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Economic and financial analysis of live bait production of curimba: a case study

Análise econômica e financeira da produção de iscas vivas de curimba: um estudo de caso

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Abstract: Live bait production is a relevant socioeconomic activity for fishermen and fosters the touristic infrastructure of Mato Grosso do Sul state, especially in the Pantanal biome. This study aims to analyze economic and financial viability associated with live bait production of curimba (*Prochilodus lineatus*) used by the market of Mato Grosso do Sul's Pantanal. The present work collected zootechnical data and evaluated costs of production. A SWOT analysis was performed to identify strong and opportunities, as well as the weaknesses and threats of the property in question. Economic feasibility was analyzed through key indicators, such as Effective Operational Cost (EOC), Total Operational Cost (TOC), Total Cost (TC), Gross Margin (GM), Net Margin (NM), Profit (P) and Gross Revenue (GR). Financial feasibility evaluation was based on these indicators: Net Present Value (NPV), Internal Rate of Return (IRR), Payback and Profitability Index (PI). We considered three productivity scenarios for the indicators: realistic, pessimistic and optimistic, during the period of commercialization of live baits. Curimba's live bait production is a profitable activity. The estimated values were R$ 208,209.60 for GR, R$ 102,870.14 for GM, R$ 62,092.62 for NM and R$ 60,370.55 of P, whereas financial return after the first investment was 3.3 years. These results indicate that this activity has a potential for an increase of production in the future, offering direct financial advantages to the suppliers, enhancing fishery's sustainable actions at Pantanal. Considering the variable market's dynamic, this present work provides valuable insights that can guide future developing decisions and strategies for the suppliers of live baits in this specific location.

Keywords: Fish farming; pantanal; *Prochilodus lineatus*; sport fishing.

Resumo: A produção de iscas vivas é uma atividade socioeconômica de grande relevância para pescadores e fomenta a infraestrutura turística no Mato Grosso do Sul, especialmente no bioma Pantanal. Este estudo objetiva analisar a viabilidade econômica e financeira associada à produção de iscas vivas de curimba (*Prochilodus lineatus*) destinadas ao mercado do Pantanal Sul-Mato-Grossense. O trabalho envolveu a coleta de dados zootécnicos e a avaliação dos custos de produção. Foi elaborada uma matriz SWOT identificando pontos fortes e oportunidades, bem como os pontos fracos e ameaças da propriedade em questão. A viabilidade econômica foi conduzida por meio de indicadores-chave, como Custo Operacional Efetivo (COE), Custo Operacional Total (COT), Custo Total (CT), Margem Bruta (MB), Margem Líquida (ML), Lucro (L) e Receita Bruta (RB). A avaliação da viabilidade financeira baseou-se nos indicadores: Valor Presente Líquido (VPL), Taxa Interna de Retorno (TIR), Payback e Índice de Lucratividade (IL). Para os indicadores foram considerados três cenários de produtividade: real, pessimista e otimista, durante o período de comercialização de iscas vivas. A produção de iscas vivas de curimba apresenta-se como uma atividade rentável econômica e financeiramente. Foram estimados R$ 208.209,60 para RB, R$ 102.870,14 para MB, R$ 62.092,62 para ML e R$ 60.370,55 de L, onde o tempo de retorno financeiro após o investimento inicial foi de 3,3 anos. Esses resultados indicam que a atividade apresenta potencial de perspectivas para um aumento futuro da produção, oferecendo benefícios econômicos diretos aos produtores e contribuindo para a sustentabilidade das práticas pesqueiras na região pantaneira. Considerando a dinâmica variável do mercado, este estudo fornece insights valiosos que podem orientar decisões futuras e estratégias de desenvolvimento para os envolvidos na produção de iscas vivas nesta localidade específica.

Palavras-chave: Pantanal; pesca esportiva; piscicultura; *Prochilodus lineatus*.

1. Introduction

In 2022, approximately 61.8 million people worked full-time, partial, occasionally or in non-specified positions in the primary sector of commercial fishery and fish farming. This number is superior compared with the data from 1995 to 2021. The fish farming sector represented 36% of workers, with a crucial role in the creation of jobs for the population [8]. According to reports by FAO [8], fish farming world production reached 185 million tons in 2022. Ninety-four million tons of this are aquatic organisms, representing 51% from the total, surpassing fishery for the first time, which produced 91 million tons, corresponding to 49%. Aquatic organisms' cultivation, especially fish farming, showed an annual mean increase of 3.2%, between 1950 and 2022.

Fish farming executes several activities, including production of live baits for sport fishing. This modality was officially acknowledged as a sport in Brazil only in 2018, certified by the Brazilian Sport Fishing Confederation (CBPE)[6], stimulating the support to the live bait farmers and providing improvements in the management. Regardless of the recent certification by CBPE, Mato Grosso do Sul state was an active participant in the live bait production for several decades, especially in Pantanal. According to the data from the Secretary of Environment, Economic Development, Production and Family Agriculture – SEMAGRO [25], the touristic infrastructure at Pantanal increased significantly since the 1980s, followed by the increase on live bait market, becoming an essential part of the regional tourism of sport fishing. Since the state law no. 1,910 from 1998, later reinforced by state law no. 2,898 from 2004, sport fishing on Mato Grosso do Sul has a regulation for capture and commercialization of live baits exclusively for qualified professionals [12], becoming a socioeconomical activity for professional fishermen from the state.

Among the species used for live bait production, curimba (*Prochilodus lineatus*) stands out. Besides extractivism, production in captivity by laboratory induced reproduction is presented as a relevant practice with commercial potential due to its reproductive efficiency by hormonal induction, resulting in a considerable number of quality eggs [9]. Barbieri et al. [1] highlighted the curimba as a species with excellent economic and social importance for professional and sports fishermen. According with data from IBGE (Brazilian Institute of Geography and Statistics) [11], production in cultivation of this species in Brazil in 2022 was approximately 3.2 thousand tons, whereas 87.37 tons are from the center-west region, including the state of Mato Grosso do Sul.

According to recent data [2], the state of Mato Grosso do Sul is among the 10 largest producers of farmed fish in Brazil, occupying the eighth position, and stands out as the fourth largest exporter of tilapia, behind only Paraná state. In 2022, the state government launched a state plan for strengthening the fish farming production chain, named Pró Peixe, with the aim of boosting fish production. This plan includes tax incentives that benefit local producers, contributing significantly to the continued development of the production chain. In 2023, fish production in the state reached 34,100 tons, of which 1,900 tons were native species. In addition, 142 contracts were signed with a total production capacity of 96,596.21 tons per year, which could generate 1,358 direct jobs and up to 2,716 indirect jobs.

Curimba's production in the state occurs mainly in cities close to the capital; however, it does not fully supply the demand of live baits used in sport fishing in Mato Grosso do Sul [11]. Our aim was to understand the live bait market of curimba in Mato Grosso do Sul. Therefore, we analyzed economic and financial viability for live bait production with curimba used by the sport fishing market in the state's Pantanal.

2. Material and methods

This case study was performed on a fish farm on Terenos, a city from the center-west region, in Mato Grosso do Sul (Figure 1). This present work evaluated costs of production and revenue for a year (one production cycle), evaluating economic and financial viability in the period from November 2020 to October 2021, where the commercialization period was from April 1 to October 31, 2021. All cost figures have been updated to January 2024.

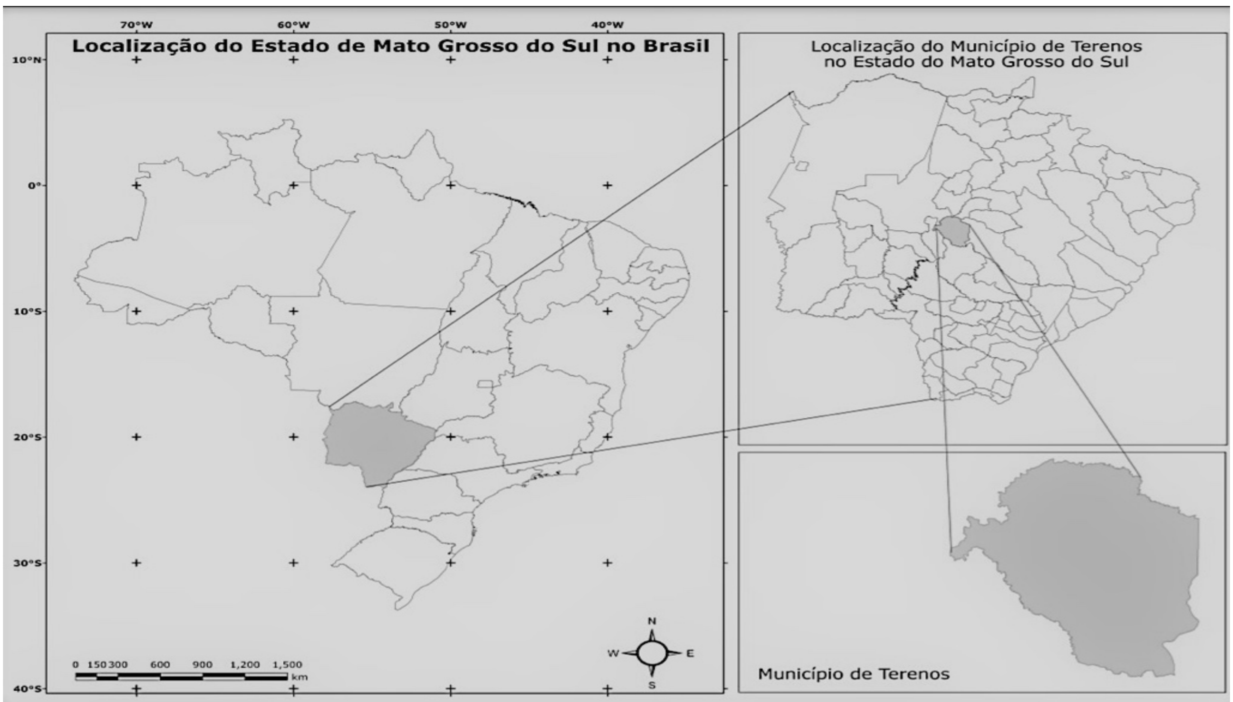

Figure 1. Map of the region of Terenos city on Mato Grosso do Sul and Brazil. Source: Adapted [7].

2.1 Property's characterization

The fish farm has 14 excavated tanks with approximately 1,033 m^{-2} tank and mean depth of 1 m. In addition, there is a laboratory for larvae production. Water layer's total area is 1.4 hectares, of which two tanks are used by the breeders and 12 tanks for juvenile production. The laboratory that produces 180.740 larvae has eight 200 L incubators, three 500 L tanks to receive the breeders and a desk with sink for disinfection and reproduction procedures. The fish farming had eight reproducers (4 males and 4 females) with a mean weight of 1.2 ± 0.3 kg, allotted in excavated tanks with a density of 1 kg m^{-2}. The density for three cycles of juvenile production was 12 fish m^{-2} until the harvest. To characterize the strengths, weaknesses, opportunities and threats to the property's internal and external environment, a SWOT analysis was performed with *in loco* data [21].

2.2 Production parameters and management methods

The property's process flow, mapped with Bornia [3], offers insights about resources used (fuel, workforce, equipment, materials and others) and use of the available infrastructure (laboratory, tanks for juvenile production and breeders maintenance) for fish production. Production data included one spawning for year/female, with a proportion of 10% the female's weight (1,000 eggs g^{-1}), fertilization rate of 90% and eclosion rate of 70%, resulting in approximately 180,740 larvae of curimba. This data is in accordance with the literature [9]. Induced reproduction was performed with hormonal application through hypophysation using crude extract of carp's hypophysis [9]. The protocol used was application of hormones in two doses, the first one 0.5 mg kg^{-1} of fish on both males and females and the second dose 5 mg.kg^{-1} on females and 3 mg kg^{-1} on males. After five days on incubators [20], the larvae were stocked at fingerlings tanks with density of 100 fish m^{-2}, fed *ad libitum*, with commercial powder feed with 55% of crude protein, with three daily meals.

After 30 days, the curimba's juveniles were stocked with a feed conversion of 1.4. During this period until the bait commercialization, 80% of the juveniles survived and it was sold with 15 cm of length. Therefore, the production capacity of the structure and the breeders used in the fish farming were estimated at 144,590 juveniles. The average density for three cycles of juvenile production was 12 fish m^{-2} until the harvest. To quantify volume production, the following data was collected: number of fingerlings produced during the production cycle and final survival rate ((total estimated number of larvae - total number of curimba's juveniles at the end of the cycle) x 100).

2.3 Economic viability

For the economic analysis, data on the property's infrastructure was obtained, covering detailed information about the items, price and useful life, as well as data related to the production process, such as labor, maintenance of the tank infrastructure and inputs used. An investment spreadsheet was prepared, specifying the items necessary for the total production of fish farming, including machinery, improvements and licensing. All costs were distributed and apportioned proportionally to the area allocated to curimba production based on real data from the local market.

The breeders' acquisition price was calculated using the price of live fish (R$ 8.00 kg^{-1}) from fish farming located in the region. Deflation was added, with the prices of baits and materials sold were calculated with real data from the property. The used economic viability indicators were determined according to the methodology of Matsunaga et al. [(17)], characterizing its economical profile. The following items of cost and revenue were determined and evaluated:

Total revenue (TR): consists of the entry value from selling the animals. Effective Operational Cost (EOC): costs of materials' purchase and interest. Total Operational Cost (TOC): EOC plus depreciations and remuneration. Total cost (TC): its value is determined when the remuneration of tied-up capital (capital's opportunity cost) is added to TOC. Considering these items of cost and revenue, the classification presents the following indicators to evaluate the economy of companies: Gross Margin (GM): TR – EOC; Net Margin (NM): TR – TOC and Profit (P): TR- TC.

Costs with the necessary documentation for regulation were considered, presented as follows: Registration and License for Fish Farmers, Declaration of Conformity for Agribusiness Activity, Environmental Exemption Certificate [(19)] and rural registration, considering that the fish farm already had the tanks and larvae laboratory with a water layer smaller than 5 hectare, which does not require environmental license and hydraulic and electrical work.

Expenses for equipment's maintenance were considered, with an estimation of one to twenty years of the acquisition's value. The workforce used in the property consists of manual labor with a fixed salary, with taxes and vacations added to the sum. Fish farming direct costs were used entirely by the products, with the following items being considered based on the quantity used for production of each fingerling: larvae feed (55% crude proteins, powder), fingerlings I feed (32% of CP- grinded) and fingerlings II (32% of CP- particle size 4 mm; fertilizer (urea and rice bran) and quicklime. Regarding indirect costs, cost drivers and technical criteria of distribution were used [(15)].

The identified activity's cost drivers were:

a) Remuneration, accountant (1 employee), workload (1 employee), fuel (gas), maintenance; depreciation and working capital.

b) Number of packages for transport used to sell the baits, related juveniles' transportation: plastic bags and compressed oxygen.

c) Breeders' feed, hypophysis, laboratory materials and insurance (employees and vehicle).

The break-even was defined according to the total production cost, divided by the unit price of juveniles. BEP= TC/UP, where BEP= Break-even (expressed in R$); UP= Unit price. The scenarios: pessimistic, realistic and optimistic were calculated according to the price of curimba juveniles' selling in the region, being respectively R$ 1.50, R$ 1.80 and R$ 2.00. Factors taken into consideration were based on the commercialization time, size and survival rate.

2.4 Financial viability

The detailed cash flow considered several aspects, including materials (feed, fertilizers, hypophysis, oxygen reload, common salt, fuel, packages, laboratory materials), maintenance, equipment repairs, property's leasing, employees (a handyman and an accountant), taxes, electrical energy and remuneration. The values related to electrical energy were calculated based on mean monthly use by the fish farm, which had specific requirements. Workload consisted of manual labor, and had a fixed remuneration, taxes and vacation.

Financial viability' analysis was performed following the methodology by Neto and Lima (18). Financial indicators used were the Internal Rate of Return (IRR), Payback (PB), Net Present Value (NPV) and Profitability Index (PI). The NPV was calculated considering the cash flow, the minimum acceptable rate of return of 10% per year and initial investment (30). Discount rate or the minimum acceptable rate of return (MARR) used to calculate the NPV was 10% per year:

$$NPV = \sum_{j=1}^{n} \frac{CFj}{(1 + MARR)^{j}} - \text{Initial Investment}$$

Where NPV= Net Present Value; Cash flow= Return of benefit expected in the first year; MARR= minimum acceptable rate of return; and *j* = period of each cash flow.

The Internal Rate of Return was defined by the sum of each cash flow (estimation of 1 year), minus the initial investment, where the value was zero, using the formula:

$$\sum_{i=1}^{n} \frac{CFj}{(1 + IRR)^{i}} - \text{Initial Investment} = 0$$

Where N= final period of investment; CF= cash flow; and *i* = internal Rate of Return.

Payback (PB) or payback period (PBP) are the necessary periods to recover the capital used to implement the investment (17) and was determined by the equation:

$$PB = \sum_{t-0}^{k} \frac{(FCF)}{(l + i)^{k}} \geq 0$$

Where FCF= Free cash flow expected by cash entry (operational net flow); k= period of time in which the cumulative balance is ≥ 0; i = discount fee (interest) considered to update the cash flow.

Profitability Index was represented by the following equation:

$$PI = \frac{NPV}{I^{0}}$$

Where PI= Profitability Index; NPV= Net Present Value; I^0 = Initial investment.

Regarding the financial indicators, it was also considered the pessimistic, realistic and optimistic scenarios. The selling price and juvenile survival were considered at the end of the production cycle. The values were defined based on the producer's sales experience and survival rates described in the literature [(2)]. The established parameters were:

• Pessimistic scenario: price of R$1.50 per unit and survival of 60%;

• Realistic scenario: price of R$1.80 per unit and survival of 80%;

• Optimistic scenario: price of R$2.00 per unit and survival of 90%.

These values reflect a combination of local market practice and scientific data, allowing a balanced analysis of possible production conditions and their financial impacts.

3. Results

With the SWOT matrix it was possible to identify the property's strengths and weaknesses, as well as its opportunities and weaknesses (Figure 2).

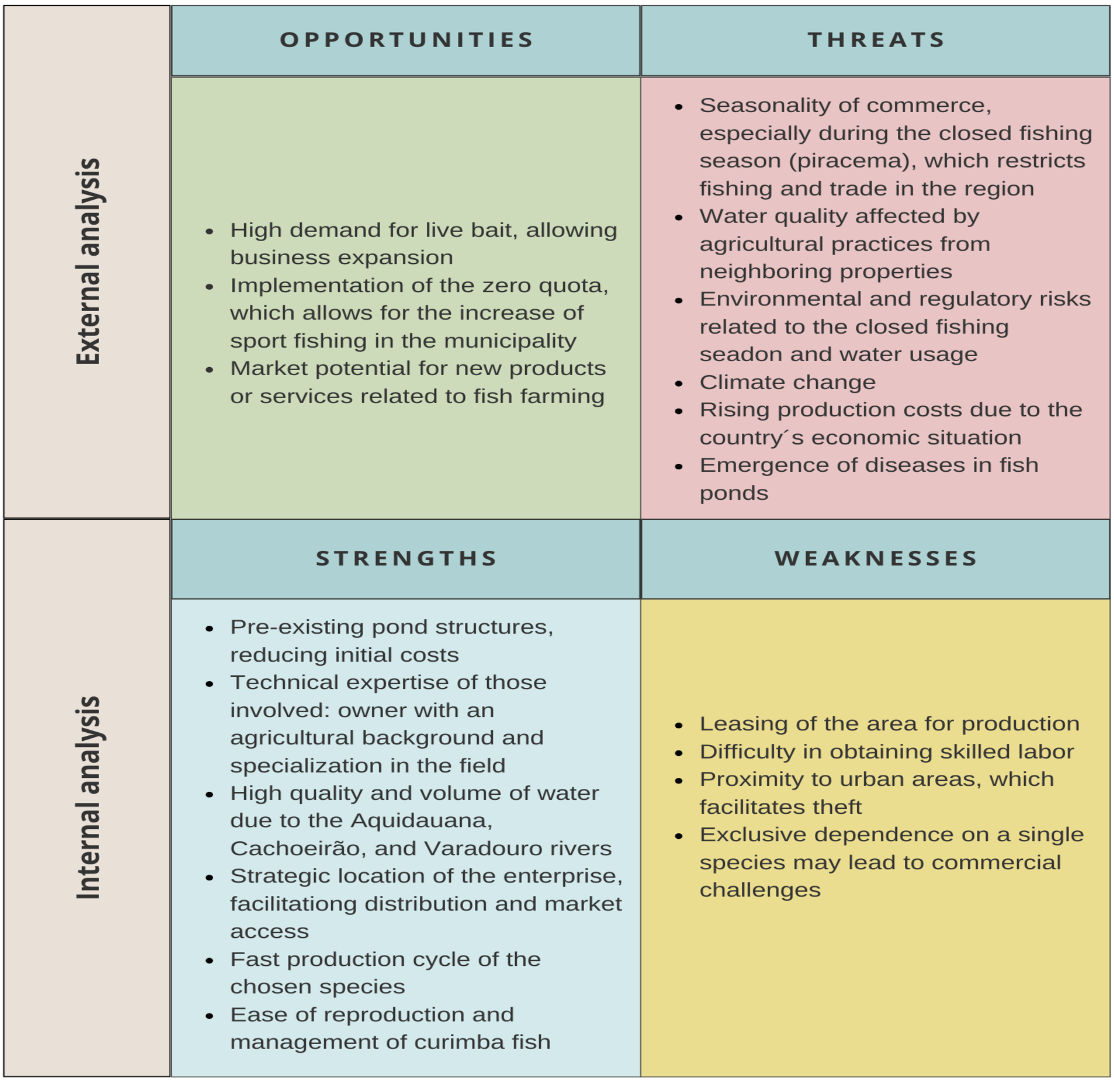

Figure 2. SWOT analysis with is four aspects for the production of live bait in the Terenos-MS region.

The necessary initial investment was estimated at R$ 58,669.50 (Table 1). Among costs with investment, the material with harvest and a tractor stood for most expenses with approximately 29 and 27%, respectively.

Table 1. Items of initial investment in Real (R$) for curimba's production for live baits on 1.4 hectare of water layer, in Terenos, MS. The values in reais refer to the month of January 2024 (US$ 1 = R$ 4.97).

Item	Quantity	Value (R$)	(%)	Useful life (years)
Breeders	12	96.00	0.16	5
EQUIPMENT				
Office supplies	1	2,346.39	4.00	1
Laboratory supplies	1	3,289.42	5.61	10
Water analysis kit	1	3,197.26	5.45	10
High pressure cleaner	1	765.00	1.30	10
Nets and casting-net	1	3,285.00	5.60	5
Harvest	1	16,952.80	28.90	10
Motor-pump	1	2,138.63	3.65	10
Tools box	1	699.00	1.19	10
Pallets	8	200.00	0.34	10
Stihl 160 brush cutter	2	3,200.00	5.45	10
Massey Ferguson 65X tractor (USED)	1	16,000.00	27.27	20
Back platform for the tractor	1	1,500.00	2.56	20
LEGALIZATION				
Documentation	1	5,000.00	8.52	
TOTAL VALUE		58,669.50	100.00	

The fish farm's annual effective operational cost (EOC) was a total of R$ 105,339.46 (Table 2). The value was higher than the ones with implementation investment, considering costs with remuneration, employees and feed were more significant.

Table 2. Economic evaluation of curimba's production for live baits on 1.4 hectare of water layer, in Terenos, MS. The values in reais refer to the month of January 2024 (US$ 1 = R$ 4.97).

Item	Quantity	Months	Value (R$)	Annual Value (R$)	(%)
Leasing	1	12	1,500.00	18,000.00	12.32
Employee	1	13	1,600.00	20,800.00	14.24
Accountant	1	12	350.00	4,200.00	2.87
Feed (Bag 25 kg) 55% CP	8	1	150.00	1,200.00	0.82
Feed (Bag 25 kg) 32% CP	40	12	75.00	36,000.00	24.64
Package (un)	58	12	1.00	692.00	0.47

Oxygen reload	0.34	12	100.00	408.00	0.28
Common salt (Bag 20 kg)	7	12	17.00	1,428.00	0.98
Quicklime (Bag 20 kg)	70	1	13.00	910.00	0.62
Urea (Bag 50 kg)	0.08	12	125.00	120.00	0.08
Rice bran (Bag 50 kg)	0.17	12	51.00	104.04	0.07
Hypophysis (mg)	1.1	12	1,800.00	165.00	0.11
Physiological saline (ml)	-	12	6.00	6.00	0.00
Laboratory supplies	-	12	15.00	180.00	0.12
Office supplies	-	12	20.00	240.00	0.16
Maintenance	-	12	137.00	1,644.00	1.13
Fuel (liters)	137	12	4.32	7,102.08	4.86
Energy	1	12	425.00	5,100.00	3.49
Interest	-	12	586.70	7,040.34	4.82
EOC	-	-	-	**105,339.46**	-
Depreciation	-	12	398.13	4,777.52	3.27
Remuneration	1	12	3,000.00	36,000.00	24.64
TOC	-	-	-	**146,116.98**	-
Opportunity cost	-	-	-	1,722.07	-
TC	-	-	-	147,839.05	100.00
Total revenue	-	-	-	**208,209.60**	-
Gross Margin	-	-	-	**102,870.14**	-
Net Margin	-	-	-	**62,092.62**	-
Profit	-	-	-	**60,370.55**	-

EOC= Effective Operational Cost; TOC= Total Operational Cost; TC= Total cost.

Annual total cost (TC) for production of curimba's live baits was R$ 147,839.05, resulting in a profit (P) of R$ 60,370.55. Gross Revenue of the pessimistic scenario was 50% lesser in comparison with the optimistic scenario. The difference between profit on the pessimistic and optimistic scenarios was 115.75% according to data from Table 3.

Table 3. Economic indicators of different scenarios in curimba's production for live baits on 1.4 hectare of water layer, in Terenos, MS in the pessimistic, realistic and optimistic scenarios. The values in reais refer to the month of January 2024 (US$ 1 = R$ 4.97).

Indicators	Pessimistic	Realistic	Optimistic
Annual revenue	130,131.00	208,209.60	260,262.00
Effective Operational Cost (EOC)	105,339.46	105,339.46	105,339.46
Total Operational Cost (TOC)	146,116.98	146,116.98	146,116.98
Total cost (TC)	147,839.05	147,839.05	147,839.05
Gross Margin (GM)	24,791.54	102,870.14	154,922.54
Net Margin (NM)	- 15,985.98	62,092.62	114,145.02
Profit (P)	- 17,708.05	60,370.55	112,422.95

Only the pessimistic scenario presented the negative cash flow. The difference between the cash flows highlights the considerable variation in the financial results according to the market conditions (Table 4).

Table 4. Cash flow with the Net Present Value and Internal Rate of Return in Real (R$) for the pessimistic, realistic and optimistic scenarios of curimba's production of live bait, in 1.4 hectare of water layer, in Terenos, MS.

	Pessimistic		Realistic		Optimistic	
Period	Cash flow (R$)	Discounted cash flow (R$)	Cash flow (R$)	Discounted cash flow (R$)	Cash flow (R$)	Discounted cash flow (R$)
0	-204,786.48	-204,786.48	-204,786.48	-204,786.48	-204,786.48	-204,786.48
1	-15,985.98	-14,532.71	62,092.62	56,447.84	114,145.02	103,768.20
2	-15,985.98	-13,211.55	62,092.62	51,316.21	114,145.02	94,334.73
3	-15,985.98	-12,010.50	62,092.62	46,651.10	114,145.02	85,758.84
4	-15,985.98	-10,918.64	62,092.62	42,410.09	114,145.02	77,962.58
5	-15,985.98	-9,926.04	62,092.62	38,554.63	114,145.02	70,875.08
NPV	**-284,716.38**	**-265,385.92**	**105,676.62**	**30,593.40**	**365,938.62**	**227,912.95**
IRR	**-**	**-**	**16%**	5%	48%	34%

NPV= net present value; IRR= internal rate of return.

4. Discussion

Fish farming established itself as a valuable economic activity in agribusiness, especially for small and intermediate producers, considering the need for a small area and lower investments [(8)]. Even though the live bait sector in Brazil is commercially relevant, the lack of specific information challenges the planning and sustainable growth [(31)]; therefore, complex comprehension of costs is essential to start a production. Initial investment on live bait production of *Prochilodus lineatus* in Terenos (MS, Brazil) was considered low, considering that the property with the excavated tanks was leased. Building these structures would increase initial costs, according to previous studies [(13, 17)]. Increased elevated costs associated with harvest and tractor acquisition were justified as critical investments in basic infrastructure for the fish farming [(23, 27)].

In this present work, costs with the workforce (employee and accountant), including the producer's remuneration, which worked daily, represented 45.4% (R$ 61,000.00) of the production total costs. This value surpasses the proportions found in other studies [(13, 14)], indicating that specialized workforce can represent more than 50% of costs [(10)]. Feed is the most expensive material, with approximately 25% of the production's total costs. According to Souza et al. [(26)], costs with industrial feed can reach 70% of the total. To mitigate these costs, partnerships with cooperative corporations for group purchases in large scale can be considered. Furthermore, adjustments in feed quantity according to the feeding frequency determined in the production cycle, performed in places to avoid lost material can also be done, since feed is one of the most critical cost in fish production [23]. In addition, the property maintained the breeders to provide the larvae and consequently, production of curimba's baits, which requires feed of different nutrients and particle size, causing a variation of this material's price.

Through the analysis of the values of gross margin, net margin and profit, this activity can thrive in the short and long term, presenting positive values capable of covering expenses with depreciation and interest. The pessimistic scenario is an exception, where the producer needs to evaluate the market and use strategies to reduce risks. Regarding materials and the property's equipment, it was taken into consideration the time of specific useful life for each item listed. Therefore, the producer that presents technical knowledge of this activity, can connect with the economical part, that when there is a lack of economic evaluation can restrict the farmer, considering its difficulty to use this knowledge to practice, limiting their decision-taking process [23].

Payback result is in accordance with data found by other researchers, such as Sanches et al. [24], with values between 1 and 4 years, showing a fast return of the invested sum. Regarding NPV and IRR, the values were lower than the ones observed in economic analysis of fish farming [3, 23, 24]; however, in the optimistic scenario, IRR is in the range of 8.86% to 45.51%, as showed by Sanches et al. [24] and Trombeta et al. [28]. In the pessimistic scenario there was no internal rate of return in the five-year estimation.

The financial indicators NPV, IRR, CP and PI were positive, except in the pessimistic scenario, with an interesting viability, considering that the positive values represent the minimum to retrieve the invested capital. The evaluation of economic and financial viability is crucial to gather information that can help the farmer to plan the fish farm in the long term and determine the product's selling price; therefore, identifying and adjusting the items that cause more impact on costs to improve the production [5]. Thus, the increase of productivity guarantees more profit.

We suggest that the production of live baits in the analyzed fish farm can be amplified or diversified in relation to the production of other species, such as the yellow-tail lambari (*Astyanax altiparanae*), providing different live bait required by producers in the region, causing the breeders number to increase, considering that there is enough tanks for breeders, nursery tanks and incubators. Increase of production and commercialization of these animals contribute to market growth of live baits and increase in quality of life of people affiliated to the activity. However, the present study showed data of costs and financial viability to the farmer that produces curimba's live baits, contributing to an improved planning.

Even though the market information is scarce regarding this production, the analysis presented a positive profit. The results highlight the viability; however, the fish farmer must analyze the market and the production beforehand, focusing on reaching greater economic viability and efficiency. Besides, understanding the market and exchanging information between the seller and the consumer is extremely important for profit. Information of production cost is a valuable tool to aid the negotiation for selling the product, identifying the items that cause more impact on costs and therefore, adjusting them to improve the production [(5)].

On the other hand, an economic and financial analysis for small properties aid decision taking, requires adequate knowledge, when higher values are involved. Otherwise, it might be a risk to invest money incorrectly, or even neglect a resource that would bring more financial return. Therefore, the correct planning for small properties is critical, considering most farmers have a small income and depend on the small productive area on their property, with few or no technology and no knowledge about how to plan the production and increase the results.

The property analyzed represents the reality of other productions in the region, needing an economic/financial evaluation to aid more efficient management and systems of production, reducing costs and production scheduling. These processes lead to more viable activity for the farmers, which is more relevant for the live bait market, increasing the production and commercialization of these animals. However, the present study presented the parameters of costs and financial viability to the farmer that produces curimba's live baits, contributing to an improved planning.

5. Conclusion

The results demonstrate that the business is viable economically and financially, since the production and commercialization can cover the costs associated with the activity. Therefore, the production of curimba's live baits for the sport fishing market on Mato Grosso do Sul state has a crucial role to develop the region's aquaculture, supporting the small farmers and stimulating growth and use of technology. In this context, the producer's knowledge about the production's costs is crucial, allowing the strategic implantation of the fish farm and efficient planning of the activity.

Conflicts of interest statement

The authors declare no competing interests.

Data availability statement

The data will be provided upon request.

Author contributions

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