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EFFICIENCY OF COLLECTIVE ACTIONS OF BEEF CHAIN IN THE STATE OF MATO GROSSO DO SUL

EFICIÊNCIA DAS AÇÕES COLETIVAS DA CADEIA PRODUTIVA DE GADO DE CORTE NO ESTADO DE MATO GROSSO DO SUL

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ABSTRACT

Contrary to common-sense beliefs that beef cattle producers have difficulties in cooperating among themselves, cooperation initiatives can be noticed in Brazil, especially in the Midwest region. Built on a theoretical framework of Collective Actions and Transaction Cost Economics (TCE), this work analyzes the *horizontal cooperation pattern of beef cattle producers in the state of Mato Grosso do Sul (MS)*. Based on Collective Actions and Transaction Cost Economics theories, we focused on Private Interest Organizations (PIOs) with the purpose of identifying typologies and analyzing beef collective actions efficiency. Case studies with seven PIOs conducted through semi-structured interviews exhibits the efficiency of these organizations regarding the ability to provide collective goods, which vary according to their organizational aspects and typology. Results points out that PIOs were founded to contribute in technology and professionalization, increasing competitiveness and access to new markets, coordinating productive systems, reducing transaction costs among agents, modifying the institutional environment, and, finally, altering the behavior of bovine meat consumers.

Keywords: Collective actions. Horizontal cooperation. Beef system.

RESUMO

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Na contramão das crenças de que o pecuarista de gado de corte tem dificuldade em cooperar entre si, é possível perceber iniciativas de cooperação no Brasil, especificamente na região Centro-Oeste. Sob o arcabouço teórico das ações coletivas e da Economia de Custos de Transação (ECT), este trabalho analisa o *padrão de cooperação horizontal de produtores de gado de corte no estado de Mato Grosso do Sul*. Com base nas teorias de Ações Coletivas e Economia dos Custos de Transação, focou-se nas Associações de Interesse Privado (AIPs) com o propósito de identificação de tipologias e análise da eficiência das ações coletivas em gado de corte. Foram conduzidos estudos de caso com sete AIPs a partir da realização de entrevistas semiestruturadas, mostrando a eficiência dessas organizações no que tange a capacidade de proverem bens coletivos, que variam de acordo com seus aspectos organizacionais e tipologia. Constatou-se que as AIPs contribuem na tecnificação e profissionalização da atividade, no aumento da competitividade e acesso de novos mercados, na coordenação dos sistemas produtivos, na diminuição dos custos de transação entre os agentes, nas mudanças no ambiente institucional e no comportamento do consumidor de carne bovina.

Palavras-chave: Ações coletivas. Cooperação horizontal. Carne bovina.

1 INTRODUCTION

Brazilian agriculture sector undergoes gradual processes of internationalization and specialization of its production activities aiming to adequate itself to the changes and novel requirements of both national and international markets. In this scenario, entities focused on the representation of specific interests emerge as some production chains are structured (IGLÉCIAS, 2007). These entities are mostly non-profitable and assume the configuration of collective actions, such as non-governmental organizations (NGOs), foundations supported by companies, philanthropic groups, and private interest organizations (PIOs³) (NASSAR, 2004). In terms of food production, Zylbersztajn, Neves and Coleman (2015) observed an improvement of production class in carrying out collective actions that aim to contribute to the organization of Brazilian agribusiness. Moreover, the authors point out the awareness of cooperative gains among farmers as a trend for the future of the Brazilian agriculture. Studies on collective actions are frequently undertaken considering poultry, swine, and dairy cattle agro-systems, wherein collective actions are more evident in Brazil.

Concerning the Brazilian beef cattle agro-industrial system (AGS), Malafaia *et al.* (2009) pointed out the lack of vertical and horizontal cooperation initiatives. Cooperative actions in the beef system and the consequent establishment of long-term productive arrangements are challenged by the low integration of production levels and the presence of a large asymmetry of information among agents. These are related to an organizational culture, which reflects on opportunistic behavior as well as short run targets (MALAFAIA, *op. cit.*). Buanain and Batalha (2007) corroborated Malafaia's conclusions by recognizing the competitiveness of Brazilian beef cattle AGS as well as the lack of cooperation among agents.

Simultaneously, Araújo *et al.* (2006) observed that Brazilian beef cattle AGS begun to experience a technical revolution due to the intensification of specific knowledge applied to face market changes. This led to an AGS restructuration that was mainly characterized by changes in production concepts and processes, which modified objectives, structure, production methods, and strategies. Recognizing the Brazilian beef cattle system complexity and its

³ Private interest associations (PIOs) are intended to common interests of their members, so that their survival arises from their capacity in promoting these interests. (OLSON, 1999; NASSAR, 2001).

apparent difficulty of performing collective actions and the lack of studies that integrate all these themes, we envisioned a promising avenue for research, which is to investigate the pattern and the efficiency of collective initiatives among cattle producers.

Based on this, we address some research questions: i) what motivates cattle producers to cooperate?; ii) how do they cooperate?; iii) do the collective actions among such producers provide members with collective goods and contribute to AGS structuring and coordination?

In general terms, this research is about organizations. Milgrom and Roberts (1992) defend that organizations are a mean through which people interact to attend economic and collective purposes. According to Alchian and Demsetz (1972), organizations are a nexus of contracts with the aim of economizing on transaction costs. According to Williamson (2000), organizations are set in the middle level of an economic analysis that encompasses at least three levels: individuals, organizations, and institutions. In this scheme, individuals represent the base level, indicating the fundamental influence derived from behavioral characteristics (e.g., bounded rationality). Organizations, the middle level, may be restricted by or take advantage of opportunities arising from their interactions with institutions and individuals.

Beyond the ability to interact with individuals and the institutional environment, the strategic capacity of organizations is also rooted in their capacity of cooperation with rivals, suppliers, buyers, public or private agencies (TEECE, 1994). Farina (1997) points out that vertical and horizontal cooperation are both important to achieve competitiveness under the context of organizations' strategy.

Regarding horizontal cooperation, it is important to analyze the type of organizations which main objective is to influence other parties on behalf of their own interest, herein called *PIO*. Interest is related to attitude, values and preferences (SALISBURY, 1984). Milgrom and Roberts (1992) stress that organizations' members spend a large amount of time and effort with influence activities in a way that influence activity should not be neglected in management and strategy studies. It is under this perspective that it is conventionally assumed that people join together to influence public policies to attend their common interest (SALISBURY, 1984). However, sometimes the organization interest is not the members' interest. Then, conflicts show up and the organization longevity is challenged.

The case studies presented here aims to analyze the pattern of collective actions, specifically the *PIO* of cattle ranchers in the State of Mato Grosso do Sul (MS)/ Brazil. The beef cattle sector is relevant not only to Brazilian economy, but also to other countries as Brazil is a global player in the international market of bovine meat, assuming the second position in world beef production and exportation (USDA, 2017).

The State of MS is the second largest cattle producer in Brazil (MAPA, 2017), and the activity represents 81% of the gross value of livestock production in the state (FAMASUL, 2017). Moreover, MS is recognized by innovation in cattle management and technology breakthrough in livestock production (SOUZA, 2010). Besides that, Souza (2010) observed the existence of collective actions among cattle ranchers in the state, such as buying and selling groups, marketing alliances, and private associations, which mutually promote improvements in market relationships and coordination. However, those cooperative actions lack incentives and support from state government. The author identified and highlighted a new generation of union leaders that are willing to innovations, changes, dialogues, and questioning, which comprises all generations of cattle producers.

This research is based on the evaluation of *PIOs* efficiency in terms of organizational aspects, regarding the organizations' capacity to generate collective goods to their associates as well as the generation of positive externalities to MS beef cattle system and consumers. This research sought to provide institutions and economic agents with outcomes that contribute to encourage

and incentive collective actions among cattle producers not only in the state of MS, but for the country as a whole, considering the relevance of this region for Brazilian beef cattle farming.

2 THEORETICAL FRAMEWORK

According to Hardin (1994), collective actions are coordination movements whose structuring occurs both informally and formally (SCHMIDT, 2010) and comprise from the establishment of political and trade union representation entities to cooperative buying practices, after-sales services, and quality control, among others (SACHS, 2003).

In order to discuss the collective action dilemma, it is necessary to clear some concepts like *public goods*, *private goods* and *common pool resources*. For Ostrom (1990), a collective good is related to *common pool resources*, usually a natural or man-made resource which is large enough to make it costly (but *not impossible*) to exclude others from getting benefits from them

According to the economic perspective, the type of goods might be classified due to two main drivers: i) rivalry and ii) exclusivity. *Public goods* are non-rival (the one individual's consumption does not reduce others' consumption) and non-exclusive (no one could be excluded from consuming it). Examples of such goods are national defense, public education and organizational knowledge (SAMUELSON, 1954; STIGLITZ, 2000). *Common pool resources* present high difficulty of exclusion (as public goods) but they present a high level of subtractability (one can exclude others from the use of the good) and, in turn, *private goods* are exclusive (some individual can exclude others from the good consumption) and rival as individuals' consumption subtract part of the others' consumption (OSTROM, 2010).

Demsetz (1970) argues that public goods are those which benefits could be enjoyed by more than one individual and that it is possible at no cost for an additional person to use the same unit of the good. Collective goods, in turn, impose a stronger definition as it is costly but not *impossible* to exclude others from consuming the good. National defense is an example of a public good as one person's use cannot prevent others to enjoy the service benefit and the simultaneous use by many individuals does not entail the increase in the costs and does not reduce the availability of the good to others.

Nevertheless, both types of goods (public and collective) are subject to the free rider problem. Based on Olson (1965), when one person cannot be excluded from the benefit of using a good, there is no motivation to joining effort to produce or to maintain a collective good, but to free ride on the efforts of others. In this way, some may provide the good at their expenses, leading to less than the optimal outcome. In the end, if all individuals decide to free ride, the collective good won't be provided. That is the main challenge to be overcome in organizing collective actions.

Olson (1999), under an economic bias, when analysing what motivates individuals to cooperate, characterized collective actions as organizations that are supposedly aimed to defend common interests of their members. Olson's introduction of collective goods concept (*op. cit.*) supports his belief that individuals should cooperate in order to achieve the collective goods they need due to their motivation by self-interest. Olson also mentions that these individuals would not bear the costs of these assets. Therefore, no individuals would produce goods in an independent fashion.

According to the author, once the good is collective, this implies that every individual of the group can achieve the outcome, even those who have not contributed. Olson (*op. cit.*) presents, therefore, the 'free-rider' concept, which denotes the rider who is benefited by a collective good without having contributed or given poor contribution toward its achievement. As pointed out by the author, the free-rider results from the different degrees of importance that individuals of

a group can attribute to a collective good. In short, individuals have different perceptions of the value of collective goods and, therefore, each agent would be willing to pay more or less for such good (NASSAR, 2001). As a result, collective goods would be provided in situations wherein the difference between the group gain and its total cost is greater than the individual gain of one or more members (OLSON, *op. cit.*).

In smaller groups, collective benefit is more likely to be achieved because, even if a member has to bear all costs by him/herself, his/her effort towards a benefit will provide him/her with gains (OLSON, *op. cit.*). Concerning large groups, Olson (*op. cit.*) claim that, as these become larger, individual contribution tends to be greater than the individual perception of a collective good shared among the members of the action.

The situation of non-participation in collective actions is overcome through the selective incentive mechanism (OLSON, *op. cit.*), which makes associate provision gains feasible as well as generates income for the organization (MOE, 1980, *apud* NASSAR, *op. cit.*). Selective incentives could be either positive – i.e., private benefits that are offered solely for the contributing agents – or negative – punishments to agents that do not contribute to achieve the collective good.

Saes (2000) introduced variables to collective action typification, in addition to the prepositions of Olson (1999), who analyzed the size and capacity of collective good provision. The author incorporated variables related to attachment and cooperation forms among individuals:

- i) Attachment form – the individual may be linked to organizations – e.g., cooperatives and associations – either in a voluntarily or compulsorily;
- ii) Monitoring/cooperating form – cooperation may occur spontaneously in cases where individuals cooperate naturally among themselves. On the other hand, cooperation may also occur in an induced manner when incentive or coercion mechanisms are used for members to cooperate. Cooperation is conscious and results from an intentional context wherein there is a separation between inducing incentive and action result.

From the systematization of the concepts introduced by Olson (1999), Nassar (2001) developed and applied concepts related to the homogeneity, decision-making structure, and group contribution in collective actions. The author pointed out that efficient, homogeneous groups have well-defined collective good types that are of interest to their associates. Moreover, the group represented by the organization controls its efficiency, since there are no alternatives in the market that can replace this organizational form.

Nassar (2001) questions how the interests of heterogeneous groups should be represented and argues that associations are obliged to segment their members to offer for each segment tailor-made collective goods. The author observes that compulsorily guaranteed resources as well as those from services provision support the possible survival of these associations. This statement corroborates the point of view of Olson (*op. cit.*), i.e., an association is subject to failure if it does not offer selective incentives to its members, which hence distorts its function (NASSAR, *op. cit.*).

Based on Olson (1999), Ostrom (2007) seeks an in-depth understanding of the reasons why individuals cooperate in a social context, in which there is the possibility that members take advantage – i.e., rides – of other members' efforts in a group (SCHMIDT, 2010). Ostrom (*op. cit.*) studies, specifically, the institutions that individuals develop to manage common natural resources. The author argues that the management does not present a unique path, neither authoritarian-centralized nor privatized, provided that individuals may organize themselves by means of collective institutions.

Ostrom (2007) presents eight structural variables that could influence the probability of a group in providing a collective good. At first, variables that do not depend essentially on situations that repeat continuously: i) number of involved members; ii) form of sharing resources; iii) heterogeneity of the participants; iv) face-to-face communication; and v) 'free-rider' existence. Then, the author presents structural variations that affect the groups' level of cooperation in repeated interaction situations: vi) existence of information about past actions; vii) relationship among individuals; and viii) freedom to enter and exit.

2.1 COLLECTIVE ACTIONS AND TRANSACTION COST ECONOMY (TCE)

Transaction costs are those that occur in situations of business-to-business and resource transfer within the company, assuming that information among agents are not perfect and have costs (WILLIAMSON, 1985).

According to Nassar (2001), the alignment of TCE theories and collective actions occurs through the verification that there are costs attributed to group formation and organization as well as transaction costs. In this perspective, transaction costs are those related to the promotion of selective incentives, communication with the individuals of a group, and monitoring of employees and directors. The author highlights that, by saying that an individual only participates in a collective action if his/her maintenance cost is lower than the benefit, Olson (1999) refers to the sum between production costs, associate contribution, transaction, participation in meetings and councils, and dealing with other members of the group.

Nassar (*op. cit.*) indicates three existent relationships between TCE and collective actions:

- i) The larger the group, the greater are the internal transaction costs of the organization;
- ii) There are also external transaction costs due to the negotiation with the State, with companies belonging to the same sector, and with other economic sectors. These costs increase according to organization activity level and do not depend on the number of members;
- iii) The larger and the more heterogeneous the group, the greater the tendency of having higher organization manager monitoring costs. In minor, homogeneous groups, in turn, these costs are lower. This occurs mainly because of information asymmetry, opportunism, and alignment among of organization members' interests.

According to Zylbersztajn and Machado Filho (1998), collective actions structured through PIOs tend to contribute for AGSs coordination, since these favor transaction between agents by exerting a stabilizing impact on the institutional environment. Organizations that work in AGSs featuring problematic coordination must overcome obstacles to remaining competitive in the market in a long term. Furthermore, the lack of system coordination results in conflicting situations and opportunistic actions due to the high transaction costs as well as difficulties to establish competitive long-lasting strategies (ZYLBERSZTAJN; MACHADO FILHO, *op. cit.*).

Zylbersztajn and Farina (1999) highlight the role that control and incentive mechanisms play in reducing the transaction costs in any exchange situation. According to these authors, control mechanisms manage members' actions. Incentive mechanisms assume a role of conciliating organization objectives with self-interest of its members.

Given the above, the efficiency of collective actions in relation to the provision of collective goods depends on administrative control mechanisms that aim to mitigate aspects that hinder cooperation among individuals of a group. For example, opportunistic behavior presented by

‘free-riders’, transaction costs, and perception and fulfillment of members’ interests. These mechanisms, presented by Moe (1980), Olson (1999), and Nassar (2001) as selective incentives, are not common to every group because each of them has different characteristics, such as number of members, heterogeneity, and institutional environment.

The determination of the administrative apparatus is not to be efficient in encouraging cooperation unless it is well advertised by PIOs. The development of communication channels that enable limited rationality is of great relevance because, in accordance to Moe (*op. cit.*), such channels provide insight into collective goods and selective incentives offered by association as well as leaders’ composition and actions.

2.2 PRIVATE INTEREST ORGANIZATIONS (PIOs)

Private interest organizations (PIOs) are organizations featuring collective character. Olson (1999) conceptualized PIOs as organizations whose unique purpose is to promote interests that are common to their members. Therefore, their efficiency results from the maintenance and attraction of contributing members (STAATZ, 1983; NASSAR, 2001).

According to Zylbersztajn and Machado Filho (1998, p.3), “private interest organizations should be seen as common interest clusters intending to create and defend margins for their associates”. These organizations can focus either on agent cooperation – horizontal PIOs – or on a set of vertically related agents – vertical PIOs. Braga (2010) defined vertical cooperation as a relationship among individuals or organizations of two or more stages within a productive chain, while horizontal cooperation occurs among individuals or organizations that act at same stage of the productive chain (PODOLNY; PAGE, 1998).

All PIOs have a set of common objectives that aim solely to achieve the interests of their members. PIOs serve as interlocutors with the government, other organizations, and the society in general. Moreover, these organizations can assume the task of pressuring institutional environment rules through lobby activities, resolving conflicts among agents, and monitoring their members (ZYLBERSZTAJN; MACHADO FILHO, *op. cit.*; FAO, 2010; ALPMANN, 2013).

Regarding organizations focused on collective and cooperation efforts in agribusiness, we can stress some surveys conducted by Hellin, Lunby and Meijer on maize and vegetables in Meso-America (2009); Dacillo (2011) on cattles, in Philippines (2011); Alpmann (2013) on milk, in Germany; Benos, Kaligeras, Verheees, Sergaki and Pennings on cooperatives agribusiness in Greece (2016).

In the case of Brazilian agribusiness, the performance and the studies on PIOs are recent. According to Zylbersztajn and Machado Filho (*op. cit.*), PIOs started to contribute significantly to coordination and competitiveness increase in production system in the 90s, mainly in agro-industrial systems. The operation costs of the free market – originated from market failures, imperfect and asymmetric information, externalities, monopoly power, and predatory competition – imply in an inferior competitiveness degree compared to a cooperation arrangement. This justifies the increasing importance of PIOs in Brazilian agribusiness and their strategic role in protecting the interests of their members (ZYLBERSZTAJN; MACHADO FILHO, *op. cit.*).

Among the studies of PIOs in Brazilian agribusiness, that of Nassar (2001) assumes a great relevance not only for using the concept of collective actions, but also for carrying a comprehensive technical study of the subject as well as for realigning it, primarily, to the agribusiness dynamics.

Overall, the contributions of Nassar (2001) to the theory of collective actions rely upon the findings that PIOs exist and charge monthly fees due to economic reasons. Moreover, the authors argues that PIOs play preponderant roles in the allocation of private and public

resources, since these formulate policies together with the State and provide services to their members, who are unable to access them in market due to several limitations.

Regarding the interface between PIOs and transaction costs economics, Conejero (2011) argues that when PIOs develop several coordination mechanisms of their transactions, these contribute to resolve issues, such as information asymmetry and consequent opportunistic behaviors and conflict situations. In order for PIOs to succeed, their structures ought to address economic incentives that are to be offered and the need for accommodating members' interests (CONEJERO, 2011).

Yet, Conejero (*op. cit.*) emphasizes that, even in homogeneous groups with an elevated level of common interests among members, individuals require personal incentives to join a representation entity. Since PIOs come from collective actions, individual incentives are offered in a limited way, through services provision, according to the decision-making structure, the internal organization, and the manner through which resources are collected.

Other researches that applies the concept of PIOs to agribusiness activities, it can be highlighted those of Silva (2005) on beef cattle AGS; Barra, Silva, and Machado (2007) on the coffee sector; Machado Filho, Mizumoto, and Zylbersztajn (2006) on pasta industries; Conejero (2011) on soy, sugarcane, and coffee AGSs; and Fornazier and Waquil (2012) on apple productive chain.

In order to understand the dynamics of horizontal cooperation, particularly the PIOs of primary production link of beef cattle production chain in the state of MS, theories of Collective Actions and Transaction Cost Economy (TCE) will be utilized as theoretical framework.

3 METHODOLOGICAL PROCEDURES

In general, the research method is inductive with an exploratory nature. A qualitative approach is applied in order to give a greater focus on fact comprehension than on their measurement (LAZZARINI, 1997). The investigation is developed through primary and secondary data collection and has multiple case studies as research procedure.

According to Yin (2001), the determination of the theoretical framework to support data collection, interpretation, and analysis is essential for the development of case studies, regardless whether it is exploratory or not. The theoretical framework of this research was built through a literature review concerning the theories of collective actions and Transaction Cost Economics (TCE), with an analytical support of the concept of agro-industrial systems (AGSs). This was done based on bibliographical researches, scientific periodicals, theses, dissertations, and specialized magazines of economy and management. Secondary data survey pertinent to the research problem guaranteed the buildup of a theoretical conjuncture as well as of variables in which primary data were analyzed.

Considering that collective actions in the beef cattle system has not been significantly explored, the greatest challenge encountered during this research was the identification of horizontal PIOs belonging to the production sector. To do so, a careful, detailed work was carried out to identify and further characterize associations by applying forms in each of them. These stages enabled the identification of regularities in order to propose PIOs pattern typologies of beef cattle producers in the state of MS as well as the subsequent selection of associations for the case study.

Typologies were proposed relying upon the statement of Olson (1999, p. 17): "the logical point to begin any systematic study of organizations is their purpose". According to the author, there are organizations of several types, shapes, and sizes, but the purpose that is characteristic of most of them is the interest of their members. Olson (*op. cit.* p.18) cites the following phrase of a social teacher and psychologist called Leon Festinger: "the attraction that exerts affiliation to

a group is not much about belonging sensation, but the possibility of achieving something through that belonging”.

Given the above, the typologies proposed in this work are originated from the identification of what each association member can achieve when he/she belongs to it. Therefore, common regularities were identified among associations referring to the purpose. As a result, regularities attributed to the main “something” that beef cattle producers intend to achieve by associating themselves could also be observed.

Seven associations headquartered in the state of MS participated in the case study. Their selection relied on four factors: i) typology – at least one organization was chosen for each of the proposed typologies; ii) characterization – it enabled the identification of relevant preliminary data; iii) availability – agenda issues of potential respondents and/or organization policies enabled or restricted organizations that could contribute to this research, and iv) time – the short time for this work was accentuated by factors ii and iii.

In-depth interviews conducted in the associations were guided by a semi-structured script and performed with presidents, members of the board if directors, and associations’ superintendents, depending on the organization availability between June, 2015 and January, 2016. The interviewees signed a Free and Informed Consent Term, which determined their anonymity, but authorized the identification of the organizations by their abbreviations, nomenclatures, and acronyms.

Based on the work of Nassar (2001) work, the efficiency of the associations was analyzed under three aspects:

- i) Individuals/Beef cattle producers – it suggests the analysis of internal structure and actions developed by associations through the identification of their rules and standards, stipulated both informally and formally;
- ii) Beef cattle farming/AGS – indicates the analysis of the capacity of collective goods in diminishing the transaction costs, that is, the direct impacts of collective goods on the coordination of beef cattle AGS;
- iii) Society – it is suggested the analysis of the influence of associations in altering the institutional environment and the behavior of beef consumers.

Nassar (*op. cit.*) verified the efficiency of a PIO from a conjunct analysis of strategic positioning, internal structure, and association actions. Therefore, the interview script applied to PIOs dealt with variables that enabled a detailed understanding of four analysis categories: i) contextualization and classification; ii) organizational aspects; iii) AGS externalities; and iv) society externalities.

Data obtained in the contextualization and classification of selected PIOs, together with the characterization of data in the preliminary form, enabled the identification of the strategic positioning of the associations. Organizational aspects allowed the identification of the internal structure and strategic actions of the PIOs. Externality categories in both AGS and society allowed an in-depth analysis of strategic actions developed by PIOs that impact the relationship between AGS agents, the AGS structuring, and its institutional environment.

According to organization requirement and/or availability, PIOs made accessible documents, such as protocols, regiments, and ordinances, which were utilized to enrich the database and, consequently, the research itself. Multiple evidence sources, such as documentary research, eventual opportunities of direct observation, archive access, questionnaire application, and interviewing, allowed approaching a greater variation of historical, structural, and action aspects of the PIOs, which in turn were able to develop convergent research lines, named triangulation (YIN, 2001).

4 RESULTS

The mapping of collective action practices among beef cattle producers in Brazil enabled the identification of 33 horizontal PIOs, out of which 28 (twenty-eight) were active. In line with the literature, PIO characterization allowed the proposition of 4 (four) PIO types that varied according to the predominant purpose of the producers constituting the groups. Table 1 presents the recommended typologies and relates them to associations selected for the case study.

Table 1 – The types of PIOs

Typology	PIO Predominant Purpose	N. of Identified PIOs	Selected PIOs
PIOs of Market Niche	Promote and/or meet specific market demand for beef.	2	Young Steer of MS (MS association of early calf producers).
PIOs of Breed	Promote beef cattle breeds by offering genealogical registration services and/or marketing actions among AGS economic agents.	22	ABCZ (Brazilian Association of Zebu Breeders) and ANC (National Association of “Herd-Book Necklaces” breeders).
PIOs of Representation	Represent the class of beef cattle producers by developing skills related to institutional negotiations and support in the elaboration of public sector policies (ZYLBERSZTAJN; NEVES; CALEMAN, 2015).	5	Acrissul (Breeders Association of Mato Grosso do Sul), Famasul (Federation of Agriculture and Livestock of Mato Grosso do Sul) and MNP (Producers’ National Movement).
PIOs of Regional Representation	Support public policies and mobilize producers through a representation unit that foments and fights for the development of the region which it represents.	4	Unipan (Union of marsh workers in Nhecolândia).

Source: Elaborated by the authors.

4.1 CONTEXT OF PIO CREATION

Identifying the factors that motivated the creation of each PIO and the reasons why their founders organized themselves collectively reveals that PIO creation scenarios may correspond to business opportunities, technological revolutions, alterations in consumers’ eating habits, as well as the need for structuring producers’ representation units.

Summing up, in view of the identified scenarios, the motives that led beef cattle producers to organize themselves collectively support the literature on the theme developed by Nassar (2001) and Olson (1999). These authors argue that collective actions are formed by groups of individuals that could barely produce common goods alone – Young Steer MS, Acrissul, MNP, and Unipan – due to the action of ‘free-riders’, or a belief that individual actions for assets’ provision are less efficient than collective actions – ABCZ and ANC. It is worth stressing out

Famasul creation, which took place through a legal apparatus, being the only searched PIO of mandatory binding. However, its creation roots do not escape the belief that by merely uniting rural producers these would have their claims represented.

ABCZ and ANC creation refers to a context in which there were no guaranteeing regulations of animals' genealogical origin that were starting to be imported. In other words, the institutional environment did not legally protect the increase in the number of imported animals created in the country as well as their genetic origin guarantee. Subsequent to the creation of PIOs, the Ministry of Agriculture and Livestock (MAPA) regulated the genealogical record and became responsible for authorizing associations that offered this service. This case denotes the capacity of PIOs in filling the gap left by the State in deregulation situations, thus playing an important role in contributing to coordination and enhancement of the competitiveness of production systems, therefore corroborating the studies of Barra, Silva, and Machado (2007). Contrastingly, the studied PIOs diverge from that reported by Farina *et al.* (1997), who argues that restructuring production chains facing market alterations for their survival and growth is carried out primarily by institutional, technological, and cultural environments, as well as that in a long-term approach individual and collective strategies determine these environments and modify governance structures.

Unipan's performance towards social, economic, and environmental developments as well as improvements to the Pantanal region of Nhecolândia supports Olson (*op. cit.*) belief that individuals driven by self-interests get organized to achieve the required collective goods, once isolated individuals would not assume the costs of these goods.

Because the identified PIOs of regional representation seek the preservation and development of Mato Grosso do Sul's Pantanal, it fits in Ostrom (2007) studies, which sought to analyze the institutions developed by the individuals to manage common natural resources. Thus, Unipan represents an institutional manner developed by beef cattle producers who utilized such common natural resource in order to solve difficulties in their management. Furthermore, Unipan may also project institutions with the government and PIOs of class representation as well as other organizations.

4.2 CLASSIFICATION AND ORGANIZATIONAL ASPECTS OF PIOS

In all studied cases, PIOs determined the administrative apparatus of collective goods' development and distribution as well as positive and negative selective incentives in order to encourage and ensure cooperation. According to Olson (1999), Ostrom (2007), and Nassar (2001), it is not surprising that all studied associations featured induced cooperation. Olson (*op. cit.*) believes that large groups do not arise in the absence of selective incentives. For Ostrom (*op. cit.*), the larger the group, the higher the additional resources. Finally, Nassar (*op. cit.*) conclude that the survival of heterogeneous groups and large homogeneous groups depend on selective incentives. Table 2 presents the classification of the studied PIOs.

Table 2 – Classification of the studied PIOs

PIO	Performance Level	Type of Group	Binding Form	Cooperation Form	Associates Profile
Young Steer of MS	State.	Large and homogeneous.	Voluntary.	Induced.	Beef cattle producers.
ABCZ	National	Large and heterogeneous.	Voluntary.	Induced.	Beef and dairy cattle producers.
ANC	National	Large and heterogeneous.	Voluntary.	Induced.	Beef cattle and equine producers.
Acrissul	National	Large and heterogeneous.	Voluntary.	Induced.	Rural producers of several production chains.
Famasul	National	Large and heterogeneous.	Mandatory.	Induced.	Rural producers of several production chains.
MNP	National	Small and heterogeneous.	Voluntary.	Induced.	Rural and urban producers of several production chains.
Unipan	Nhecolândia region	Large and homogeneous.	Voluntary.	Induced.	Rural producers of several production chains, but which are all beef cattle producers.

Source: Elaborated by the authors.

It is interesting to take into account the AGS that comprises these PIOs. Beef cattle AGS has a history of recent technification and professionalization, at the same time that it is known for its disorganization and failures of coordination mechanisms. Analyzing and relating selective incentives offered by these PIOs to beef cattle producers as well as the environment in which the AGS is inserted, beef cattle farmers do not obtain these selective incentives individually in the market or other associations. In this way, PIOs provide selective incentives to beef cattle producers, incentives that they are not always able to obtain in the market or in other organizational forms.

Positive selective incentives offered by PIOs to beef cattle producers consist of holding parties, events, exhibitions, auctions, prizes, courses, and lectures, offering economic advantages from partnership with other AGS agents, and establishing partnerships with institutions for conducting research. Should the association not have the function of representing the class, negotiating capacity and claim mobilization could also be considered a positive selective incentive. Selective incentives increased cattle farmers' perception of gains, considering that the definition of selective incentive for each PIO varies according to its purpose.

Therefore, PIOs develop different strategies of selective incentives in order to increase associates' perception of received benefits. PIOs can offer advantages that are paid by the associates separately when the service or product is an organization asset or even when there are high transaction costs for achieving it. In the case of heterogeneous PIOs, these develop specific actions to beef cattle producers, a scenario that corroborates the considerations of Nassar (2001) that these PIOs need to offer each segment tailor-made collective goods.

Famasul, however, is a PIO with mandatory binding and already has guaranteed economic survival. Nonetheless, the federation develops numerous strategies aimed at encouraging the cooperation among beef cattle producers in terms of their active participation in the federation.

PIOs survival also depends on their abilities to keep up with new market demands and the needs of beef cattle producers. This analysis corroborates Saes (2000) position that PIOs have the challenge of always renewing their strategies to meet the interests of their associates.

Administrative apparatus determination would not be efficient in encouraging cooperation if this is not well advertised by PIOs. The studied associations adopt strategic communication actions with their members and potential associates mainly through digital communication channels. Communication mechanisms enabled to strengthen the relationship between PIO and its associates by disseminating information about past and present actions (OSTROM, 2007). Moreover, these mechanisms contribute to understanding the interests of group members, which denote an aspect of great importance given the dynamism of bovine meat market and activity. The case study reveals social networks and internet as efficient communication media in the attraction and retention of associates as well as in the mobilization of and incentives to the cooperation among rural producers.

Although in different proportions, every voluntary PIO developed mechanisms to mitigate 'free-riders', such as a software use to monitor non-payment and the implementation of entry and exit policies, rights, advantages, and members penalties. According to Ostrom (2007), situations in which these policies are not sufficiently structured, associates have the possibility of opt not to "play" besides deciding to cooperate. The presence of 'free-riders' may inhibit cooperation among beef cattle producers and affect the survival of PIOs that present none defined punitive strategies to non-cooperating producers. The nature of collective goods offered by PIO reflect on the number of 'free-riders'. This could be observed in structuring and superior variance of importance degree that beef cattle producers give to collective goods offered by the association.

4.3 EFFICIENCY OF PIOS

The capacity of PIOs in promoting collective goods to their associates, beef cattle producers, and society is due to their internal structure oriented by the principal purpose of association, action level (international, national, state, or regional), group type (large or small; heterogeneous or homogeneous), binding form (voluntary or mandatory), mandatory form (induced or spontaneous), and organizational aspects. Table 3 compiles the collective goods provided by the studied PIOs of each typology in their three analysis aspects.

Table 3 – Efficiency of the studied PIOs

	Beef Cattle Producers	Beef Cattle AGS	Society
PIOs of Market Niche Young Steer of MS	Offer financial benefits, such as bonuses, production assistance and orientation, training tools, and services products from partnerships with institutions and companies.	Contribute to technification and professionalization of rural properties and reduction of conflicts among beef cattle producers and frigorific industry influencing activity competitiveness.	Present active participation, even when indirect, in discussions of technical scientific proposals and public polices linked to meat production.

	Promote and participate in events and lectures either on their own initiative or through partnerships with institutions and companies.	Facilitate the relationship among AGS agents. Present active participation on the development of researches linked to meat production.	Directly influence buying behavior alterations of beef consumers.
PIOs of Breed ABCZ and ANC	Offer financial benefits, such as discounts on their services and products (genealogical record, genetic improvement programs, distance courses, production assistance and guidance). Hold auctions, exhibitions, lectures, and awards on its own initiative or through partnerships with institutions and companies.	Contribute to AGS development fomenting business environment and exploring new markets. Guarantee genetics and animal origin. Facilitate the relationship among AGS agents. Work in technical-scientific programs and in the development of researches and products from partnerships with universities and companies.	Contribute directly or punctually to discussions about public policies and in higher education development. Ensure to consumers the supply of quality meat regarding genetic origin.
PIOs of representation Acrissul, Famasul and MNP	Represent the associates in the promotion of public policies, and in the defense negotiation of their interests. Coordinate commissions and discussion fronts of specific topics. They can act in producers' mobilization and offer economic benefits from partnerships with organizations. Hold events, auctions, exhibitions, and animal awards. Offer training courses and lectures. Present partnerships with governmental and educational institutions to promote research and studies.	Contribute to technification and professionalization of rural properties by offering courses and training lectures. Assists in genetic improvement of MS herd and in reduction of conflicts among AGS agents by promoting discussions and meetings between AGS agents. Promote new leaderships in agribusiness. Impact the competitiveness increase of AGS in MS.	Act directly in the discussions of policies and technical-scientific programs.
PIOs of Regional Representation Unipan	Represent the beef cattle producers of a specific region by claiming for improvements. Offer agreements with partner organizations.	Contribute to technification and professionalization of rural properties through partnerships with sector organizations. Reduce conflicts among AGS agents by promoting	Act directly in the discussion of policies and technical-scientific programs. Influence the preservation of natural

		discussions and meetings between them and by valuing and guaranteeing beef cattle production in the region they represent. Facilitate the relationship among AGS agents.	resources that are common to the society.
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Regarding positive externalities to beef cattle AGS, the studied PIOs contribute either directly or indirectly to the reduction of transaction costs among cattle producers and other AGS agents by contributing to the resolution of conflict situations and the decrease of opportunism and information asymmetry. Consequently, the studied PIOs also influenced AGS coordination and structuring. Moreover, PIOs enabled the development of new markets and businesses for AGS. The interlocutor role that PIOs of 4 typologies may play among AGS agents highlighted the contribution of PIOs in the coordination and increase of agribusiness systems competitiveness, as pointed out by Zylbersztajn and Machado Filho (1998). It should be noted that, even so, those PIOs that did not act directly act in conflict mediation related to beef cattle production can generate an impact when assuring economic improvement of associates and Brazilian herd, thus contributing indirectly to AGS competitiveness.

All studied PIO contributed to AGS development of beef cattle production by encouraging the technical training of cattle producers, fomenting professionalization and technification of rural properties as well as developing researches that address several issues towards the improvement of production through partnerships and organizations. Therefore, PIOs increase the competitiveness of rural properties, which reflect on AGS competitiveness of beef cattle production in the state of MS.

Regarding positives externalities caused in society, the studied PIOs acted either directly or indirectly in the development of public policies' alterations, participating in discussions, hearing, meetings, and councils. The main purpose of PIOs of class representation is acting in the institutional environment. Even though certain PIOs present no belonging connection to the typology of class representation, they can play the representative function of cattle herders in specific situations.

At this point, two situations are identified. The first refers to the representative role that these PIOs exert indirectly in AGS through the participation in discussions and council meetings, therefore contributing to the formation of claims to the PIOs of class representation. The second consists in the effective role of representativeness of beef cattle productive class that a specific group that a beef cattle producer assumes forms a PIOs. For example, ABCZ, due to reached proportions in relation to its territorial dimension, number of associates and their participation in the organization, plays a representative role of zebu breed producers under Ministry of Agriculture and Livestock attributions. Unipan acts directly in the formation of public policies in the Nhecolândia region, hence representing the beef cattle producer.

Even though ABCZ and Unipan exert this role, the association has as principal objective represent neither beef cattle producers' class nor any specific group. However, the association fits in two typologies proposed in this work (race and class representation) due to its performance. Perhaps the situations, in which PIOs of beef cattle producers perform the representativeness function, even whether this is not their main objective, are a reflection of the lack of an exclusive representative unit of beef cattle producers. This supposition is based on the knowledge that there is not such a PIO that represents exclusively every AGS producer of Brazilian bovine meat production and/or of MS as occurs in other productive activities, such as sheep farming, goat breeding, swine farming, and dairy cattle, among others.

As a result, it is verified that every association influences changes in the institutional environment, when representing specific groups of beef cattle producers or instead the class as a whole. This confirmation is in line with Zylbersztajn and Machado Filho (1998), who stated that PIOs play a dialogue role with the government and carry out a task of pushing the rules of the institutional environment through lobbying activities, regardless of their main purpose.

There are also PIOs that influence modifications on bovine meat consumers' buying behavior – Young Steer of MS – and preservation of natural resources that are common to the society – Unipan.

Considering AGS externalities of beef cattle production and in society, the PIOs of beef cattle producers of MS comply the role determined by Farina (*op. cit.*) with organizations and organizational environment of influencing competitive, institutional, and technological environments. This contributes to structuring alteration of efficient governance structures.

4.4 EFFICIENCY LEVEL OF PIOS BASED ON THEIR TYPOLOGIES.

Based on the compilation of case studies presented in Table 4, an exercise referring to PIOs efficiency level is proposed.

In order to signal the capacity level of PIOs in providing collective goods to beef cattle producers, it was evaluated if exclusive associations offered goods and the direct impact of these on productive economic results. The level of AGS externalities of beef cattle production was analyzed according to PIOs capacity of contributing to AGS coordination and the reduction of transaction costs among agents. Finally, PIO capacity to influence the institutional environment and consumer behavior determines its efficiency level in the society. Table 5 presents an analysis exercise of PIOs efficiency level according to the proposed typologies.

Table 4 – Efficiency Level of Typologies

Typology	Beef Cattle Producers	Beef Cattle AGS	Society
Market Niche	●●●	●●●	●●
Breed	●●	●●	●
Class Representation	●	●●●	●●
Regional Representation	●●	●●	●●

Legend: (●) low, (●●), intermediate, and (●●●) high.

Source: Elaborated by the author.

PIOs of market niche have elevated high efficiency level in the provision of exclusive collective goods as well as contribute to economic improvement of productive activity. PIOs of breed have a great capacity to offer exclusive collective goods, which vary principally according to their authorization to perform genealogical registration. These PIOs provide greater advantages in animals' commercialization among beef cattle producers and frigorific industries.

PIOs of class representation are subject to representative actions of other PIOs, which make their offered collective goods less exclusive. Representative actions could interfere either directly or indirectly in production, commercialization of animals, and meat production.

The purpose and context in which PIOs of regional representation are derived result in associations subjected to representative actions of other PIOs, but to an inferior extent when compared to PIOs of class representation. Meantime, collective goods offered by these PIOs are more likely to interfere positively on economic and productive yield of beef cattle producers.

Concerning AGS externalities of beef cattle production, the PIOs of market niche feature an elevated contribution to AGS coordination and reduction of transaction costs among AGS agents. PIOs of breed have an intermediate contribution to AGS coordination since their actions reflects mainly on the coordination of relations among beef cattle producers to themselves, thus leading to a partial decrease in transaction costs.

PIOs of class representation have a high level of efficiency in generating externalities to AGS since these act directly in their coordination, which echoes in the decrease of transaction costs among AGS agents. The associations of regional representation by signifying specific groups of beef cattle producers have intermediate contribution in AGS externalities. Consequently, these play a role of reducing transaction costs among agents.

PIOs of market niche could contribute indirectly and punctually in alterations of the institutional environment, while interfering in the meat consumption behavior, being classified as medium level capacity associations to generate externality in the society.

PIOs of breed can eventually contribute to the modification of both institutional environment and consumer behavior. PIOs of class and regional representation perform directly and with main objective in the institutional environment. However, these associations present little interference in alterations of consumer behavior.

5 CONCLUSION

The identification of horizontal cooperation pattern among beef cattle producers in the state of MS indicates that the members of such class cooperate among themselves. However, this cooperation is different from that of producers of other segments.

Mapping and characterizing the horizontal PIOs formed by producers in the state of MS allow the proposal of 4 (four) organization types, which vary according to their primary purposes: i) PIOs of market niche; ii) PIOs of breed; iii) PIOs of class representation; and iv) PIOs of regional representation. The PIOs may be classified in more than one typology due to their performance in certain cases.

The case study in 7 (seven) PIOs aimed to understand the formation and motivation context of collective actions among producers as well as the efficiency of the studied associations. Considering what motivates cattle producers to cooperate, it was found that PIOs could emerge in several scenarios, such as business opportunity, technological revolution, alterations in consumers' eating habits, and changes in the need for structuring producers' representation units. The institutional environment may also motivate collective practices among beef cattle producers, either compulsorily or voluntarily, through trade union laws, fiscal incentives, and public policies.

The cattle producers decided to act collectively because they believed that their common principal purpose would be achieved more efficiently if they nurtured a collective organization – ABCZ and ANC – and that, once alone, they could not achieve their targets – Novilho Precoce MS, Acrissul, MNP, and Unipan. It should be noted that Famasul creation took place through a legal apparatus, being the unique PIO searched for compulsory linking. Nonetheless, its creation roots present no escapes from the common-sense belief that merely uniting rural producers would represent their claims.

The efficiency level of a PIO in providing beef cattle producers with collective goods varies according to their internal structure and classification. On the other hand, the efficiency levels of a PIO in generating externalities to both AGS and society depend on the typologies in which this association is classified.

The survival of PIOs is due to their internal structuring, which determines the sources of resource and the management of the offered collective goods, with an emphasis on the mechanisms and strategies aimed to understand the needs of their members, establishing selective incentives, establish communication among the associates, and diminish transaction costs and 'free-ride' actions. The dynamism and complexity of beef cattle AGS influence its organizational aspects.

Considering how they cooperate, it is understood that beef cattle producers cooperate through the economic return provided by the PIO. Yet, PIOs offer a variety of collective goods in order to influence gain perception that producer have when becoming a member. Consequently, this contributes to attract new associates and to maintain current ones. These goods consist in economic benefits, action and programs of several natures, such as party organizations, events, expositions, lectures, courses, auctions, and awards as well as representing associates in their interests. Moreover, partnerships with research institutions to enable research as well as with private companies for commercial agreements. Since the livestock producer cooperates through economic return that PIO offers, this collective goods offered by PIOs could influence in gain perception that beef cattle producer has when becomes an associate, contributing to associates attraction and maintenance.

Transaction costs impact the transactions among the association and its members as well as the association and the other agents of the AGS. Consequently, transaction costs determine PIO capacity to provide collective good to their associates as well as to generate possible externalities to the AGS and to the society.

Considering the role of PIOs of structuring and coordinating beef AGS, collective actions like PIOs act in the development of new markets and business to the beef cattle AGS, in the minimization of conflicts, opportunist behaviors, information asymmetry, and transaction costs among beef cattle producers and other AGS agents. Through partnerships with organizations and institutions, the PIOs encourage the technical training of beef cattle producers, foster technification and professionalization of rural properties, and develop research and studies that increase the competitiveness of rural properties. The PIOs of market niche stand out for their elevated efficiency in providing collective goods to beef cattle producers as well as externalities to beef cattle AGS.

Moreover, the PIOs intervene in institutional environment due to their demand for legal alterations, filling legal gaps or contribution in the development of regulations that lead to the development, coordination, and hence increased competitiveness of beef cattle AGS. The PIOs of class representation play a significant role in changing the institutional environment as well as in leading to a higher efficiency level as for AGS coordination.

The direct or indirect influence that all studied PIOs exert on the institutional environment, even if this is not their principal purpose, reflects the lack of an exclusive representative unit of beef cattle producers.

With regard to the PIOs of beef cattle producers in the state of MS, they play an expressive role in the coordination, structuring, and competitiveness of the beef cattle AGS, whereas these associations are concerned with ensuring preservation of natural resources exploited by the activity. Because no specific cooperative for beef cattle producers was identified, it is believed that these producers structure their cooperative form exclusively in associations, except for Famasul, which is a compulsory PIO. Moreover, the exclusive tendency of this class denotes that beef cattle producers cooperate, but this occurs in a distinct manner from producers of other animal growing activities, which are also structured in cooperatives in addition to associations.

From the obtained conclusions, it is possible to identify interesting situations to be studied as well as to formulate questions for future researches. Why do not beef cattle producers organize themselves in cooperatives, which is a common practice among producers of other productive activities? What is the impact level of transaction costs in the efficiency of these associations? Could the advance in grains and forests production in the state of MS, which may influence the need of more competitiveness in beef cattle production, lead to modifications in the pattern of the cattle producers cooperation?

As some limitations involved in conducting this research, it worth noting the time restriction to perform it, as well as the resistance of the organizations to take part, resulting in a low number of cases studies investigated. In addition, it is worth to stress the necessity to consider the producers' personal point of view, besides theirs perspective as organizations managers.

There is much to be further investigated on the issue of collective actions among beef cattle producers. This work enables in-depth studies about questions on this thematic that permeate AGS's economic agents and serves as a starting point for formulating questions that, once resolved, will contribute to the development, coordination, and structuring of beef cattle production activity.

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