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RURAL EXTENSION FOCUSING ON OPTIMIZING ANIMAL NUTRITION: CASE STUDY ON PRACTICES AND ADDITIVES IN CATTLE PRODUCTION IN MATO GROSSO DO SUL

EXTENSÃO RURAL COM FOCO NA OTIMIZAÇÃO DA NUTRIÇÃO ANIMAL: ESTUDO DE CASO SOBRE PRÁTICA E ADITIVOS A PRODUÇÃO DE BOVINOS EM MATO GROSSO DO SUL

EXTENSIÓN RURAL CON ENFOQUE EN LA OPTIMIZACIÓN DE LA NUTRICIÓN ANIMAL: ESTUDIO DE CASO SOBRE PRÁCTICAS Y ADITIVOS PARA LA PRODUCCIÓN GANADERA EN MATO GROSSO DO SUL

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Abstract: This case study analyzes the role of veterinary professionals in animal nutrition, highlighting the importance of diet formulation and management strategies to optimize production and ensure profitability. With the increasing demand for food, efficiency in production becomes essential, especially in regions like Mato Grosso do Sul. An livestock consultancy company, in partnership with a nutrition company, developed a program involving farm visits and technical support aimed at improving animal performance. The study covered various farms in Anaurilândia, Douradina e Nioaque in Mato Grosso do Sul, Brazil, during January to June, 2024 and focused on feed quality and the use of additives, such as narasin and monensin, which showed superior weight

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gain results. Additionally, crucial aspects such as water quality and the adequacy of feeding troughs were analyzed, as they are fundamental for animal health and productivity. The results indicate the economic viability of using additives and emphasize the need for technical guidance, as inadequate practices can lead to significant losses for producers. Thus, this case study demonstrates that the combination of technology and specialized support is essential for sustainability and profitability in animal nutrition.

Keywords: Veterinary assistance, cattle farming, management, productivity.

Resumo: Este estudo de caso analisa a atuação de profissionais veterinários na nutrição animal, destacando a importância da formulação de dietas e das estratégias de manejo para otimizar a produção e garantir rentabilidade. Com o aumento da demanda por alimentos, a eficiência na produção torna-se essencial, especialmente em regiões como Mato Grosso do Sul. A empresa de consultoria agropecuária, em parceria com a empresa de nutrição animal, desenvolveu um trabalho que envolve visitas a propriedades e acompanhamento técnico, visando aprimorar o desempenho dos animais. O estudo abrangeu diversas fazendas nas cidades de Anaurilândia, Douradina e Nioaque, Mato Grosso do Sul, Brasil, durante os meses de Janeiro a Junho de 2024 e focou na qualidade da alimentação e no uso de aditivos, como narasina e monensina, que demonstraram resultados superiores em ganhos de peso. Além disso, foram analisados aspectos cruciais, como a qualidade da água e a adequação dos cochos, fundamentais para a saúde e produtividade animal. Os resultados indicam a viabilidade econômica do uso de aditivos e ressaltam a necessidade de orientação técnica, uma vez que práticas inadequadas podem resultar em prejuízos significativos para os produtores. Assim, este estudo de caso evidencia que a combinação de tecnologia e acompanhamento especializado é essencial para a sustentabilidade e lucratividade na nutrição animal.

Palavras-chave: Assistência veterinária, bovinocultura, manejo, produtividade.

Resumen: Este estudio de caso analiza el papel de los profesionales veterinarios en la nutrición animal, destacando la importancia de la formulación de dietas y las estrategias de manejo para optimizar la producción y garantizar la rentabilidad. Con el aumento de la demanda de alimentos, la eficiencia en la producción se vuelve esencial, especialmente en regiones como Mato Grosso do Sul. Una empresa de consultoría ganadera, en colaboración com una empresa de nutrición animal, desarrolló un programa que incluye visitas a fincas y acompañamiento técnico con el objetivo de mejorar el rendimiento de los animales. El estudio abarcó diversas granjas y en las ciudades de Anaurilândia, Douradina e Nioaque, Mato Grosso do Sul, Brasil, durante los meses de enero a junio de 2024 y se centró en la calidad de la alimentación y el uso de aditivos, como narasina y monensina, que mostraron resultados superiores en ganancias de peso. Además, se analizaron aspectos cruciales como la calidad del agua y la adecuación de los comederos, fundamentales para la salud y productividad animal. Los resultados indican la viabilidad económica del uso de aditivos y resaltan la necesidad de orientación técnica, ya que prácticas inadecuadas pueden resultar en pérdidas significativas para los productores. Así, este estudio de caso evidencia que la combinación de tecnología y apoyo especializado es esencial para la sostenibilidad y rentabilidad en la nutrición animal.

Palabras clave: Asistencia veterinaria, ganadería, manejo, productividad.

INTRODUCTION

Extension services are an important element within animal production systems, providing a flow of information that can improve the well-being of rural producers and the quality of their production. The objectives of extension include transferring knowledge from researchers to farmers, advising and educating them in decision-making, enabling them to clarify their own goals and possibilities, and encouraging desirable agricultural developments (ANDERSON AND FERRER, 2003).

The technical assistance company focuses on consultative selling, which means that its approach goes beyond mere commercial transactions. It is an approach where salespeople act as consultants, listening to potential customers and understanding their needs before offering products or services (CARVALHO AND CRUZ, 2016). In this way, the company seeks to deliver comprehensive solutions that include not only high-tech products but also management and operational strategies aimed at maximizing the profitability of producers, thus standing out in the market.

Technical assistance companies have been operating in Brazil since the 1940s, playing a direct role in the rural extension process, bringing innovation and technology diffusion to agricultural producers. The states of the Midwest region stand out in the country for having the largest number of properties receiving technical guidance, with the state of Mato Grosso do Sul being prominent (PEREIRA AND CASTRO, 2021).

In general, animal nutrition companies have partnerships with agricultural consulting firms, allowing producers to access a diversified portfolio of additives and supplements that are carefully selected to meet the specific needs of their herds. This collaboration enables field professionals to have adequate technical support to implement the best nutritional practices.

Aiming to increase and optimize production, additives are widely used in the formulation of diets for ruminant animals. These additives can include substances that improve digestion, promote weight gain, and increase feed efficiency. However, the mere inclusion of additives in diets does not guarantee positive results. It is essential to have qualified professional monitoring to ensure that the practices adopted are effective and truly contribute to the performance of the animals (POLIZEL et al., 2017), highlighting the importance of technical assistance within the scope of rural extension.

In this context, in the state of Mato Grosso do Sul, livestock farming is a vital economic activity, making the optimization of animal nutrition even more relevant. The region faces unique challenges, such as variability in climatic conditions and the types of forage available. Therefore, understanding how additives can be used effectively and adaptively is crucial to ensuring the success of cattle production (TOSETI, 2021).

This case study aims to explore the practices and use of additives in cattle production in Mato Grosso do Sul, focusing on rural extension through business technical assistance and its implications for production efficiency, with a focus on sustainability in the region. Through the analysis of the strategies adopted and the results achieved, the study seeks to provide valuable insights that can help professionals in the field make more informed decisions and achieve more sustainable and profitable production.

DESCRIPTION

The case study was conducted by analyzing various clients of Nutron, including several farms in the state of Mato Grosso do Sul, with a special focus on rural extension, seeking to implement more efficient and sustainable practices in cattle farming. Action plans and strategies were developed in the offices, where the production objectives were defined. Visits and monitoring were carried out on feedlot, semi-feedlot, rearing, breeding, and fattening farms.

The company has a strategic structure for quality service, with the commercial team consisting of a technical sales representative whose role is to acquire new clients, maintain existing ones, and ensure strategic growth of the registered clients.

The objective of the technical assistant is to execute sales, monitor productivity by assessing needs and challenges, formulate diets, and provide post-sales support, aiming to solve management issues on the property.

The focus of the activities was the strategic monitoring of existing clients, with occasional visits to prospects, preparation, and presentation of commercial proposals. Emphasis was always placed on new market technologies aimed at increasing productivity and improving already used products.

MONITORING OF BREEDING AND REARING CLIENTS

The study covered several farms in the cities of Anaurilândia, Douradina, and Nioaque, in Mato Grosso do Sul, Brazil, from January to June 2024, totaling 30 visits. The visits always started in the morning, at the earliest possible time, coordinated with the field employee and the manager or available producer. Stock levels were checked, and estimated projection calculations were made to meet the needs of each property. New orders took into account the delivery time, considering the time of year, such as drought or rainy seasons, which was a crucial factor in deciding which product would be used, focusing on the availability and quality of pastures.

During the monitoring of management practices, the technicians assisted the producers, aiming to make management more efficient by addressing questions from producers and employees. This approach was found to be the most effective way to bring information and new technologies to the farms. Management practices such as deworming, vaccination, or weaning were closely monitored.

On farms with feed mills and their own concentrate production, the quality of the mix, sieve conditions, raw materials, and other factors that could impact diet quality were evaluated.

Clients involved in breeding did not always finish the animals, with many opting to sell calves after weaning due to limited capacity to house the animals on the property, lack of sufficient labor, or because it was not the primary objective of the operation.

Figura 1. Evaluation of feed quality in a trough on a property in Nova-Nioaque - MS.

MONITORING OF REARING AND FINISHING CLIENTS

The rearing and finishing/termination stage is strategic and allows little room for mistakes. Some rearing clients purchase weaned calves at a price they consider attractive and make a tactical sale to producers who need to complete their lots. In other cases, the same client who raises the calves also handles the rearing and, sometimes, the finishing, making decisions based on factors such as the time of year, cost of supplementation, market price of cattle, labor availability, farm capacity, and the price of rearing or weaning.

Various factors can influence the profitability of the property. During the visits, the team toured the entire or nearly the entire property, seeking ways to enhance efficiency. It is important to note that almost never do the rules and management practices of one property fit another, even if they are neighboring ones. It is the technician's role to assess each property individually and, in the end, align with the producer to determine the best management practices for that specific farm.

FEED FACTORY EVALUATION

Visits to clients' factories were almost always accompanied by the Technical Sales Assistant. These visits focused on diet adjustments, considering the available raw materials, the condition of the mix, the premix to be used, the expected and proposed performance, as well as the season of the year for proper inclusions, with adjustments to the mixtures being made as needed. Training sessions were frequently conducted, often focused on Standard Operating Procedures (SOP).

Some producers used mixing wagons, eliminating the need for a factory, usually to produce diets solely for the confinement system. Producing several different diets in a single mixing machine can result in poor diet homogeneity and even traces of the previous diet. It was recommended that after each mixture, the machinery be cleaned with ground corn, which was provided in the machinery, and then collected and discarded.

Figura 2. Feed factory at a client's property.

RESULTADOS E DISCUSSÃO

With the start of technical assistance on the properties, it has been possible to observe a technological evolution, where producers are improving their management practices in beef cattle farming, making production more sustainable and profitable. The professionals providing technical assistance are directly involved in the rural extension process, as in many of the visited properties, these professionals are responsible for bringing innovation and technology, whether through the implementation of new management practices or by offering new products that yield better results (ARAÚJO; TOLEDO, 2024).

A consultative work proposal should never be made without first visiting the farm where the services and products will be directed. During this visit, the consultant should, if possible, tour the entire property, observing crucial factors such as water quality, availability of feeding troughs, stocking density, and the quality and availability of pasture. If there is a feed factory, its condition, labor force, and, of course, alignment with the available budget for investment should also be assessed. It is important to categorize what is being done and should be maintained, what is not being done and needs to be

implemented, and what is being done but can be improved. Based on these factors, a proposal for service is developed that is coherent with the client's needs, and then the work can begin.

EVALUATION OF WATER QUALITY

Bica et al. (2021) observed the different types of water sources and their impacts on animal performance, specifically studying ponds and drinking troughs. The animals' performance reflected a 29% difference in Average Daily Gain (ADG), with animals drinking from troughs gaining 0.467 kg/day, while those drinking from ponds gained 0.362 kg/day, a performance difference of 0.105 kg/day. The study confirmed that water consumption frequency was higher in troughs, where the water is warmer and better located, compared to a stream, creek, or river, which generally have surrounding trees. The study also showed that animals prefer cleaner water, which is found in troughs and waterers. This performance difference was even more significant in cows that had calved, where those drinking from troughs gained 0.270 kg/day more than those drinking from streams, as pointed out by the animal scientist. As we know from various studies, one of the fundamental requirements for a cow to conceive is its body condition score.

Thus, guidance was given to producers about the impact that water quality has on animals. Based on the numbers from this study, an example was provided to producers: if one arroba costs R$230.00, the cost per kilogram of arroba is R$7.66. Multiplying the cost per kilogram by the amount the animal failed to gain, i.e., 0.105 kg/day, results in a loss of R$0.80 per head per day. This calculation became even more concerning when projected over a year, leading to a loss of R$292.00 per animal. Furthermore, multiplying by the number of animals the producer had, an example was made using a fictitious number of 1000 animals, resulting in a loss of R$292,000.00.

EVALUATION OF TROUGHS AVAILABILITY

Several animal supplementation companies, such as Nutron-Cargill, have already published studies and continuously provide technical recommendations regarding the availability of trough space per animal. This availability varies depending on the supplement provided to the animals (Table 1). The supplements available in our region

include White Line Mineral Salt, Supplemented Mineral Salt, Condensed Mineral Salt, Protein Supplements, Energy Protein Supplements, and Feed. The consumption of protein supplements can vary significantly and is adjusted according to the strategy and operations of the property. The same applies to feed, which can be a total or partial diet, commonly used in semi-confinement systems and Intensive Pasture Finishing (IPF) (Table 1).

Table 1. Linear Trough Measurements According to the Supplement Used.

Product	Average Consumption	Trough Diameter
White Line Mineral Salt	25g to 35g/kg of body weight	Minimum 5 cm/head
Supplemented Mineral Salt	40g to 70g/kg of body weight	Minimum 5 cm/head
Protein Supplement	100g to 200g/kg of body weight	Minimum 15 cm/head
Energy Protein Supplement	300g to 700g/kg of body weight	Minimum 30 cm/head
Feed	≥800g/kg of body weight	Minimum 40 cm/head

Source: Nutron Nutrição Animal (2024).

The trough lengths directly affect animal performance, as it has been proven that cattle are gregarious animals (ALBADES et al., 2017). This means that cattle tend to move together. In diets where animals are not confined, when a non-dominant animal reaches the trough and there is no space to feed due to the presence of a dominant animal, it tends not to feed properly (ODONGO et al., 2007). This happens because cattle, being gregarious animals, typically come to the trough to eat only a few times a day, and when they do, they eat together. One of the easiest ways to notice uneven consumption within a group is the disparity between animals on the same diet, in the same environment, with the same management, water quality, and genetics.

Proper adjustment of this structure also helps prevent some metabolic disorders due to improper intake of certain ingredients in the diets, especially when the diet is poorly adjusted or offered to hungry animals. The impact of poorly performing animals leads to various problems on a property, such as staggered slaughter of animals of the same age, turnover time in confinement, and crop rotation, among others.

EVALUATION OF ADDITIVE USE

The additives chosen were positioned according to the category and purpose of the animals. During the study, it was possible to monitor the use of Narasina and

Monensin Sodium. The additives act through different mechanisms, including altering ruminal fermentation (increasing propionic acid formation, decreasing methane production, and reducing proteolysis and deamination of dietary protein in the rumen), stabilizing the ruminal environment, and protecting the gastrointestinal tract against pathogens.

Ionophores, such as Monensin, are antibiotics that alter fermentation patterns, helping maintain rumen pH (MARINO, MEDEIROS, 2015). Monensin is one of the most widely used and studied nutritional additives globally, with over 6,000 published studies. It has been used in cattle since the 1970s. Its use aims to produce more while consuming the same amount of dry matter, increasing feed efficiency and extracting more energy from diets by improving digestion. Another characteristic of this additive is its modulating effect on consumption, commonly used in confinement diets and pasture finishing, such as in TIP (Intensive Pasture Finishing) or semi-confinement systems.

Nicodemo (2001) evaluated over 10,000 confined animals in his study, with 5,696 in the control group and 5,578 receiving Monensin in their diet. The animals that received the recommended dose of Monensin showed an average daily gain of 1.6% and consumed about 6.4% less dry matter (DM). The same study was conducted on pasture, though with fewer animals: 456 in the control group and 458 with Monensin, where the additional gain was 13% for animals that received the additive.

However, as indicated in other studies, the main challenge lies in ensuring the correct daily dose of the active ingredient is consumed, due to the erratic consumption patterns of supplements offered to animals on pasture, often exacerbated by a depressive effect on the consumption of the additive. Additionally, there are warnings about handling Monensin, its provision to equines, and its compatibility with the antibiotics Tiamulin and Troleandomycin.

Narasina is mainly recommended for use on pasture, as it does not have the modulating characteristic found in Monensin and other animal nutrition additives. Another feature of Narasina is its inclusion in products like Supplemented Mineral Salt or higher consumption products, such as a 0.3% Protein supplement. The recommended daily dose is 13 ppm (13 mg/kg of dry matter consumed).

The use of Narasina gained prominence for animals in the rearing and finishing phases on pasture, as it provides superior performance compared to its main competitors. Narasina was compared with four other additives over a period of 140 days in rearing animals. The results obtained during this period are as follows:

Table 2. Weight Gain Using Narasina.

Comparison	Weight Gain (Kg)
Narasina vs Salinomycin	+17,8 kg
Narasina vs Virginiamycin	+12,1 kg
Narasina vs Lasalocid	+10,7 kg
Narasina vs Flavomycin	+9,4 kg

Source: Silva et al., 2015; Polizel et al., 2017.

Thus, it was possible to demonstrate a solid foundation for the use of Narasina in the rearing and finishing phase on pasture, enhancing animal performance and increasing profitability for the producer, even with a higher daily cost per animal. Most clients tended to use White Line Mineral Salt, such as the well-known 40P, 60P, and 80P Phosphorus products.

For example, if a client chose a 60P Mineral Salt, with a daily cost of R$0.25 per animal, and compared it to a Narasina-supplemented Mineral Salt with a daily cost of R$0.55, there would be a difference of R$0.30. Currently, the price of an arroba in the MS region is R$213.00. As mentioned, Narasina showed superior weight gain compared to other additives, such as Salinomycin. Over a 140-day period, Narasina resulted in an additional weight gain of 17.8 kg, which represents an additional average daily gain (ADG) of 0.127 g.

It is important to highlight that White Line Mineral Salts do not contain additives that promote efficiency in their formulation. To evaluate the feasibility of using Narasina, we calculated that with the price of an arroba at R$213.00, the cost per kilogram is R$7.10. To find the break-even point for the daily cost difference between the products, we divided the R$0.30 difference by the price per kilogram of the arroba, resulting in 0.042 g required to justify the investment. In a published study, an additional gain of 0.127 g was demonstrated, resulting in a profit of approximately R$0.60 per day per animal. These data serve as a basis for the economic analysis of Narasina use.

Table 3. Costs and Gains with Supplemented Salt.

Description	Value
Cost of Arroba and Cost per kg of Arroba	R$213,00 / 30 = R$7,10
Daily Difference between White Line Salt and Supplemented Salt	R$0,30
Break-even Point Calculation	R$0,30 / R$7,10 = 0,042g

Proposed Additional Gain vs. Break-even Difference	0,127g – 0,042g = 0,085
Additional Daily Profit	0,085 * R$7,10 = R$,60

Source: Silva et al., 2015; Polizel et al., 2017.

FINAL CONSIDERATIONS

The proper use of the technologies and actions described in this report results in consistent profitability for the producer. In the context of rural extension, the strategies suggested to optimize animal performance also significantly contribute to animal welfare, as higher productivity is intrinsically linked to their health and well-being.

It is essential that the use of performance-enhancing additives be always monitored by a qualified technician, especially in rural extension settings, as the technician is often the only source of assistance available to these producers. The improper use of these products can lead to significant, often irreparable, losses for the producer. Therefore, technical guidance is crucial to ensure the best results.

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