Cooperatives' role on the income and technological information of farmers in the Western region of the state of Paraná – Brazil

Papel das cooperativas na renda e informação tecnológica dos agricultores da região Oeste do estado do Paraná – Brasil

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ABSTRACT
Western Paraná is an important agricultural and livestock region, where the cooperatives are an important differential aspect. Therefore, this study sought to identify the role of cooperatives on the income and technological information of farmers in Western Paraná. An exploratory/descriptive research using questionnaires answered by cooperative members was carried out and it was identified that most of the farms (58.2%) have between 10 and 50 ha and, 96.0% of the farmers carry out the annual crops cultivation as the main source of income. In addition to this, activities such as poultry farming (28.0%) and dairy cattle (19.0%) are also frequently developed. Most members (31.6%) consider that 100% of their income is linked to a cooperative and 95.0% of the members answered that the cooperative offers free courses and/or lectures to help them in their agricultural activities. Thus, the active cooperatives in the western region of Paraná guarantee profitability for small and medium-sized farmers, in addition to providing educational and information services by offering courses, lectures and professionals for technical assistance, thus improving the way the cooperative members develop their agricultural activities.

Keywords: Agriculture and livestock. Cooperativism. Family farming. Profitability.

RESUMO
O Oeste do Paraná é uma importante região agropecuária, onde as cooperativas são um importante diferencial. Portanto, este estudo buscou identificar o papel das cooperativas na renda e na informação tecnológica dos produtores rurais do Oeste do Paraná. Foi realizada uma pesquisa exploratória/descritiva por meio de questionários que foram respondidos pelos cooperados e identificou-se que a maioria das propriedades rurais (58,2%) possuem entre 10 e 50 ha e, 96,0% dos agricultores realizam o cultivo de culturas anuais como principal fonte de renda. Além disso,
atividades como a avicultura (28,0%) e a bovinocultura leiteira (19,0%) também são desenvolvidas com frequência. A maioria dos cooperados (31,6%) considera que 100% de sua renda está vinculada a cooperativa e 95,0% dos cooperados responderam que a cooperativa oferece cursos e/ou palestras gratuitas para ajudá-los em suas atividades agropecuárias. Assim, as cooperativas atuantes na região Oeste do Paraná garantem rentabilidade aos pequenos e médios agricultores, além de prestarem serviços educacionais e informativos por meio de cursos, palestras e profissionais para assistência técnica, melhorando assim o desenvolvimento agrícola dos cooperados.


1 INTRODUCTION

The western Paraná region covers an area of 22,851,003 km² and is composed by fifty municipalities distributed in three microregions: Toledo, Cascavel and Foz do Iguaçu. The population estimate made in 2017 showed that there are 1,309,564 inhabitants in this region, which represents 11.56% of the whole state of Paraná population, from which 175,467 inhabitants are in the rural area (Instituto Brasileiro de Geografia e Estatística (IBGE), 2018a).

Western Paraná is an important agricultural and livestock region, among the activities developed are pig breeding, poultry farming, dairy cattle, fish farming and annual agricultural crops such as corn, soybeans and wheat (Territorial Observatory, 2018; Ilha, Piacenti & Leismann, 2018). Paraná has the second largest pigs drove in Brazil, which totaled 6.7 million of pigs in 2018, of which 4.2 million come from the western region, which represents 62% of the total in Paraná. The cities of Toledo and Marechal C. Rondon are, respectively, in first and fourth place in the national classification of the largest pig producers.

The effective total of gallinaceous animals in Paraná was 384 million heads, consolidating itself as the largest producer in 2018, with 115.2 million of these coming from the western region, which represents 30% of the total in Paraná (IBGE, 2018b; Associação Brasileira de Proteína Animal (ABPA), 2019).

Dairy production is also an important activity for the Paraná economy, which was, in 2018, responsible for 13% of Brazilian milk production (4.4 billion liters of milk) and, as expected, the western region has a strong participation in this total (22.5%) (IBGE, 2018b).

The ranking of tilapia production, the main fish produced by fish farming in Paraná, showed that in 2016, nine of the ten largest producers are in Western Paraná, a region that, in total, concentrated 73% of Paraná's production of tilapia (Departamento de Economia Rural (DERAL), 2016)
Regarding agricultural production, the three main grains produced in Paraná are corn, soybeans and wheat. In 2018, this state was the second largest corn producer in Brazil, with a total of 12.7 million tons, of which 4.1 million were produced in the western region. Regarding soybeans, Paraná was also the second largest producer in 2018 with 19 million tons produced in total and of these 3.6 million were produced in the western region. The production of wheat in Paraná was 2.9 million tons in 2018 which guaranteed the state the title of the largest wheat producer in Brazil. Of this total wheat produced, the western region was responsible for 605.2 thousand tons of grain (IBGE, 2018c).

One of the reasons for the expressive numbers in relation to agricultural production in the state that were shown above are due to partnerships between farmers and cooperatives. The farmers organize themselves into cooperatives in order to increase their production possibilities, reduce risks and income through joint efforts (Moreira, Barreiros, & Protil, 2011).

There are 220 cooperatives in Paraná, of which 74 belong to agribusiness and represent 57.8% of the agricultural economy in Paraná, which earned R $ 45 billion in 2016. Of the fifteen largest cooperatives in Paraná, seven are located in the western region. It is important to highlight that of the 47,624 associated with cooperatives in Western Paraná, 82% belong to family farming (Territorial Observatory, 2018). Cooperatives are seen as a means of survival for family farmers in the capitalist system (Marschall, 2005; Silva, Zerbato & Da Rocha Jr., 2010). It is also noteworthy that the mode of occupation in the western region was a determining factor for the development of cooperativism, since in the 1930s the movements to agricultural frontier expansion encouraged the immigration to the region with a colonizing intention, which was mostly carried out by colonists of European descent, predominantly from Rio Grande do Sul and Santa Catarina (Cremonese & Schallenberger, 2005; Marschall, 2005; Ritzman, 2016; Ilha et al., 2018).

The cooperatives activity in the Paraná economy and, especially in the western region, brings consequences that were projected on the region profile of development, contributing to the change of economic indicators by job creation, generating and circulating income, improving the life quality, due to the diversification of business initiatives (Cremonese & Schallenberger, 2005) and avoid the rural exodus, mainly of small farmers, reasons that were the motivators for carrying out this study. In addition, the participation of agricultural cooperatives in Paraná stands out since they are major drivers in the agro-industrial complex of various products (Fajardo, 2008).

The performance of cooperatives through economic participation of members and education, training and information, which are, respectively, the third and fifth of the seven basic principles of cooperativism (Aliança Cooperativa Internacional (ACI), 1995) are the main
investigated aspect in this study. Thus, the development of this study may identify advantages and disadvantages in being a cooperative member, as well as market opportunities and the possibility for the elaboration of public policies aimed at agriculture. Thus, the study objective was to identify what is the perception of farmers in Western Paraná regarding the importance of cooperatives on their income and technological information.

2 METHODOLOGICAL PROCEDURES

In this study, a descriptive/exploratory research was carried out using questionnaires with twelve objective questions to the target audience (cooperative members) to obtain information about (1) the farm size (ha), (2) type of cultivation or production and (3) if they are fully cooperated, (4) if the farmers are selling and (5) buying products just within the cooperative, (6) if the farmers are only members of one cooperative, (7) what is the total monthly income on the farm, (8) the farmers' perception of how much their income (%) is due to the partnership with the cooperative (9) whether the cooperative offers courses and lectures, (10) whether the farmers usually participate of lectures and courses offered, (11) what types of courses are often offered and (12) whether the cooperative offers experts to guide them. The full questionnaire was presented at supplementary documents (SD1).

Contact was made with nine cooperatives operating in the Western Paraná region through e-mail and “contact us” on the cooperatives' website and positive responses were obtained from two cooperatives, the others do not work directly with the farmers, so they are unable to contact them. Thus, 140 paper questionnaires were distributed, with prior authorization for their distribution, in some of the cooperative units. In addition, virtual questionnaire was developed through Google forms (https://forms.gle/qxrmBtxAP69Lfvm6) that were sent to the e-mail of the secretariats of the graduate programs of the universities present in Western Paraná.

The two cooperatives that were part of this study have headquarters in the Palotina city and another in the Marechal Cândido Rondon city (Figure 1) but both have units distributed in other cities and even other states. Both cooperatives were founded in the 1960s and 1970s and are part of an agro-industrial complex, implementing various agro-industries such as chicken and fish slaughterhouses, and other industries such as animal feed manufacturing, among other activities in the agro-industrial complex.
After three months, the questionnaires were collected and the data generated were tabulated and processed for graphic presentation.

3 RESULTS AND DISCUSSION

Seventy percent of paper and on-line questionnaires were answered (partially and in full), showing that the majority of the farms (58.2%) have between 10 to 50 ha, 17.3% of farms are greater than 100 ha, 9.2% of farms have between 5 to 10 ha, 9.2% of farms have between 50 to 100 ha and 6.1% of farms have less than 5 ha (Figure 2).

In Western Paraná, the fiscal module size [MF] is equivalent to 18 ha (Constituição, 1979), so the most of farms in partnership with the cooperative in the west are classified by the National Institute for Colonization and Agrarian Reform (INCRA) as small (1 to 4 MF) and medium (4 to 15 MF) farms (Constituição, 1993), thus prevailing family farming in the most of farms. This
result corroborates with the whole data in Paraná, where about 80% of rural properties in the state are family farming establishments (Paraná, 2017).

Family farming according to Brazilian legislation is “the land cultivation by small rural landowners, whose labor is essentially the family nucleus, in contrast to employer agriculture - which uses contract workers, fixed or temporary, on properties medium or large” (Constituição, 2006).

Several studies have shown that agricultural cooperatives and agriculture form a fundamental link for the survival of the family farmer in the capitalist system (Marschall, 2005; SILVA et al., 2010) contributing to the properties acquiring a business profile, articulation of farmers with modern systems of production, commercialization of products, access to new markets and financing (Sabourin, 2006; Moraes & Schwab, 2019).

The main activities developed for profit on the farms are the annual crops cultivation, poultry farming and dairy cattle (Figure 3). It was possible to notice that the annual crops cultivation is not carried out 100% integrated within the cooperative, unlike poultry and fish farming which are developed in an integrated manner (Figure 3).

FIGURE 3 – Activities developed for profit on farms in Western Paraná and cooperatives participation in the development of these.
Integrated production is technically defined as a form of articulation between agro-industrial companies and agricultural farmers, in which the production process is organized industrially, with massive application of technology and capital (Paulilo, 1990). Thus, integrated production is advantageous for both, the cooperative and the farmers, since the farmers are responsible for fattening the animals, but receive inputs, technical assistance and guarantee of purchase from the cooperative, and the cooperative receives the feedstock for their products industrialization.

According to Fajardo (2008), the agricultural cooperatives in Paraná are part of an agro-industrial complex, which started from 1960 until 1980, and played an important role in the process of agriculture modernization, leading the cooperative members to quickly adhere to technological innovations for certain activities.

Reflection of what was exposed above is the great number of pigs and poultry production in farms in the Western Paraná, since currently the cooperatives encourage the creation of animals in confinement (mainly poultry and pigs and currently even fish), to serve the Agro-industrial Complex to which they are inserted.

According to Ben and Schlosser (2012), cooperatives have become internal and international channels of commercialization, as industrialization agents of agricultural production that ended up being called "entrepreneurial cooperativism", where it directs its members to produce according to the needs of the market, transforming the rural areas and changing the life way of the members.

The dairy cattle is also a great activity frequently developed in the region, but it was noted that this activity is not commonly carried out in partnership with the cooperative, as is the case of poultry, fish and pig farming (Figure 3). The reason for this is the search for better prices paid, which are paid according to compliance with 51 regulations and the quantity produced (the more milk the higher the price, due to transport logistics) (Ministério da Agricultura, Pecuária e Abastecimento (MAPA), 2002).

Regarding monthly income on the farms, 18.5% of farmer respondents said that the monthly income on the property greater than R$ 15,000.00, 16.5% of farmer respondents have an income between R$ 3,000.00 to R$ 5,000.00, 14.4% of farmer respondents have income between R$ 5,000.00 to R$ 10,000.00, 12.4% of farmer respondents have income between R$ 998.00 to R$ 3,000.00 and 9.3% of farmer respondents have income between R$ 10,000.00 to R$ 15,000.00 (Figure 4). Other farmer respondents (28.9%) did not feel comfortable answering this question.
The Figure 4 shows that farmers in the Western Paraná achieve good profitability in the activities they develop, but the cooperatives in Paraná not only help farmers to improve their income, but also modify the region profile, because they provide job generation (Cremonese & Schallenberger, 2005; Zanella, 2016).

When relating income data versus activity developed on the farm, it is observed that 26% of the farmer respondents who have a monthly income greater than R$ 10,000.00 perform the annual crops cultivation, but just 9% of them do it exclusively (Figure 5). This is due to the risks inherent in agricultural production and to risk on only one source of income. According to Moreira et al. (2011), in agribusiness, some risk sources, such as climatic instability and the appearance of diseases and pests, are specific to the activity. In addition, risks such as market or institutional risks, although they are also present in the business context, in agribusiness present different importance and characteristics that should be engaged by the cooperative in risk management practice. Therefore, farmers choose for diversification of activities.

We also identified that the poultry and fish farming, pig breeding and dairy cattle also reach an income of R$ 10,000.00 monthly (Figure 5).
We observed that the farmers recognize the importance of the cooperative's performance on their income since their perception of how much of their monthly income is due to partnership with the cooperative, 31.6% of the farmer respondents consider that 100% of their monthly income is due the partnership with the cooperative. The remaining 22.4% of farmer respondents replied that 70 to 90% of their monthly income is due to partnership with the cooperative, 11.2% of the farmer respondents answered that 50 to 70% of their monthly income is due to partnership with the cooperative, 7.1% of the farmer respondents answered that 30 to 50% of their monthly income is due to partnership with the cooperative, 10.2% of the farmer respondents answered that 10 to 30% of their monthly income is due the partnership with the cooperative and 17.3% farmer respondents did not feel comfortable answering this question (Figure 6a).
This recognition of the performance of cooperatives on their members' income in a given activity can be confirmed with the scenery presented by Gogola Neto (2010), who summarized some numbers and noted that the adhesion of farmers to agricultural cooperatives in Paraná went from 145,495 members in 2014 to 170,793 members in 2018.

Of this 31.6% of the cooperative members who answered that 100% of their monthly income is due to a partnership with the cooperative (Figure 6a), 93.5% carries out the annual crops cultivation, 51.6% the poultry farming activity, 19.4% the fish farming activity, 9.7% the pig breeding activity and 9.7% the dairy cattle production (Figure 6b). This result corroborates what was mentioned above, in which the cooperative encourages its members to carry out activities such as the annual crops production, since the cooperative needs feedstock for the manufacture of animal feed, fish and poultry to feed the slaughterhouse, and process derived products. In addition, it stands out again that these activities are developed in an integrated manner with the cooperative.

Regarding the inputs acquisition (e.g. seed, fertilizers, pesticides, etc) and the products sale (e.g. meat, grains, milk, etc) the majority of farmers do this operation together the
cooperative. 85.6% of the members purchase products only from the cooperative to which they are a member (Figure 7a) and 82.5% of the members sell the products in the cooperative (Figure 7b) which may be due to agility in the process, logistics of loading and even facilitating the purchase and sale since the farmers are registered with the cooperative. Through the cooperative, farmers of the same activity combine their production to sell it to the market in large quantities, and buy inputs with more affordable prices, so the cooperative's economic objective is to increase the exposure of the farmers and also to help their members. The research carried out by Ocepar (2015) showed that the cooperatives participation in agricultural production in Paraná (2014/15 harvest) was 64% in corn production, 72% in soybean production and 67% in wheat production.

FIGURE 7 – a: Members percentage who purchase products only from the cooperative they are members. b: Members percentage who sell products only to the cooperative they are members. c: Members percentage who are members of only one cooperative.

In Figure 7c, we showed that 81.4% of the farmers are members of only one cooperative, thus, with this result we can see that the joint work between the cooperative and their members present a loyalty characteristic. Cooperatives in Western Paraná have good economic and financial competitiveness in the agro-industrial sector (Ilha et al., 2018), which encourages the adhesion of members.

Regarding farmers’ education and information through courses and lectures, 95% of farmers answered that their cooperatives provide courses and lectures free of charge and 92% of farmers answered that their cooperatives also provide experts for technical assistance (agronomist, veterinarian, zootechnist, etc.) free of charge (Figure 8a). The free supply of courses/lectures and qualified professionals for technical assistance shows the commitment of cooperatives to the cooperative principle of educating, training and providing information to their members (ACI, 1995).
The cooperative has great influence on how farmers conduct work in the field. For example, Moreira et al. (2011) carried out a study, through interviews and questionnaires, with the objective of evaluating the possible influences that the cooperatives have on the production preferences in the agribusiness of Paraná and verified that the main reasons that influence the decisions about production are related to economic and rational aspects, as a strategic focus of the cooperative, in addition resistance of the members.

The majority of members (76.6%) attend courses and lectures offered by the cooperative (Figure 8b). This is an important result because, according to Ben and Schlosser (2012), the mediation of cooperativism to introduce the modernization of agriculture is very important, so the cooperatives are the great mediator of the introduction of agribusiness in the field. Thus, cooperatives in the Western Paraná bring technological innovations that give new directions to productive activities, which started to incorporate new techniques and new equipment (Ben & Schlosser, 2012).

The western and southwestern regions of Paraná hold the highest quality and productivity herds of pigs and chickens due to the use of technology (Instituto Paranaense de Desenvolvimento Econômico e Social (IPARDES), 2000). As Fajardo (2008) comments, for small and medium farmers, agrarian modernization occurs mainly via cooperativism.

Figure 9 shows that the main types of courses/lectures offered by cooperative is about soil management and plant nutrition, animal husbandry care and those focused on finance and farm administration.
The results regarding which types of courses are most offered (Figure 9) correlate with the farm activities developed (Figure 3), that is, the soil management and plant nutrition course was the most offered (47.8%) since the main activity on the properties is the annual crops cultivation. The same thought applies to the animal management course, which was the second most offered.

Courses aimed at field sustainable production have not been verified in this study, but would be a good option for the cooperatives to offer considering the current environmental pressures linked to the agricultural sector (Campanhola & Pandey, 2019). Leite and Batalha (2016) conducted a study through interviews and using a questionnaire to analyze the role of agricultural cooperatives in the dissemination of sustainable agricultural practices among their members and concluded that cooperatives have promoted actions to expand farmers' access to more sustainable agricultural practices.

So, the results obtained in this study show that the majority of the cooperative members (31.6%) have the perception that 100% of their income is due to the cooperative (Figure 6), and 76.6% benefit from the offer of courses/lectures (Figure 8b). Thus, the cooperative economic and social resources are being invested in line with the cooperative members’ objectives. After all, one of the great challenges for cooperatives is to manage and to balance the economic, social and political interests of their members (Antoniali, 2000).

4 CONCLUSION

The active cooperatives in the Western Paraná region have an important role in the profitability of small and medium-sized farmers, who have the perception that the cooperatives role is fundamental to their production.
The active cooperatives in the Western Paraná region provide educational information services by providing courses, lectures and experts for technical assistance, thus improving the way the cooperative members develop their agricultural activities.

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