

Socioeconomic diagnostics of the dairy productive chain of the microregions in the northeast portion of the state of Pará, Brazil

ABSTRACT

The main objective of this study was to characterize the socioeconomic and productive profile of family dairy farmer in the microregions of the northeast portion of the Brazilian state of Pará. A questionnaire was applied between March and April 2016 at the 20 rural properties of the cities of Castanhal, Irituia, Nova Timboteua, Peixe-boi, and São Francisco that work with dairy cattle. The dairy activity in the microregions of the northeast portion of the state of Pará is characterized by low technological and productivity indices. It is essential producers seek to improve their technical and managerial knowledge in order to optimize zootechnical and productive indicators.

KEYWORDS: Dairy cattle. Dairy producers. Milk quality.

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INTRODUCTION

Dairy production in the North region of Brazil is developed in small land units of diversified production. In the state of Pará, as well as throughout the Amazon region, dairy farming is connected to family agriculture (SENA et al., 2012). Pará has been standing out in the national production ranking and featured in 12th position in 2017 among the 26 Brazilian states and the Federal District. The herd of milked cows increased in the North region and, in Pará, milk production has increased by 2.7% (14.7 million L) to reach 554 million L (IBGE, 2018).

Some mesoregions of Pará, such as the northeast portion of the state, face big hurdles in dairy production, such as insufficient techniques in pasture, animal, and sanitary management; low use of inputs; and low investment capacity since production is characterized by small decapitalized properties (SENA et al., 2012; NERES et al., 2017).

The activity in the mesoregion has become less attractive due to alternatives in agriculture, which is its main economic foundation. Therefore, the present study aimed to investigate the reality of the dairy properties of the microregions in northeastern Pará and to characterize their production profile. The information generated may contribute to the improvement of the productive sector in cattle farming in the state based on Normative Instruction no. 62/2011 of the Ministry of Agriculture, Livestock and Food Supply, which sets microbiological and physicochemical standards of milk.

MATERIAL AND METHODS

The research was carried out at 20 properties located in five municipalities of the microregions in the northeast portion of Pará (São Francisco do Pará, Nova Timboteua, Castanhal, Peixe-boi, and Irituia) and interviewed their land owners. The dairy properties selected have herds under 100 animals, mean daily production below 100 L/day, and are centralized in settlements that distribute the milk produced to specialized companies and for artisanal production of dairy products.

Producers and production were characterized during March and April 2016 through a semi-structured questionnaire adapted from Dantas (2016), which comprised 14 sections with 50 open- and close-ended questions to obtain information on characterization of producers, schooling, access to and knowledge of Normative Instruction no. 62, household, time in dairy farming, technical support, organization of producers, family income, labor in the activity, production characteristics, herd feed, reproductive management, sanitary management, and milking management.

The questionnaire was applied by graduate and undergraduate students of the Federal University of Pará and Federal Institute of Pará after training in order to ensure uniformity in collecting the information and guarantee that variations among answers were due to individual differences instead of how the researchers asked the questions. The statistical software BioEstat version 5.3 was used to treat the data, which underwent graphical analysis through frequency distribution as percentages. This method aims to cluster data by occurrence class, summarizing the dataset analysis in plots.

The research was approved by the Ethics Committee of the Institute of Health Sciences of the Federal University of Para, according to the number 2.025.226.

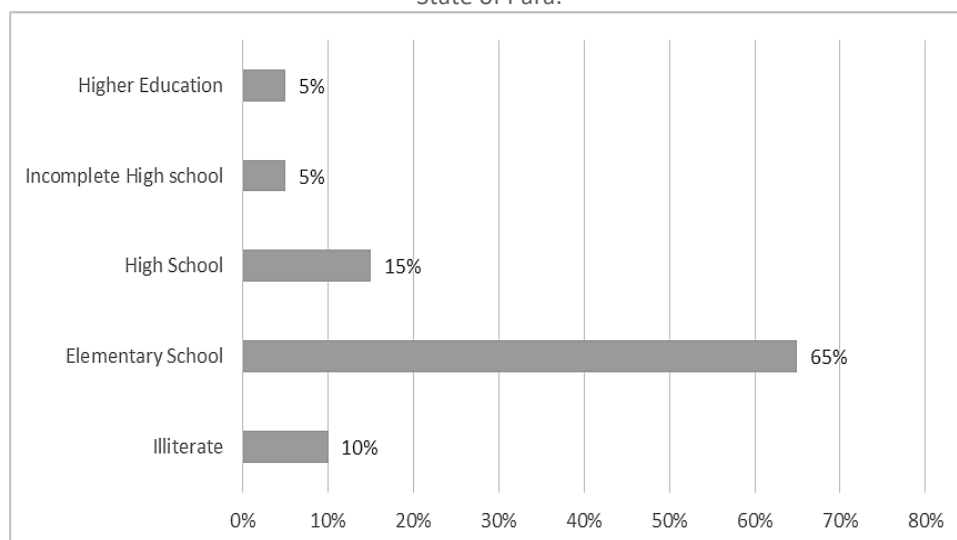
RESULTS AND DISCUSSION

An analysis of the questionnaire showed that, at the properties assessed, dairy production is handled by males (100%), however, female labor directly takes part in managing the enterprises. Dantas et al. (2016), in a study on dairy farmers from Irituia and Ulianópolis in the same state, also found that women are usually responsible for internal services at the property whereas men carry out internal and external operational activities related to agribusiness management, such as the sale and purchase of field materials.

Sabbag and Costa (2015) stated that, as dairy production grew, its economic and social importance significantly increased, thus men acquired autonomy over the activity, and that the modernization of the sector further drove male domination over family production. This study revealed that only the men attended courses and training.

The survey showed that 65% of the producers had elementary school education while 10% were illiterate (Figure 1). Almeida et al. (2015) stated that people with low schooling are less likely to accept new techniques and to absorb information on management practices, which hinders the adaptation to new technologies in dairy farming.

Figure 1 - Degree of schooling of dairy farmer in the micro regions of the Northeast of State of Pará.



Source: Author.

Dantas et al. (2016) conducted a research on cattle farmers and found that most had not completed elementary school. Those authors stated that this scenario would hardly change unless public policies are implemented aiming to alter this reality.

The investigation revealed that 95% of producers were unaware of Normative Instruction no. 62 (BRASIL, 2011) of the Ministry of Agriculture, Livestock, and Food Supply, which sets microbiological and physicochemical standards of milk. This can be attributed to countless factors, such as the lack of specific public policies, low

schooling, and limited access to technological information. Although the legislation aims to improve the quality of milk produced in Brazil, it becomes visible that investment is required on the technical formation of producers through training and courses in good practices, particularly for family producers whose major source of income is dairy farming (NERES et al., 2017). The concern with small producers is because many lack the financial and technological conditions required to adapt to the norms or to purchase the equipment required to implement the changes (BATTAGLINI et al., 2013).

With regard to housing, 50% of the producers lived in farms and the other 50%, in urban areas. The producers who live at the property have greater control and are more involved in the activities of the farm and animals. Those living in urban areas attributed all animal management and commercialization of milk to cowhands since the farmers have little contact with dairy farming. Neves et al. (2011) reported that 46.4% of the producers in Petrolina, PE, Brazil lived in urban areas and justified they did not live at the properties given the short distance from the city. Dantas et al. (2016) highlighted that producers who live at their rural properties enjoy greater autonomy in dairy farming and in milk production, which is a positive characteristic.

It was found that 65% of the producers have been in dairy farming for over a decade, while the others reported periods of six to ten years. Aleixo, Souza and Ferraudo. (2007) stated that the time of experience in dairy farming leads to gains in knowledge over the production system. In contrast, producers with little experience tend to have low zootechnical and productive performance and are often driven to give up on the activity. To Dantas et al. (2016) and Cunha et al. (2018), the lack of experience regarding cattle management is the main factor causing producers to quit dairy farming since experience is crucial to enhance techniques and animal management practices.

Lack of access to technical support was reported by 85% of the producers, while the others stated that the guidance from such support was limited. To Cunha et al. (2018), the lack of technical follow-up directly impacts the low productivity indices of rural enterprises by preventing producers from accessing new technologies. Limited technical support was observed by Dantas et al. (2016) when characterizing producers in southeast Pará. Those authors found that the technical visit took place at the producers' homes and not at the rural properties themselves and provided basic guidance in sanitary and nutritional management. Bazotti, Nazareno and Sugamoto (2012) explained that technical support is essential to obtain positive results in dairy activity since failure in support prevents the verticalization of knowledge and information on management techniques between producers and technicians. That reduces the adoption of new technologies and practices that might lead to innovation and profitability of the properties and, this way, make the economy of small and medium-sized farms viable.

Of the producers studied, 70% stated not taking part in any cooperative, association, or union and reported preferring to work alone as they do not believe in financial return from joining other producers. Dairy cooperatives in northeast Pará would be an excellent option to market production since this region is near large consumer centers. A cooperative is a company founded and managed by an association of users who get together on equal grounds aiming to develop an economic activity or provide common services, thus skipping the middle men

(WINCKLER; SANTOS; MACHADO, 2013). The cooperative movement contrasts with large, monopolistic capitalist corporations.

Partnerships, in turn, are a way of dairy farmers to organize to access collective public policies, obtain better prices when purchasing inputs, and receive specialized technical support. This type of organization may greatly benefit low-production farmers whose only source of income is milk, helping them overcome hurdles in knowledge (KUNZLER and BULGACOV, 2011). In the present study, the other producers who are members of the rural union of their municipalities reported that this type of organization is important to obtain knowledge through courses and training offered by the unions.

The family income from dairy farming for 25% of the producers was one time the minimum wage (equivalent to USD 229.31 as of September 2018), three times the minimum wage (USD 687.93) for 45%, and five times the minimum wage (USD 1,146.55) for 25% when the only source of income was dairy activity. Other producers reported that their properties have diversified production, such as vegetable gardens, poultry farming, beef cattle, and fruit production, which ensures other sources of income.

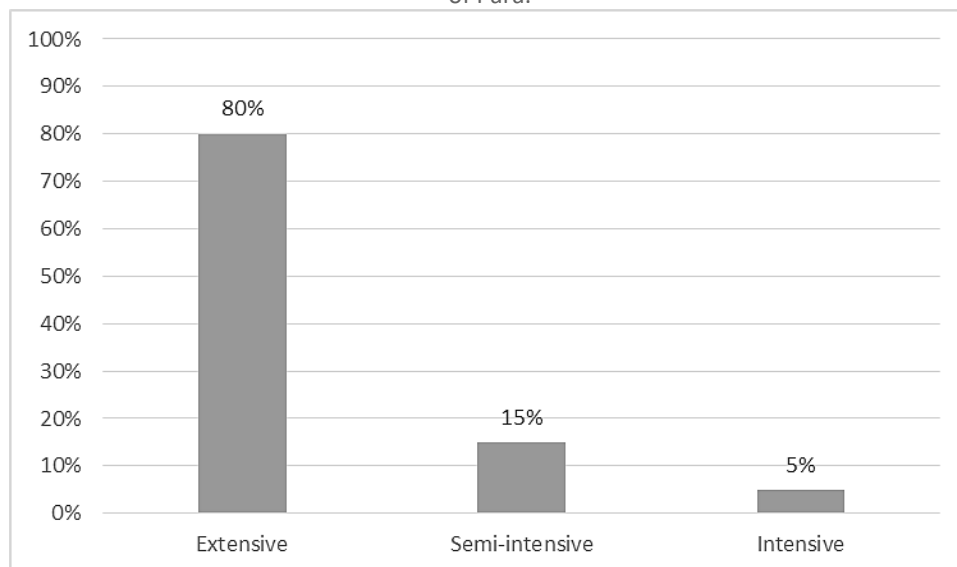
Silva (2013) believes dairy farming ensures stable monthly income to the family, besides requiring intense use of labor whether in milking, maintaining facilities, or treating and feeding the herd. Based on that, countless families, particularly those with many members, face the need to continuously enhance the rearing system, to seek to intensify and diversify land use so as to generate more income, and, simultaneously, find productive occupation for all family members. Hence, many producers develop cattle farming along with other plantation and animal husbandry activities to diversify land use, productive resources, and labor.

Labor in this region comprise 55% family workers since hiring external labor makes dairy farming costly and cripples production. However, 45% prefer to hire temporary labor to carry out specific jobs in milking and general animal management. Silva et al. (2010) assessed the milk production system in the state of São Paulo and found that many workers were family members and the proprietors lived in the farms, thus hired labor was low.

Dairy farming in the region is predominantly developed in extensive systems, found in 80% of the properties (Figure 2). Dantas et al. (2016) characterized southeast and northeast Pará and found that 94% of the producers practiced extensive farming.

Rational use of pasture areas in semi-intensive systems provides the producer with a balance between high production and nutritional potential of the forage, resulting in even use of pastures and higher milk production (CLEMENTINO et al., 2015). Dias-Filho (2011) explains the potential for extensive production using pastures in Brazil, particularly in the North region. However, for it to be viable, choosing adequate forage grasses and meeting their nutritional and soil-correction requirements is essential.

Figure 2 - Production system of dairy farms in the microregions of the Northeast of State of Pará.



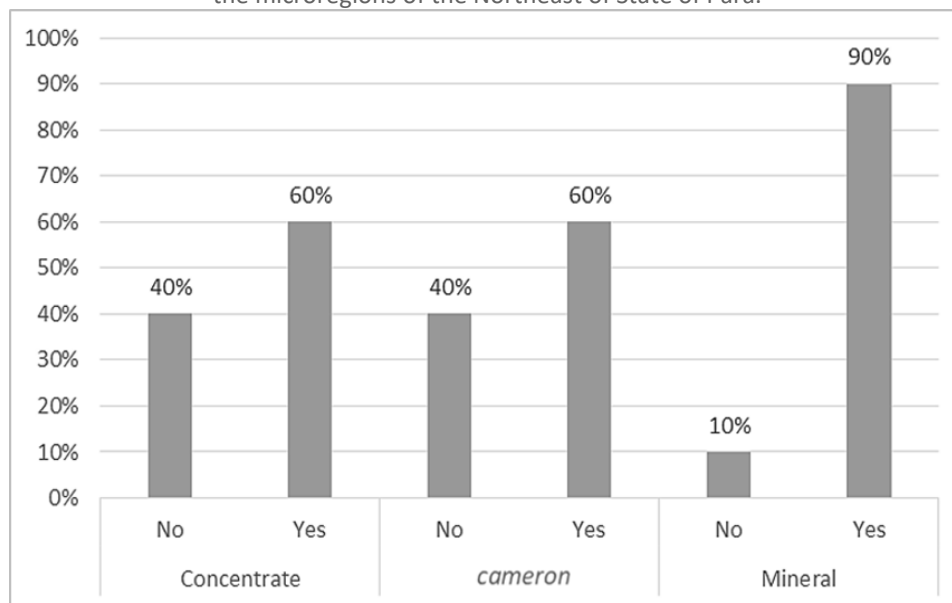
Source: Author.

The total area of the properties assessed ranged from 25 to 80 ha, while most were between 50 and 80 h, with mean dairy production in the dry season of 100 L/day and 120 L/day in the rainy season, when pasture potential is higher. The main destination of production is dairy industries in the region. To 80% of the producers, this is the main activity developed, while the others diversify the activities in the farm. The mean herd in the farms over 365 days was 54 animals and the producers were classified according to the size of the dairy cattle herd. The smallest producers were those with fewer than ten cows, corresponding to 10.53%, while 68.42% had 11 to 50 heads, and the largest producers had between 51 and 100 animals, with 15 lactating cows on average.

The main types of pastures were palisade grass (*Brachiaria brizantha*) and Guinea grass (*Panicum maximum*), used by 60% of the producers for their adaptability to the region and nutritional value. The other producers (40%) reported preferring koronivia grass (*Brachiaria humidicula*), which adapts very well to low-fertility, acidic soils. Sarmiento et al (2010) highlight the preference for palisade grass in this region is due to the nutritional quality, resistance against leafhoppers, and good adaptation to the local climate.

Feed supplementation was reported by 60% of the producers, who use concentrate (brewery residue) and elephant grass (*Pennisetum purpureum* cv. *cameron*) plantations as roughage. Mineral lick was used by 90% of the producers (Figure 3).

Figure 3 - Food supplementation of the herd with concentrate, cameron and mineral, in the microregions of the Northeast of State of Pará.



Source: Author.

The in loco visit found that the brewery residue was improperly stored and the roughage grass was beyond the harvest point, which favors reduced productivity of both. Mineral supplementation was done incorrectly by 90% of the producers, who used table salt and high concentrations. Well-managed pastures reduce the need for animal supplementation, especially during the rainy season, and are able to meet the dietary needs of lactating cows, thus increasing milk production (CUNHA et al., 2018).

All producers reported performing sanitary control only through the application of vaccines against rabies, foot-and-mouth disease, and brucellosis, which are overseen by the Agriculture and Livestock Defense Agency of the State of Pará (ADEPARÁ). However, none of the producers perform diagnostic tests for brucellosis or tuberculosis. Diarrhea and mastitis were treated by 90% of the farmers and were the most commonly treated infectious diseases. Endo- and ectoparasites were controlled by 85% and 95%, respectively. The risk of transmission of infectious and zootecnical diseases may cause countless economic losses to the activity, such as lower production, herd contamination, lower birth rate, and issues to identify the diseases (BOLAND et al., 2012; DÍEZ and COELHO, 2013).

Natural mount was employed by 95% of the producers, with no control over estrus and the bull freely and randomly copulating. This practice directly impacts the birth rate of calves at the property, with a negative impact on milk production. Sena et al. (2012), in a study on western Pará, found that new reproductive management technologies are less often used and emphasized the need to spread technologies through public policies to meet these deficiencies. Ideally, courses and training in artificial insemination would be offered through the rural unions in partnership with city halls and specialized technical support organs.

In all properties assessed, the cows were manually milked and Good Practices of Hygiene in Milking (GPHM) were followed in none of the farms, which

compromises hygiene conditions and, consequently, milk quality. Overall, the low quality of milk can be attributed to the deficiency in or lack of management, poor hygiene during milking, mammary gland health, improper hygienization of equipment and utensils, and inefficient or inexistent refrigeration (TISCHER et al., 2018).

GPHMs in dairy farming are a set of techniques developed within the rural enterprise to ensure health, well-being, and safety of the animals, people, and the workplace. Such practices are associated with safe and quality processing of dairy products, besides being requirements of consumers, industries, and legislation (PAIXÃO et al., 2014).

CONCLUSIONS

The dairy activity in the microregions of the northeast portion of the state of Pará is characterized by low technological and productivity indices. It is essential producers seek to improve their technical and managerial knowledge in order to optimize zootechnical and productive indicators or the rural properties so as to achieve greater development of dairy farming in the region. Researches to characterize family dairy properties become essential to learn the reality of rural enterprises in order to facilitate access to governmental credit and generate income to producers involved in the chain.

Diagnóstico socioeconômico da cadeia produtiva do leite das microrregiões do nordeste do estado do Pará, Brazil

RESUMO

A caracterização e o perfil socioeconômico e produtivo dos produtores familiares de leite das microrregiões do nordeste paraense foi o principal objetivo deste estudo. Entre os meses de março e abril de 2016, foi aplicado um questionário nas 20 propriedades rurais dos municípios de Castanhal, Irituia, Nova Timboteua, Peixe-boi e São Francisco que trabalham com bovinocultura leiteira. A atividade leiteira na microrregião do nordeste do Estado do Pará caracteriza-se por apresentar baixos índices tecnológicos e produtivos. É fundamental que os produtores busquem aperfeiçoar seus conhecimentos técnicos e gerenciais, objetivando a otimização dos indicadores zootécnicos e produtivos.

PALAVRAS-CHAVES: Gado de leite. Produtores leiteiros. Qualidade do leite.

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