



## 52ª Reunião Anual da Sociedade Brasileira de Zootecnia

*Zootecnia: Otimizando Recursos e Potencialidades*

**Belo Horizonte – MG, 19 a 23 de julho de 2015**



### **Simulações de resultados econômicos com o uso da IATF em fazenda de cria no Pantanal<sup>1</sup>**

Luiz Orcírio Fialho de Oliveira<sup>2</sup>, Érikliis Nogueira<sup>2</sup>, Anderson Lucio da Silva Gri<sup>4</sup>, Juliana Corrêa Borges<sup>5</sup>, Walvonvitis Baes Rodrigues<sup>6</sup>, Urbano Gomes Pinto de Abreu<sup>7</sup>

<sup>1</sup>Parte de da tese de mestrado do terceiro autor, UEMS

<sup>2</sup> Pesquisador Embrapa Pantanal e-mail: [luiz.orcirio@embrapa.br](mailto:luiz.orcirio@embrapa.br)

<sup>3</sup> Pesquisador Embrapa Pantanal e-mail: [eriklis.nogueira@embrapa.br](mailto:eriklis.nogueira@embrapa.br)

<sup>4</sup> Pós-Graduando em Zootecnia- UEMS- Aquidauana. e-mail: [veterinariogri@hotmail.com](mailto:veterinariogri@hotmail.com)

<sup>5</sup> Pesquisador Embrapa Pantanal e-mail: [juliana.correa@embrapa.br](mailto:juliana.correa@embrapa.br)

<sup>6</sup> Bolsista Embrapa Pantanal DCR- FUNDECT e-mail: [witis@uol.com.br](mailto:witis@uol.com.br)

<sup>7</sup> Pesquisador Embrapa Pantanal e-mail: [urbano.abreu@embrapa.br](mailto:urbano.abreu@embrapa.br)

**Resumo:** Objetivou-se com este trabalho avaliar por meio de simulações de sistemas, o custo-benefício da utilização de IATF em bovinos em três cenários no Pantanal sul-mato-grossense: Propriedade com pastagens nativas e com monta natural (P1), Propriedade com pastagens nativas e utilização de IATF (P2), Propriedade com pastagem cultivada com utilização de IATF (P3), todas tendo como base propriedades modais do Pantanal Sul Mato-grossense. Buscou-se simular o impacto do aumento da produtividade e da qualidade do rebanho, no retorno econômico das propriedades de criação extensiva da região. Foi desenvolvido um modelo determinístico através de planilhas para a realização dos cálculos de custos e receitas. As margens econômicas foram estimadas pela diferença entre os custos e receitas dos sistemas de produção estudados. As variáveis, números de bezerros (as) desmamados e número de vacas em produção, foram as que apresentaram maior impacto na remuneração dentro da situação considerada. A utilização de IATF em propriedades com pasto nativo ou cultivado, apesar de aumentar os custos, aumentou a taxa de prenhez ao final da estação de monta, levando a um aumento no número de bezerros disponíveis para venda e consequentemente, elevando a receita e diminuindo o custo marginal do bezerro produzido em propriedades extensivas no Pantanal sul-mato-grossense.

**Palavras-chave:** custo de produção, gado de corte, pantanal, análise econômica, custo do bezerro

### **Simulations of economic results with the use of FTAI in cow-calf farm in the Pantanal<sup>1</sup>**

**Abstract:** The objective of the study was to evaluate, by system simulations, the cost-benefit of FTAI use in three different scenarios in the Pantanal of Mato Grosso do Sul: Conventional Ranch (P1), Conventional Ranch with FTAI (P2), and Ranch with cultivated pasture and the use of FTAI (P3), all based on modal farms in the Pantanal of Mato Grosso do Sul. The study simulated the impact of increased productivity and herd quality in the economic turnover of extensive breeding farms in the region. A deterministic model was developed, by using spreadsheets to perform the costs and the turnover calculations. The economic margins were estimated by the difference between the costs and turnovers of the production systems studied. The variables number of male and female calves weaned and increased number of cows in production showed the highest impact in the compensation. The use of FTAI on farms with natural or cultivated pastures increased the pregnancy rate at the end of the breeding season (EM), leading to an increased number of calves available for sale and consequently increased turnover and decreased marginal cost of the calf produced on extensive breeding farms in the Pantanal of Mato Grosso do Sul.

**Keywords:** economic analysis, production of cattle, cost of calf.

### **Introduction**

The identification of low livestock productivity levels in the Pantanal opened significant opportunities for agricultural research, which generated technologies and practices appropriate to the regional conditions, although not always widely adopted by producers. The analysis of alternative procedures with low environmental impact, as well as the impacts of changes in the current cattle management practices may provide solutions that meet both the objectives of preservation of the Pantanal's flora and fauna genetic diversity and the increase in livestock productivity.



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The cost-benefit analysis is a useful tool for dealing both with the impacts of changes in the current herd management techniques, and with the impacts of alternative procedures in the Pantanal. Due to the low reproductive efficiency observed in Brazilian herds, it is crucial to develop ways to understand, control and improve the main reproductive indices (pregnancy rate, service rates, birth interval, birth rate). This evolution in breeding herds could be incremented by means of artificial insemination (AI), which would bring indirect and direct benefits, as the absorption of technologies, especially the ones that positively impact the reproductive indices of breeding herd in the Pantanal, are essential for the maintenance of the activity in the long term (Carvalho et al., 2009).

For the sustainable growth of the cattle raising activity in the Pantanal, it is necessary to increase the productivity, by genetically improving the Zebu herd in the region. It is thus essential to adopt artificial insemination, although some problems such as not enough specialized workers and the extensive breeding system hamper the deployment of the biotechnology. Therefore, FTAI may be applied in order to minimize the problems and to provide improved breeding productivity and decreased production costs regarding calves on farms of extensive breeding such as in the Pantanal.

### Material and Methods

Based on the modal production system determined during a panel with producers and technical personnel, according to the methodology described by Plaxico & Tweeten (1963), three productive scenarios of extensive livestock breeding were developed in the Pantanal: Conventional ranch with native pastures and natural breeding system with bulls (P1); Conventional ranch with native pasture and FTAI in all cows and after that, mated with bulls in natural breeding (P2); and Ranch with exotic pasture in 30% of the area and FTAI in all cows, and bulls in natural breeding (P3). The data regarding inputs and products, and the main production characteristics, reproductive rates, prices of inputs and commercialized products were obtained based on the use of the FTAI technique developed on Nhumirim Farm and commercial ranches in the municipality of Corumbá-MS, in 2012. The cost spreadsheets and the cash flow of the farm used by the beef cattle cost survey program in the Center for Advanced Studies on Applied Economics (CEPEA) were the basis to analyze the total cost-effectiveness (COE) and the total operating cost (TOC). Gross revenue was calculated by adding the value of the animals sold and the (gross and net) margins estimated for each scenario of production system, according to the methodology described by Carvalho et al. (2009). The price of the land with native pasture was estimated at R\$ 1,000,00 per hectare. The typical size was 10,000 hectares, of which 2,000 ha were legal reserve (20% of the total) and 8,000ha were native pastures. On P3 farm 30% of the area was exotic pasture (*U. humidicula*). The number of cows in reproduction was 1,800 on P1 and P2 and 2,000 on P3, due to greater stocking rate, confirmed by the formation of pastures. In the P2 and P3 the FTAI protocol was started at the beginning of the breeding season, and fifteen days later, the animals were mated by Nellore bulls until the end of the four-month EM. The gestation diagnosis was made by transrectal ultrasound 30 days after the bulls had been removed. The cost with hormones and materials for the FTAI protocols was R\$23.60, and the cost of the semen used was R\$13.00. The herd included male and female calves, heifers, bulls, old bulls, single cows and calved cows. In the economical analysis wasn't considered the higher live weight in FTAI animals due the genetic improvement, because in modal farms, scales isn't usual.

### Results and Discussion

The productivity indicators and financial results are shown in Table 1. The farm turnover included the sale of male and female calves and cull cows, heifers and old bulls. The calves were the main product of the turnover. When we decide to improve the productive rates of a farm, we need more inputs, which increases the operating costs. In P3, the Operating-Cost Effectiveness (COE), which concerns the expenditure made by the producer, was 38.7% higher than in P1. The Total Operating Cost (TOC), which refers to the COE plus the corresponding costs regarding depreciation of improvements, machinery and adult animals, is also higher due to the COE and the fact that the farm has more improvements, hence greater depreciation losses. Finally, the Total Cost (TC) is equal to the total operating cost plus the remuneration (interest), which in this study was 6% per year on capital stock, (COE) and on capital applied in improvements, machinery, animals and land. The pay (payment for the activity) is determined by the producers themselves, and has great interference in the balance between the total turnover and the operating cost, thus potentially leading to the success or the failure of the farm.

In the scenarios where the FTAI protocols were applied (P2 and P3), the cost of hormones and materials used for the FTAI protocols was the item that mainly affected the effective operational cost. However, they were the farms that exhibited the highest positive margins, due to increased total pregnancy rate at the end of the breeding season, which



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leads to an increased amount of calves available for sale. The total operating cost per hectare was R\$43,22/ha on the conventional ranch (P1), R\$58,78/ha on the conventional ranch with FTAI (P2), and R\$59,90/ha on the ranch with cultivated pasture and FTAI (P3).

With the birth rate of 64% on the ranch with cultivated pasture and FTAI (P3), and 66% on the conventional ranch with FTAI (P2), the calf production cost was the same as on P1 (R\$472.98 and birth rate of 53.7%). As the birth rates on the ranches with FTAI (P2 and P3) were 81%, the increase in the number of calves born on these farms led to a lower calf production cost.

Still regarding the production cost, even though P3 presented the highest COT, it presented the lowest calf production cost, which can be explained by the increase in the stocking rate (due to the formation of 30% of the area with cultivated pastures), and the greatest amount of animals on the farm, which means more animals available for sale.

Table 1- Productive rates and Cost and farm turnovers

Production indicators	(P1) conventional	(P2) conventional + IATF	(P3) pasture + IATF
Mortality rate pre-weaning / post-weaning	8.00/ 3.00%	8.00/ 3.00%	5.00/ 3.00%
Birth rate (nulliparous, primiparous and multiparous)	53.70%	81.00%	81.00%
Stock rate in pasture area	0.22 UA/ha	0.24 UA/ha	0.27 UA/ha
<b>Livestock turnover</b>	<b>R\$ 889,800.00</b>	<b>R\$ 1,160,494.00</b>	<b>R\$ 1,220,110.00</b>
Pasture maintenance	R\$ 6,913.30	R\$ 6,913.30	R\$ 13,826.70
Animal supplementation	R\$ 76,00.00	R\$ 106,400.00	R\$ 106,400.00
Family pay - Pro-labore	R\$ 118,500.00	R\$ 118,500.00	R\$ 118,500.00
Workers	R\$ 71,043.20	R\$ 98,714.90	R\$ 114,300.00
Vaccines, Parasite Control+ Hormones and semen for FTAI	R\$ 8,516.90	R\$ 55,859.40	R\$ 65,693.60
Purchase of animals	R\$ 35,000.00	R\$ 42,000.00	R\$ 42,000.00
Administration, Taxes, Energy supply and Commercialization	R\$ 64,821.20	R\$ 66,294.90	R\$ 66,883.30
Maintenance of improvements, equipment and utility vehicles	R\$ 17,188.00	R\$ 17,514.00	R\$ 17,514.00
<b>EFFETIVE OPERATING COST (COE)</b>	<b>R\$ 397,982.60</b>	<b>R\$ 512,196.50</b>	<b>R\$ 545,117.60</b>
<b>Depreciations</b>	<b>R\$ 59,539.33</b>	<b>R\$ 60,499.33</b>	<b>R\$ 75,921.73</b>
<b>TOTAL OPERATING COST (COT)</b>	<b>R\$ 457,521.93</b>	<b>R\$ 572,695.83</b>	<b>R\$ 621,039.33</b>
Net Operating Turnover (Turnover-COE)	R\$ 491,817.40	R\$ 648,297.50	R\$ 674,992.40
<b>Total Net Turnover (Turnover-COT)</b>	<b>R\$ 432,278.07</b>	<b>R\$ 587,798.17</b>	<b>R\$ 599,070.67</b>
<b>Cost per calf</b>	<b>R\$ 472.98</b>	<b>R\$ 392.79</b>	<b>R\$ 383.36</b>

### Conclusion

The analysis, carried out according to the calculations of the data collected, shows that the FTAI on extensive breeding farms increases the total net turnover, with an increased number of calves, which dilutes the production costs and causes a decrease in the marginal cost of the calf produced.

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