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Socioeconomic and technological profile of rice growers in São Mateus do Maranhão municipality, Maranhão state, Brazil

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Abstract

This study aimed to study the socioeconomic and technological profile of rice planters in São Mateus do Maranhão, Maranhão, Brazil. Therefore, structured questionnaires were applied, besides the use of secondary data in bibliographic and documentary research. To determine the number of farmers who would be interviewed, a sample was defined based on data from the IBGE (2017) agricultural census, which yielded a sample of 75 farmers interviewed (95% confidence level, with 10% error). It was observed that the rice production activity in the municipality is developed by small, medium and large producers, where 73% are organized in associations, 24% in societies of limited responsibility, and 3% in isolated family business. From all interviewed farmers, 31% grow rice on leased land. Also, 12% of rice growers lease part of their land to other farmers to grow rice. Rice growers use two cropping systems: (a) the rainfed paddy cultivation in areas with favourable rainfall distribution (96%); and (b) the irrigated paddy rice (4%). The results show that the commercialization of production and the acquisition of new technologies represent the main obstacles for producers, especially small ones, who have difficulties in obtaining technologies to improve their activity and little access to the marketing channels available in the region.

Key words: Associations, Technological innovation, Marketing

1. Introduction

Agriculture in Maranhão undergoes transformations mainly due to its expansion and increased grain production in the state, which favored economic growth. And among the activities that most characterize state production is rice cultivation (Ferreira & Morcelli, 2006). However, ongoing changes require greater expertise in developing strategies for the state's agricultural development. Even with the projections assuring the prevalence of rice cultivated in the irrigated system (Brazil, 2017), a favorable environment is necessary for the implementation of measures that favor the adequacy of the producers to the predicted scenario, but better contributions are needed in relation to technologies and innovations, which in fact promulgate the development and sustainability of economic and social activity.

Maranhão, in relation to other rice producing states, has agroecological advantages and a privileged geographical condition, besides being close to the consumer market (Méndez Del Villar et al., 2001). On the other hand, important aspects such as the great heterogeneity of the

producers must be considered, since there are those that have a more advanced technological level.

Within this reality, the municipality of São Mateus do Maranhão is considered an appropriate place for the establishment of a modern and technified irrigation system, as it is the recipient of one of the largest irrigation projects in the state, aimed at planting irrigated rice. But not only is the municipality's production located at the state-run irrigated perimeter, the adjacent properties also practice and face problems similar to those encountered in the Salangô Project, mainly regarding lack of technical assistance and investment capacity, making the activity less efficient and attractive the producers.

For this reason, this paper aims to study the socioeconomic and technological profile of rice producers in the municipality of São Mateus do Maranhão, in order to gather important information for the management of rice cultivation in Maranhão, considering that this is an activity of economic interest for the region.

2. Methodology

The choice of the municipality of São Mateus do Maranhão as a research site is due to aspects such as high production and productivity at the regional level and, in recent years, making it one of the main centers of rice production in Maranhão. The work is characterized as exploratory-descriptive in nature.

As a procedure we used primary data through direct research using questionnaires built on the main characteristics and peculiarities of rice production, addressing quantitative and qualitative variables, and secondary data, initially obtained through bibliographic and documentary research, having as the starting point is a literature review of the main work done with rice cultivation in Brazil.

To determine the number of producers to be interviewed, a sample was defined based on data from the IBGE (2017) agricultural census, which indicated that the municipality of São Mateus has 269 properties that develop rice production. A sample calculation was used to determine a quantity of 73 properties, so that the sample was representative at the 95% confidence level with a 10% error, however, 75 producers were interviewed. The equation used was that described by Fonseca and Martins (1996) (Equation 1):

$$n = \frac{\sigma^2 \cdot p \cdot q \cdot N}{e^2 \cdot (N-1) + \sigma^2 \cdot p \cdot q} \quad (1)$$

With, n = sample size; σ = confidence level chosen, expressed as deviation number; p =% with which the phenomenon occurs; q = complementary percentage; N = population size; e = maximum allowed error. Data collection used snowball sampling. This sampling allows the researcher to locate the desired characteristics of the population (Fávero & Belfiore, 2017).

Using data from the IBGE database, an initial description was made of the main characteristics of the activity in Brazil and in the states that are the largest producers (Rio Grande do Sul, Santa Catarina, Tocantins, Mato Grosso and Maranhão).

3. Results and Discussion

3.1. Regional aspects of rice production in São Mateus do Maranhão municipality

Rice production in São Mateus do Maranhão is characterized by being an activity developed mainly by small, medium and large producers. Here small rice producers are considered those with areas of up to 50 hectares, medium producers, between 51 and 200 hectares and large producers over 200 hectares.

However, in relation to the classification of rural properties defined by Law 8,629, dated February 25, 1993, the fiscal module is considered, which in São Mateus do Maranhão corresponds to 55 hectares. By this definition it is established that Small Property is the property of area between 1 and 4 fiscal modules; Average Property, the rural property of area greater than

4 and up to 15 fiscal modules; Large Property, the rural property of the upper area 15 tax modules (Brazil, 2019).

Most of the small rice producers in São Mateus do Maranhão are organized in associations, with a total of 55 of the interviewed producers that correspond to 73%, and 24% are organized as a limited company (Ltda.) And 3% in family business.

Most of the smallholder farms are located in the Salangô Project, the largest irrigation project in Maranhão, which covers a total area of 3,600 hectares, and benefits some 437 families, with 600 hectares for irrigated rice and 2,000 for the system cultivated in the rainforest (Sagrira, 2015).

Regarding the properties that have National Register of Legal Entities (CNPJ), it was found that 83% of respondents are in possession of this document, while 17% do not have.

The data show that the formalized properties correspond to 96%, and not formalized are the total of 4%. Even so, one of the great problems of the properties that are located in areas managed by the state is the necessity of land regularization, since the producers that develop the rice production in the Project Salangô do not have title of the land, only the right of use.

Regarding the ownership of the land by farmers, it can be seen from the results that 69% of the farmers do not rent their land to others, but 31% use the lease as a complement to expand the acreage. Leases are for a short period of time ranging from 1 to 5 years, with 12% of landlords leasing their land to third parties and an amount of 88% not available to renters.

In the municipality of São Mateus do Maranhão, irrigated and rainfed systems are more commonly found, but a peculiarity is observed in the production system that is known together with the producers of the region as favoured rainfed in which low and relatively flat areas in the period. However, in the favoured rainfed system, flooding of the fields by rainwater occurs without the control of the water table, causing natural irrigation in the cultivated areas (ABREU; SANTIAGO, 2018). This is done by producers using this form of cultivation, with high levels of comparison with other systems.

Among the main production systems used by São Mateus do Maranhão rice producers, irrigation and lower gloves correspond to 4% and 96%, respectively, and another form of production used among respondents (Table 1). Of the workers, 55% of farmers have low availability for cultivation and 39% consider it available, and only 7% believe it is very available, as we can see in Table 1.

Table 1. Cropping system and labor availability.

Cropping system	Quantity	%
Irrigated (low land, flooded)	3	4%
Slash-and-burn (rainfed)	0	0%
Rainfed	0	0%
Rainfed (low land)	72	96%
Low land with natural flooding	0	0%
Total	75	100%
Labour availability		
Very available	5	7%
Available	29	39%
Little available	41	55%
Total	75	100%

Source: Field research.

3.2. Farmers' profile

Having as origin the origin of the producers, the most varied states of origin stand out, which characterizes a rich diversity of culture and knowledge, covering the great majority of the Brazilian regions, regions that have a great know-how with the rice production. However, 80% of

the rice producers originate from the state of Maranhão, followed by Rio Grande do Sul with 10.67%, Piauí with 4%, Ceará 2%, Goiás and Paraná, both with 1% the predominance of men in the conduct of the property with 87%, and 13% women. Nearly half the rice growers (41%) have already had experience with other activity than rice cultivation.

One fact is that 96% of landowners have rice production as their main occupation and, because it is subject to market dynamics, at certain periods the price of rice shows positive fluctuations, attracting other agents whose main activity is not rice production rice, as entrepreneurs and civil servants, corresponding to 3% and 1%, respectively.

The steady decline in rice prices has affected even the most experienced rice producers, raising concerns about the future production scenario, reflecting the uncertainty of the continuity of cereal cultivation by 12% of producers. This fact may be related to producers who lease third-party land and does not have the main factor of production is that the land, depending on the stimulus of the price of rice to decide whether to produce.

Producers 'educational level is also a key factor in understanding farmers' modus operandi, and surveys show that in São Mateus do Maranhão 47% of farmers have only incomplete primary education, 19% are not literate, 13% are secondary, 11% complete elementary school, 8% complete high school and 8% high school, completed high school and only 3% of higher education. These data present a worrying picture regarding the educational level of producers, since the qualification is very low, which can be a barrier to the adoption of technologies.

4. Conclusions and Outlook

The results show that the marketing of production and acquisition of new technologies represent the main obstacles for producers, especially the small ones, who have difficulties in obtaining technologies to improve the activity and little access to marketing channels available in the region. This shows to the need for public policies related to technical assistance directed at marketing channels and, above all, effective technical monitoring.

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