

Applicability of management tools in a family dairy farm: a case study

Aplicabilidade de ferramenta de gestão em propriedade leiteira familiar: estudo de caso

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ABSTRACT: This study aimed to describe the application of the management tool GUT matrix in a family dairy farm in the state of Acre to identify the main weaknesses and propose adequate tools to allow better management of the causes of the three biggest identified problems. This is a case study carried out on a single property located in the municipality of Rio Branco - Acre in May 2022. Information was collected by applying a semi-structured form with 267 questions. The GUT matrix allowed ranking the three main weaknesses of the property, namely: “lack of zootechnical bookkeeping,” “long calving interval,” and “failure in feeding management.” The management tools proposed to the producer, seeking to guide and organize the activities of the property, consisted of 5W2H and Ishikawa diagram.

KEYWORDS: Zootechnical indices, rural management, GUT matrix, dairy farming.

RESUMO: Objetivou-se descrever a aplicação da ferramenta de gestão, “matriz GUT”, em uma propriedade leiteira familiar no estado do Acre para identificar os principais pontos fracos e propor ferramentas adequadas para permitir melhor gerenciamento das causas dos 3 maiores problemas identificados. Trata-se de um estudo de caso realizado em propriedade única localizada no município de Rio Branco - AC em maio de 2022, as informações foram coletadas por meio de formulário semiestruturado contendo 267 questões. A matriz GUT permitiu ranquear os 3 principais pontos fracos da propriedade, sendo: “falta de escrituração zootécnica”, “intervalo entre partos longo” e “Falha no manejo alimentar”. As ferramentas de gestão propostas ao produtor, buscando orientar e organizar as atividades da propriedade consistiram no 5W2H e Diagrama de Ishikawa.

PALAVRAS-CHAVE: Índices zootécnicos; gerenciamento rural; matriz GUT; pecuária leiteira.

INTRODUCTION

The state of Acre occupies the fourth position in the number of cattle in the North region of Brazil, with an estimated herd of 2,326,855 million head in 2020 (ABIEC, 2021), raised in 1.63 million ha of pasture and distributed in 22,649 rural properties (IBGE, 2017). Beef cattle raising in the state consists of the activity with the greatest economic expression, with 92.88% (ABIEC, 2021) of the cattle herd destined for this purpose, and the sector represents approximately 40% of the gross value of production in the state, reinforcing the development of state agriculture.

However, livestock sector productivity is often very low due to pasture degradation associated with poorly adapted breeds and weak administrative management. Therefore, much larger pasture areas are continually needed to meet market demands, and pastures have been expanded to marginal areas that are rapidly degraded (ZULUAGA et al., 2021). Acre is one of the least deforested states in the Brazilian Amazon (ROLANDO, 2017) and experts fear whether the expansion of pasture areas will actually improve the productivity of the system.

When a rural company focuses on productivity, strategies must be adopted to intensify livestock systems through

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better use of the land and its resources, regardless of the level of technology or size of the property, product, or work it offers. The rural property should be seen as a company with the mission of sustainable development, productivity, and socio-economic growth.

Unfortunately, most rural producers make property management decisions not considering the whole. Thus, their management consists of “putting out fires,” wasting workforce and money on problems and not on the real causes. Several resources, techniques, and tools can be used by producers in the observation, identification, decision-making, and monitoring of managerial demands to assist in management. However, according to LOPES et al. (2016), they are little used due to a lack of time management and understanding of the subject, among other factors. The authors also propose the implementation of educational programs for use, seeking higher knowledge and risk management of the rural company.

In the search for demystification in the use of management tools, sustainable use of the area, and productivity improvement, this report was carried out to describe the applicability of the management tool GUT matrix in a family dairy farm in the state of Acre to identify the main weaknesses and propose other management tools for the three main problems highlighted by the GUT matrix, seeking to minimize zootechnical and economic losses and manage the rural property as a rural company.

MATERIAL AND METHODS

The case study was conducted in the municipality of Rio Branco - Acre on a family farm for dairy cattle. This is a case study with a descriptive character and a qualitative approach, using the single case study method, as it allows better organization of the data, in addition to being recommended for the initial stages of investigations related to complex themes, allowing the construction of hypotheses and problem reformulation (VASCONCELOS et al., 2019).

Data collection on the property was carried out using a semi-structured form with 267 questions distributed in topics such as characterization of the producer and the property (48 questions), the herd (14 questions), production (86 questions), reproductive management (37 questions), calf management (12 questions), health control (55 questions), and the environment (15 questions).

A multidisciplinary team composed of graduate students and professors in the fields of veterinary, biology, and animal science carried out the investigation and identification of problems through brainstorming (ANDRADE; BOFF, 2014). The advantages of evaluation by a multidisciplinary team are that it does not tend to prioritize one area or another, allowing a holistic view of the cause of the problems that may compromise the productive and economic future of the production system.

Twelve weaknesses were listed and then analyzed individually by the team using the GUT management tool methodology (OLIVEIRA et al., 2016; PESTANA et al., 2016). Each weakness was analyzed by the evaluators by assigning scores on an increasing scale from 1 to 5 (1 being a non-serious problem and 5 an extremely serious problem) to the dimensions of severity, urgency, and tendency, separately. Subsequently, the scores of each variable were averaged and the GUT matrix index was obtained by multiplying the averages of the variables G, U, and T, allowing to numerically list the priority levels of the identified problems.

The classification of weaknesses highlighted by the GUT matrix enables the proposition of management tools for the first three weaknesses observed to allow organization and monitoring to solve the causes of the problems faced on the property. For this purpose, the 5W2H (LISBÔA; GODOY, 2012) and Ishikawa diagram (ISHIKAWA, 1985) management tools were proposed.

The 5W2H tool consists of an activity monitoring chart (LISBÔA; GODOY, 2012) and is considered easy to use as it helps the team fill in, monitor, and control the actions to be developed on the property. Its name comes from the combination of letters and numbers of guiding questions, that is, 5W: what, why, who, where, and when; and 2H: how and how much.

The Ishikawa diagram, also known as the cause-and-effect or fishbone diagram, is indicated for solving problems with several variables involved. Its composition considers that problems can be classified into seven different types of causes, that is, the 7Ms: machine, method, mother nature, manpower, material, management, and measurement. In some cases, another “M” can be used: money (LOPES, 2016).

RESULTS AND DISCUSSION

The problems were listed in descending order with the application of the GUT matrix, listing the decision-making priority. The three main weak points found, according to the average, were “lack of zootechnical bookkeeping,” “long calving interval,” and “failure in feeding management.” Higher scores indicate a greater need for intervention, as they are more severe and more urgent to be solved and have a higher tendency to get worse (LOPES et al., 2018). Table 1 summarizes the survey of weaknesses diagnosed using the brainstorming tool and the scores assigned by the researchers using the GUT matrix, showing the three highest scores.

Zootechnical bookkeeping

Zootechnical bookkeeping is the systematic and methodical recording process of all facts that occurred on a property to establish data necessary for any subsequent verification

Table 1. Weaknesses observed in the dairy farm in the municipality of Rio Branco - Acre.

Weakness	Average of the evaluators' scores			GUT matrix score
	G	U	T	
Zootechnical bookkeeping	4.83	5	5	120.83
Long calving interval	5	4.67	4.83	112.78
Failure in food management	4.67	4.50	4.5	94.50
Reproductive problems	4.67	4.17	4.66	90.74
No access to financing	4.33	4.33	4.66	87.63
Lack of knowledge about animal intake	4.17	4.50	3.83	71.88
No pasture rotation	3.67	4	4.66	68.44
Mineralization for beef cattle	3.67	3.33	3.16	38.70
Little shading	3.33	3.17	3.66	38.70
Dirt on the pasture	2.5	3.33	3.83	31.94
Breeding genetics (bull)	3.67	3	2.83	31.17
Inactive fish farming tanks	3.33	2.5	3	25

(SILVA, 2015). It is of paramount importance in dairy farming, as it aims to raise reproduction, production, and milk quality indices, providing information on the efficiency of production systems, enabling technical and careful analysis, which must be changed to increase productivity, profitability, and activity organization (MION et al., 2012). The zootechnical control provides higher efficiency and productivity in the system, while finance control provides higher control of costs and revenues in the property.

Unfortunately, the focus property of this study does not record possible data to generate zootechnical indices that would assist in decision-making. Therefore, the reality of the farm cannot be known from a technical-managerial point of view, making it impossible to set goals and develop management strategies to leverage the property and everyone who depends on it.

Considering that the organization of a system starts from zootechnical bookkeeping and this problem received the highest score listed by the GUT matrix, the use of verification sheets for zootechnical records with data such as animal identification and sanitary, reproductive, and productive control, as well as spreadsheets for recording expenses and revenues aiming at estimating production costs and analyzing profitability, should be encouraged among producers and their employees. In this sense, the 5W2H management tool was proposed considering the type of work that this weakness demands (LISBÔA; GODOY, 2012). A table for monitoring activities should be elaborated: a) what: production and reproduction notes; b) when: every day; c) who: the cattle handler; d) where: on individual forms and/or printed spreadsheets; e) why: to obtain data for the formation of zootechnical indices, to identify bottlenecks, and carry out guided actions; f) how: recording

calvings, inseminations, weaning date, milk volume, and entry into lactation, among others, in a specific form/spreadsheet; and g) how much: cost of printing the forms.

Long calving interval

Several parameters can be used to measure the reproductive efficiency of a herd, the main one being the calving interval (CORASSIN et al., 2009). This is one of the most important characteristics to evaluate the reproductive efficiency of the dairy herd and comprises the period between two consecutive calvings. Its extension leads to damage to production systems, as it reduces milk production and the number of lactations during the cow's useful life, in addition to the number of heifers for replacement and animals for sale, reducing the herd's productive and economic efficiency (FIDELIS; FERNANDES, 2020). The recommended calving interval for dairy cattle efficiently managed, under good health conditions, and with efficient feeding management is up to 12 months (SOUSA et al., 2012).

During the application of the questionnaire, the owner was unable to inform how long the cows had been empty. However, we could estimate that 50% of the females capable of reproduction had been empty for approximately eight months. This estimate is based on the fact that the property had no bull for reproduction up to two months before the interview and no assisted reproduction activity was carried out in that period.

Considering the characteristics of this problem, the multidisciplinary team opted to propose the Ishikawa diagram (ISHIKAWA, 1985), as it is a management tool indicated for solving problems with several variables involved.

The diagram proposed for the weakness "long calving interval" is represented in Figure 1 and was elaborated

considering the main problem and later its possible secondary problems followed by their causes.

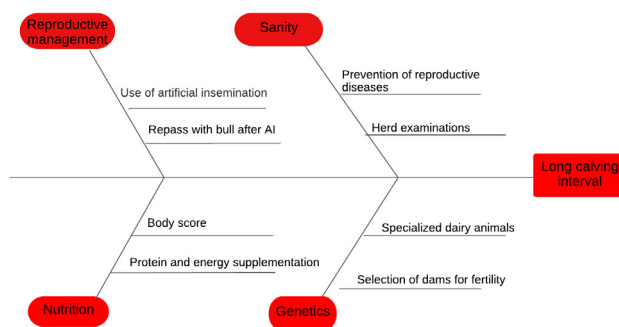
The main problem is the result of secondary problems such as health, genetics, nutrition, and reproductive management. Therefore, each secondary problem has its own nuances to be worked on, which are of paramount importance for solving the primary cause.

When the possible primary causes for the problem found are analyzed, the diagram opens up possibilities for individual evaluation for each one of them, allowing decision-making based on targeted analysis and not just by the producer's guesswork. For example, if the problem of long calving intervals is linked to animal health, then the producer must act on the possible causes shown in the diagram, such as carrying out periodic examinations of the herd, promoting diagnoses of reproductive diseases. Other tools may be suggested for each cause raised by the diagram to accompany the resolution.

Failure in feeding management

Herd feeding represents the highest production cost of the activity and, therefore, it cannot be neglected. In addition to the economic and financial issue that the erroneous application of feed management causes to the property, the metabolic problems that it can cause the animals, such as excess protein in the diet, overloading the liver and kidneys, must also be considered (CAMPO; MIRANDA, 2012; REIS et al., 2018).

A diet by category is recommended in a dairy herd because animal nutrition considers the physiological period that the animal is going through. For instance, the daily requirements in energy, protein, and minerals/vitamins for heifers at the backgrounding phase are based on determinations of maintenance and weight gain (NRC, 2001). Heifers and pregnant cows must receive balanced diets with all nutrients that guarantee good fetal development, colostrum production, and good lactation throughout the gestation and transition period (COELHO, 2009).



Source: The authors.

Figure 1. Proposed Ishikawa diagram for the “long calving interval” problem.

The third highest-scoring item listed by the GUT matrix is the fact that the property provides the same diet for all animals, that is, mineral salt, pasture, chopped forage, and, when offered, energy and protein supplements are given to all animals in the herd without considering the characteristics and nutritional requirements of each category.

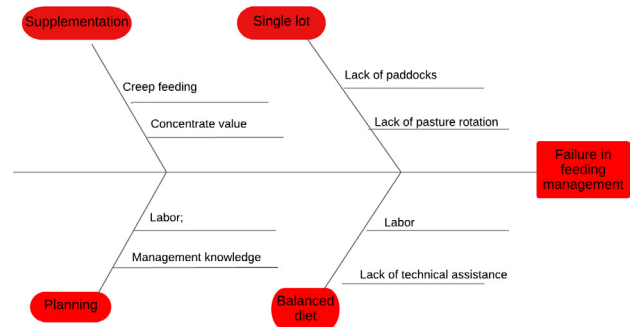
The suggested tool for this problem is the Ishikawa diagram (ISHIKAWA, 1985), considering that the main problem is surrounded by secondary causes. These secondary causes may require other management tools for their complete resolution and follow-up. Figure 2 shows the proposed diagram with their respective primary and secondary problems and possible causes. The diagram will help the producer to carry out risk management with higher clarity, making sure that the causes of problems are being worked on and not only the urgencies that will be recurrent in the property.

The acceptance and availability of the owner and employees to carry out the propositions and recommendations resulting from the application of the proposed management tools were positive. New follow-up studies and analysis of results should be constant for property management to improve productivity per area.

CONCLUSION

Management tools, when demystified and presented practically and directly to managers, help and guide the resolution of simple and complex problems. The direct application of the GUT matrix allowed identifying the main problems and prioritizing those of greater severity, urgency, and tendency, which could undermine the development of the property, which seeks to increase the productivity and profitability of production sustainably.

Prioritizing weaknesses enables the proposal of other tools to carry out risk management with greater clarity, making sure that the causes of problems are being worked on and not only the urgencies that will be recurrent in the property.



Source: The authors.

Figure 2. Ishikawa diagram proposed for the “Failure in feeding management” problem.

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