



## **The benefit-cost ratio and the rate of return on investment in sustainable intensification system of calves' production in the Pantanal**

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The beef cattle production system in the Pantanal focuses on the cow-calf phase, and is developed extensively. In order to increase the efficiency of the indices and the income of the property, some technologies were deployed in a ranch located at the Abobral (Pantanal sub region), namely: early weaning (EW) with the calves at the age of 100 days, and the use of fixed-time artificial insemination (IATF) in cows in years 2011-2012 and 2012-2013. The benefit-cost ratio (BCR) and the rate of return on investment (ROI) are indicators that relate the benefits of a project in relative monetary terms. The BCR lists the cost cash flows with the investment cash flows, expressed in monetary terms, and the costs expressed in monetary terms. The relationship between the amount of gain (or lost) money as an investment result and the amount of money invested is the definition of ROI. The two empirical indicators are widely used and relatively easily interpreted, in comparison with others. However, they present limitations, among which the insensitivity to the scale and to the duration of the project. The exceeding costs of using supplementation due to early weaning of calves were recorded, in addition to the information regarding the revenues and costs for the implementation and development of the enhanced system in the period mentioned. The property had 2,335 cows. With the intensification of the system, to weaning rate changed from 54 % to 76 % over the period, i.e., there was an increase of 22 percentage points. After calculations of the costs and benefits in the cash flow and the use of the standardized discount rate of 10 %, the value of the BCR was estimated at 1.70, i.e., for each real invested in the system there was a return of 70 cents. The ROI was estimated at 1.81 (for each real invested, there was a return of 81 cents), mainly due to the costs of the strategic supplementation adopted for the weaning. The results observed in the empirical indices were close to what was expected, which allows us to infer the good consistency of the cash flow data. The intensification of the system achieved the goal of increasing production indices of the breeding herd of the farm. In parallel, the management tool was one of the aspects improved with the intensification, even for the collection of technical and economic data. On the other hand, the analysis did not consider the cost of infrastructure deployment, depreciation, costs of opportunity, etc. These are important points for the actual estimate of the cost of production, and will be analyzed at the end of the project, in order to provide a more robust estimate of the profitability of the sustainable intensification system in the Pantanal.

**Keywords:** early weaning, fixed-time artificial insemination, cash flow

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