	5.475.360,00
C - Expenses																
Pró-labore	R\$	0,00	17.705,60	17.705,60	17.705,60	17.705,60	17.705,60	17.705,60	17.705,60	17.705,60	123.939,20	17.705,60	17.705,60	17.705,60	17.705,60	194.761,60
Technical assistance	R\$	0,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	4.000,00	28.000,00	4.000,00	4.000,00	4.000,00	4.000,00	44.000,00
Accounting Office	R\$	0,00	9.600,00	9.600,00	9.600,00	9.600,00	9.600,00	9.600,00	9.600,00	9.600,00	67.200,00	9.600,00	9.600,00	9.600,00	9.600,00	105.600,00
Subtotal C – Expenses	R\$	0,00	31.305,60	31.305,60	31.305,60	31.305,60	31.305,60	31.305,60	31.305,60	31.305,60	219.139,20	31.305,60	31.305,60	31.305,60	31.305,60	344.361,60
Expenses (A+B+C)	R\$	1.129.890,75	147.017,60	211.533,60	446.549,60	481.375,60	529.065,60	574.081,60	601.945,60	613.195,60	4.318.619,20	573.005,60	573.005,60	573.005,60	573.005,60	5.819.721,60
Gross Revenue	R\$	0,00	0,00	0,00	150.000,00	412.500,00	675.000,00	825.000,00	975.000,00	1.087.500,00	7.875.000,00	900.000,00	900.000,00	900.000,00	900.000,00	7.425.000,00
Funrural	R\$	0,00	0,00	0,00	2.250,00	6.187,50	10.125,00	12.375,00	14.625,00	16.312,50	118.125,00	13.500,00	13.500,00	13.500,00	13.500,00	111.375,00
Gross operating profit	R\$	0,00	0,00	0,00	-298.799,60	-75.063,10	135.809,40	238.543,40	358.429,40	457.991,90	3.438.255,80	313.494,40	313.494,40	313.494,40	313.494,40	1.493.903,40
Taxes (IRPF)	R\$	0,00	0,00	0,00	0,00	0,00	21.957,12	50.208,96	83.177,64	95.157,36	837.787,44	70.820,52	70.820,52	70.820,52	70.820,52	241.528,32
Net profit	R\$	-1.129.890,75	0,00	0,00	0,00	0,00	113.852,28	188.334,44	275.251,76	362.834,54	2.600.468,36	242.673,88	242.673,88	242.673,88	242.673,88	1.252.375,08
Cash Flow (Future Value)	R\$	-1.129.890,75	0,00	0,00	0,00	0,00	113.852,28	188.334,44	275.251,76	362.834,54	2.600.468,36	242.673,88	242.673,88	242.673,88	242.673,88	113.852,28
Accumulated Cash Flow	R\$	-1.129.890,75	-1.129.890,75	-1.129.890,75	-1.129.890,75	-1.129.890,75	-1.016.038,47	-827.704,03	-552.452,27	-189.617,73	2.410.850,63	2.653.524,51	2.896.198,39	3.138.872,27	3.381.546,15	4.633.921,23
Discounted Cash Flow (Present Value)	R\$	-1.129.890,75	0,00	0,00	0,00	0,00	85.077,05	132.768,35	183.058,14	227.646,88	155.012,08	95.527,67	90.120,44	85.019,29	80.206,87	19.822,84
Accumulated Discounted Cash Flow (Present Value)	R\$	-1.129.890,75	-1.129.890,75	-1.129.890,75	-1.129.890,75	-1.129.890,75	-1.044.813,70	-912.045,35	-728.987,21	-501.340,33	799.805,94	895.333,61	985.454,05	1.070.473,34	1.150.680,21	1.447.460,62

Source: Original research results

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