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Model for assessing sustainability performance of agricultural cooperatives'☆

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ABSTRACT

Agricultural cooperatives competitive context is being defined by sustainable development paradigm, which are forcing them to assess their performance considering sustainability requirements. There are few empirical studies that provide data to assess sustainable performance of agricultural cooperatives' operations. This study contributes to the theory of sustainable operations by providing a model for sustainability performance assessment that is applied to agricultural cooperatives. The objective of the research is to assess the adherence of a set sustainability performance indicators to form an assessment model to agricultural cooperatives' operations, which is named 'Sustainability Assessment for Agriculture Cooperatives – SAAC'. Empirical data is collected from five case studies, whose analysis reveals the level of adherence of the studied organizations to SAAC criteria. The assessment process proved to be feasible, useful, and easy to comprehend and use. SAAC model could be extended to create the foundation of a sustainability management system for agricultural cooperatives, helping them to effectively contribute to a sustainable development.

1. Introduction

The increasing demand for differentiation, modernization and resource efficiency has led to the integration of operations' systems and technology, leading to the achievement of high standards of performance in quality and productivity, and the emergence of a mass customization production model. Hu (2013) and Manfrina et al. (2013) consider that this has undoubtedly resulted in the development and growth of mankind in the last century, but together with this growth there is a concern about natural resources and how long they will last.

Delai and Takahashi (2011) observe that development in its broad definition, is intrinsically related to cultural, political, economic, social, and even individual aspects with the ultimate purposed of improving the quality of life. Accordingly, Krajnc and Glavic (2005) sustainable development definition proclaimed in the Brundtland Report in 1987 is that on who "meets the needs of the present without affecting the ability of future generations to meet their own needs", as it creates a perspective that it is necessary to develop and maintain available sources of wealth creation.

Furthermore, Abarghani et al. (2013) emphasize that the infrastructure to achieve sustainability and social justice is intrinsically linked to the development of collaboration and cooperation, in which collective rights prevail over individual rights. In this sense, Benos et al. (2016) consider that cooperatives generally meet sustainability insofar as a community of people voluntarily united, having an organizational design based on democracy and collaboration to develop economically in an equitable way and guarantee the social well-being of the cooperative members and the community. According to ICA (2016) and Altman (2015), the United Nations has emphasized that cooperatives are sources of sustainable development, and this importance can be widely noticed in countries with less developed economies and, mainly, in the agricultural sectors.

Abarghani et al. (2013) consider that the adoption and implementation of sustainability principles in economic, social and environmental perspectives, will take time, since this subject is relatively recent. It is in this way that cooperatives, as observed by

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Benos et al. (2016), especially agricultural producers, must understand the requirements for a new business model, since the performance of cooperatives, especially agricultural, is dependent on its socioeconomic environment that usually changing as agri-food business environment.

Therefore, there is a need for model and systems that support this new demand of sustainable management of agricultural cooperatives. The resulting models and systems are strongly based on performance assessment, which assists in decision making and produces raw information for sustainability reports. However, assessing the sustainable performance of an agricultural cooperative is not a trivial task. The dynamic and complexity of the sustainability indicators related to the economic and financial aspects must be integrated, as well as indicators related to the cooperative and their social welfare, aside from indicators that assess the impacts on the environment. Cooperatives in general adopt the sustainability regulatory framework based on GRI, AA1000, ISO standards. It could be observed that requirements for sustainability are clearly defined, but measures for assessing it deserves to be considered accordingly to their application (Marcis et al., 2018; Pavão and Rossetto, 2015; Guzmán and Arcas, 2008).

Studies related to the assessment of agricultural cooperatives sustainable operations performance point out that the complexity of designing indicators that permeate the subject comprehensively, in which simple market-based performance measures are not sufficient, and this is why assessment models and frameworks available in the literature are scarce (Zhong et al., 2018; Gallardo-Vázquez et al., 2014; Soboh et al., 2009; Cook, 1994).

According to the Confederation of Agriculture and Livestock of Brazil (CNA, 2016), in the year 2016, the agricultural sector represented 23% of the country GDP where the study is carried out. This is study contributes for improving the management process and performance results, observing sustainability requirements of one of the most representative sectors in the Brazilian economy. In addition to that the 'Brazilian cooperativism' is present in the three sectors of the economy, particularly represented in the agricultural, credit and health sectors. Cooperative growth, especially in the agricultural sector, is responsible for 50% of all Brazilian agricultural production (OCB, 2016).

Chen et al. (2017) comment that due to the importance of the sector and the difficulties presented, there is a need to homogenize sustainable performance measurement indicators for agricultural cooperatives' operations, integrating the academic body of knowledge on performance assessment to agricultural cooperatives sustainability management context.

In this way, the present research aims to work on this gap by testing the adherence of sustainability performance indicators to an assessment model for agriculture cooperatives. The main contribution of this paper is to verify if the proposed performance indicators are adequate for managing sustainability in the operations of agricultural cooperatives by observing the complex and dynamic context where cooperatives operate.

According to Grashuis (2018) there are few works that focus on the dynamics and complexity of agricultural cooperatives performance, and this is where the paper contribution is positioned, putting some light in the contingencies that connects the studied cooperatives sustainability strategies to their adopted performance indicators. The main objective is to verify if a provided set of sustainability indicators suit demands for a complete and integrated view of their sustainability performance that covers social, environmental and economic aspects.

2. Theoretical framework

For the management of agricultural cooperatives to occur in an organized and planned manner, there is a need to monitor and assess their sustainable operations. The common metrics, which are normally repeated in the sustainability performance assessment in different applications, are classified in three basic aspects of sustainability: economic, environmental, and social; which are the well-known Elkington (1994) Triple Bottom Line.

However, in the context of agricultural cooperatives, there is no currently consistent basis indicating a specific methodology for constructing an assessment model for sustainable operations of agricultural cooperatives, nor is there available processes and procedures to integrate the sustainability dimensions. This can be verified in some studies that use only the economic aspects conveyed to the environment as reported by Claver et al. (2007). Some other studies connect social and economic aspects: Benos et al. (2016), Chen et al. (2013) and Rezaei-Moghaddam and Karami (2008). Authors such as Abarghani et al. (2013) and Adrian and Green (2001) make performance assessment based on management practices and the adoption of cooperative principles.

There are few integrative studies that cover the three dimensions of sustainability operations of agricultural cooperatives. Gallardo-Vázquez et al. (2014) present a qualitative model called 'Orientation to Social Responsibility in Cooperatives – OSRCOOP', which assess seven dimensions for cooperatives performance: economic, environmental, social, dissemination, information, innovation and partner satisfaction.

Pavão and Rossetto (2015) show an assessment model to verify the relationship between 'Stakeholder Management Capability – SMC', and the sustainable performance of cooperatives in Brazil. The model analyses the impact of relationship between SMC on financial and socioenvironmental performance.

Reis (2005) presents a model for understanding the dynamics of sustainability in solidarity economy organizations that was tested in three Brazilian cooperatives, and indicated a series of interaction factors and dimensions that determine their sustainable dynamics.

The "ISO" standards support some models and frameworks: the M.A.I.S. model proposed by Sachs (1993, 2002), ISO 9000, ISO 14000 (ISO, 2017), BS 8800 (BSI, 2017), SA 8000 (Social Accountability International (SA), 2017), criteria of the National Quality Award (PNQ, 2017), the Dow Jones Sustainability Index (DJSI, 2017), the analytical framework to study sustainability in solidarity economy companies of Reis (2005), and the sustainability panel guided based on developments of França Filho and Laville (2004) and Polanyi (2000). Thus, as concluded by Ribeiro (2011) sustainability measurement and partial or complete application of TBL aspects characterize the experience of Brazilian cooperatives in assessing the degree of adherence to the principles of sustainable development and solidarity economy.

Anzilago (2015) study the applicability of the Global Reporting Initiative (GRI, 2017) to agricultural cooperatives in the state of Paraná in Brazil, but it was verified that cooperatives do not adequately and uniformly disclose their reports, which indicates that cooperatives should be trained for their applicability, and caution is needed when affirming that its adoption is possible.

A more detailed review on the topic was carried out by the authors in the paper Marcis et al. (2018), which maps the research agenda and trends on sustainability performance assessment of agricultural cooperatives operations. It is important to observe that research in this topic is in its initial process of proposing theoretical models and testing them. Through the mapping of literature, it was possible to identify 247 indicators, where 79 indicators are classified as cooperative organizational design principles related to planning and management, 80 in the economic perspective, 43 for environmental aspects, and 45 are related to social issues. It was observed that 49 indicators represent a consensus in the literature and they are used to form the first version of the assessment model.

The 'Sustainability Assessment for Agriculture Cooperatives – SAAC' model was then refined through expert interviews and produced the final version that informs the case study protocol presented in this paper. The complete process of refining the theoretical model is presented in Marcis et al. (2017a), and Table 1 shows the structure used in this work.

The original set of indicators extracted from the literature presented 4 dimensions, 13 categories and 49 indicators and, through refinements by experts' analysis resulted in a set of 5 dimensions: (i) Economic: 8 indicators; (ii) Environmental: 27 indicators; (iii) Social: 16 indicators; (iv) Indicators specific to cooperatives organizational design: 19 indicators; and (v) Trade relations: 8 indicators. A new and revised set of 78 indicators delimit the scope of the assessment task and identified measures of sustainable operations performance for agricultural cooperatives.

Although, all the chosen indicators are considered relevant, their relative importance according to Claver et al. (2007) and Campos-Climent et al. (2012), depends on the context of their application. It could be said that they are contingent to cooperatives strategies and policies regarding their business in general and their sustainable operations in particular.

This literature review shows an opportunity to study the integration of sustainability assessment in agricultural cooperatives, so the study seeks to address this gap.

3. Research design

The adopted research strategy is based on multiple case studies. In order to foster the link between sustainability theory and practice, the proposal of the performance assessment model of agricultural cooperatives used the methodology is refined and tested through multiple case studies. The collected data is used to assess the adherence of the proposed performance indicators to cooperatives sustainability strategies. The case describes indicators application in the context of cooperatives sustainable practices and policies, as well as explain their interrelationships and impact. Case studies are required because context play an important role in defining performance results, and the indicators should be studied in depth by their feasibility, usability and utility (Yin, 2017; Miguel, 2007, Leal filho, 2000).

For the development of the proposed SAAC model, the categories, subcategories and indicators applied resulted from a systematic literature review, presented in Marcis et al. (2018), and a process of refinement with specialists, practitioners in the areas of strategic planning, sustainability consulting and auditing, academics that research in the areas of sustainability and cooperatives, and representatives of cooperatives and of the Organization of Cooperatives of Parana State Brazil – OCEPAR (2017), which is fully described in Marcis et al. (2017a) and summarized in Table 1. The framework is named Sustainability Assessment for Agriculture Cooperatives – SAAC.

The five cooperatives chosen to refine and test the SAAC model are based on a sustainability disclosure study that use data collected from annual reports of agricultural cooperatives in the southern region of Brazil that is presented in Marcis et al. (2017b) and constitute a group that have 'material' information regarding sustainability as pointed out in their reports. The studied cooperatives are member of OCEPAR (2017), which has an important role in disseminating sustainability practices over the last ten years. Despite OCEPAR (2017) efforts of the 74 agricultural cooperatives registered in 2016, only 17 had reports that demonstrated sustainability performance, policies and practices.

According to Patton (2015), the sample process combines criteria to produce intensive, homogeneous, snow ball, purposely stratified and based on theories cases. Intensive cases in the sense of in-depth studies on sustainability indicators. Homogeneous for testing a preselected list of indicators. Snow ball and theory based, because the case selection is connected to a previous study that stablish sample criteria that is the disclosure study. Finally, purposely stratified means that the cases are not selected to ensure representativeness, but rather to give 'credibility' to the study.

Table 2 shows the research phases used to develop, to refine and to test proposed model. The developed procedures are based on the 'Process Approach' research technique developed in the Institute for Manufacturing of the University of Cambridge by Platts (1993), which apply principles as purpose, point of entry, procedures, participation and project management to organize a diagnosis process. The developed process is based on worksheets and workshops for collectively design a set of sustainability performance indicators. Three criteria are used for assessing the developed process: feasibility, 'Can the process be followed?'; usability, 'How easy is it to follow the process?'; and usefulness, 'Has the process provided a useful result?'

The research protocol starts with a questionnaire that defines the worksheet 1 (WS1), basically mapping the adoption of the indicators presented in Table 1 and Appendix 1**,** that is previously send by e-mail to those responsible for the strategic planning area of the agricultural cooperatives. The answers obtained provide the guidelines for the next step that is formalized by worksheet 2 (WS2) presented in Appendix 2 that is developed through interviews with collaborators responsible for the strategic planning, and environmental area of the agricultural cooperatives. These interviews are recorded, transcribed and analyzed based on a list of preidentified sustainability performance indicators. The collected evidences are related to questionnaires, interviews, direct observations, and documents (reports). For the analysis of the data, the triangulation of collected data is the basic mechanism as recommended by Yin (2017) and Eisenhardt (1989).

From the pilot case study, the cycles of identification, use of indicators, and analyzes are re-evaluated and refined, re-feeding and improving the model itself, as could be seen in the new version of worksheets. Following the pilot case study, the model is tested in four case studies, allowing the comparison of the sustainability performance of the agricultural cooperatives' operations individually, using a common methodology for assessing sustainability performance indicators.

Thus, observing the need to integrate sustainable performance assessment into the context of agricultural cooperatives, results of are presented in the next section.

4. Results

There are two previous phases of this study that inform the present research. Initially, a systematic literature review was conducted to map the current state of the research in sustainability performance assessment of agricultural cooperatives operations. The SLR identified performance indicators that are being adopted by agricultural cooperatives and helped to construct a conceptual framework to integrate performance indicators for sustainability in agricultural cooperative operations, as it is presented in Marcis et al. (2018).

The second study uses the guiding indicators extracted from the literature, and through successive refinements made by interviews with experts who had knowledge in any of the following areas: strategic management, sustainable operations or cooperative practices. Three rounds of interviews were carried out: at the 1st and 2nd rounds with 4 specialists; and the 3rd round with 3 specialists. At each round changes or revisions are promoted until a satisfactory level of convergence is reached. The refined model is named: Sustainability Assessment for Agriculture Cooperatives -

Table 1
Sustainability Assessment for Agriculture Cooperatives – SAAC model.

Sustainability Assessment for Agriculture Cooperatives (SAAC)		
Economic	**Financial Category**	No
	ROA (Return on Assets)	1
	ROI (Return on Investment)	2
	ROE (Return on Equity)	3
	Maintain control of cash flow	4
	Current liquidity	5
	General liquidity	6
	EBTIDA	7
	General debt	8
Environmental	ENVIRONMENTAL MANAGEMENT CATEGORY	
	Subcategory – Water	
	% of gross revenue invested in protection and preservation of water sources (last financial year)	9
	% of gross revenue invested in water reuse (last financial year)	10
	% of rainwater use in relation to quantity consumed (last financial year)	11
	% of gross revenue invested in effluent treatment (last financial year)	12
	% reduction of m^3 of water consumption in relation to the last two years	13
	Subcategory - Air	
	% of gross revenue invested in reforestation (last financial year)	14
	% of gross revenue invested in the treatment of emissions of air pollutants (last financial year)	15
	Average age of the fleet of cargo vehicles	16
	% of biofuel vehicles in relation to the total number of vehicles used by the cooperative	17
	Subcategory – Soil	
	Disposal of empty toxic packaging collection	18
	% of cooperatives that participated in environmental campaigns on the use of agrochemicals in relation to the total number of cooperatives (last financial year)	19
	Subcategory – Energy	
	% of renewable energy use (from sun, wind, rain, tide and geothermal energy) in cooperative facilities in relation to quantity consumed (last financial year)	20
	% KWh reduction in electricity consumption over the last two years	21
	Subcategory – Environmental awareness	
	Environmental certification of the cooperative	22
	Environmental penalties (light, serious, very serious) received during the whole existence of the cooperative	23
	Quantity of environmental penalties converted into fines (light)	24
	Quantity of environmental penalties converted into fines (serious)	25
	Quantity of environmental penalties converted into fines (very serious)	26
	Subcategory - Participation	
	Participation in meetings and conferences on sustainable development (last financial year)	27
	Participation in meetings and conferences on Social Responsibility (last financial year)	28
	Awards for excellence in environmental management received (last financial year)	29
	Cooperation projects with other organizations, for sustainability actions and corporate social responsibility	30
	Subcategory – Waste Management	
	% of **reduced** materials in production, packaging of goods and/or provision of services (last two years)	31
	% of reduction of consumption of plastic cups (last two years)	32
	% of reduction of paper consumption spent on photocopying and printing (last two years)	33
	% of **recycled** materials used to produce, package products and/or provide services (last two years)	34
	% of **reused** materials that are used to produce, package and/or deliver services (last two years)	35
Social	CATEGORY OF HR POLICIES	
	Subcategory – Occupational safety	
	Certifications of good practices in hygiene, health and safety in the workplace of the cooperative	36
	% of occupational accidents with work leave from the last financial year in relation to the total number of employees	37
	% of gross revenue invested in occupational health and safety (last financial year)	38
	Subcategory – Labor relations	
	Number of labor claims in relation to number of employees (last financial year)	39
	Staff turnover rate (last financial year)	40
	Employee satisfaction survey	41
	Subcategory – Employee benefits	
	% of gross revenue directed to employee incentives and rewards	42
	% of employees who have medical assistance through the cooperative in relation to the total number of employees (last financial year)	43
	% of employees who have a private pension plan through the cooperative in relation to the total number of employees (last financial year)	44
	% of employees who have life insurance through the cooperative in relation to the total number of employees (last financial year)	45
	Subcategory – Training and development	
	% of gross revenue invested in education training and development, higher education and post-graduate courses for employees (last financial year)	46
	% of employees who participated in technical training and courses up to 40 h paid by the cooperative (last financial year)	47
	% of employees who participated in training in higher education and post-graduate courses paid by the cooperative in relation to the total number of employees (last financial year)	48
	COMMUNITY CATEGORY	
	% of gross revenue invested in social projects developed by the cooperative (last financial year)	49
	% of gross revenue invested in cultural projects developed by the cooperative (last financial year)	50
	% of gross revenue invested in sports projects developed by the cooperative (last financial year)	51
Specific indicators of the cooperatives	COOPERATIVE MEMBERS CATEGORY	
	Subcategory – Management of cooperative members	

Table 1 (*continued*)

Sustainability Assessment for Agriculture Cooperatives (SAAC)		
	% of cooperative members entering in the last year in relation to the total number of cooperative members	52
	% of cooperative members leaving in the last year in relation to the total number of cooperative members	53
	Subcategory – Quality of service to the cooperative members	
	% of complaints resolved in the last year in relation to the total number of complaints obtained from the cooperative members	54
	Technical visits to each cooperative member's property (last financial year)	55
	Availability of production cost and profitability estimates to the cooperative members	56
	Performs cooperative member satisfaction survey	57
	Subcategory – Cooperative member benefits	
	% cooperative members who have medical assistance through the cooperative in relation to the total number of cooperative members (last financial year)	58
	% cooperative members that have a private pension plan through the cooperative in relation to the total number of cooperative members (last financial year)	59
	% cooperative members who have life insurance through the cooperative in relation to the total number of cooperative members (last financial year)	60
	% of cooperative members who have taken loans from the cooperative in relation to the total number of cooperative members (last financial year)	61
	% of cooperative members who have insured their production by the cooperative in relation to the total number of cooperative members (last financial year)	62
	% of distribution of surpluses by cooperative members (last financial year)	63
	Appreciation and recognition awards to cooperative members	64
	Subcategory – Education and qualification	
	% of gross income invested in education, training and development, higher education and post-graduate courses, for cooperative members (last financial year)	65
	% of cooperative members who participated in higher education and post-graduate courses in relation to the total number of cooperative members (last financial year)	66
	% of cooperative members who participated in courses on rural family succession planning in relation to the total number of cooperative members (last financial year)	67
	% of cooperative members who participated in courses on financial education of the rural family in relation to the total number of cooperative members (last financial year)	68
	% of cooperative members that participated in operational events and training in relation to the total number of cooperative members (last financial year)	69
	Actions (lectures, meetings, etc.) of preventive medicine carried out	70
Commercial relations	MARKETING AND COMMUNICATION	
	Measures the % of the market that the cooperative holds in relation to its main product	71
	% of gross sales directed to marketing communication (advertising, promotion, etc.) in the last financial year	72
	% of suppliers (inputs, equipment, etc.) that belong to the location of the cooperative's headquarters in relation to the total number of suppliers of the cooperative	73
	Performs customer satisfaction survey of non-cooperative members	74
	Certifications of product and service quality of the cooperative	75
	SUPPLIER ASSESSMENT	
	% of suppliers subject to environmental impact assessments in relation to the total number of suppliers (last financial year)	76
	% of suppliers subject to quality assessments in relation to the total number of suppliers (last financial year)	77
	% of suppliers subject to assessments of solidarity characteristics (last financial year)	78

Table 2
Research overview.

1 - Systematic literature review

The SLR employs the ProKnow-C and content analysis procedures for selecting a paper set, mapping the research agenda and trends, and synthesizing a conceptual framework. The first version of the assessment procedure is based on 49 indicators, which constitutes the most relevant and frequent measures adopted by cooperatives to assess their operations' sustainability. The framework is based on 4 dimensions and 13 categories (Marcis et al., 2018).

2 - Refinement with specialists

This an early stage of the research that provided a revised version of the SAAC model. It is formed by 78 indicators, that are framed in 5 dimensions: (i) Economic: 8 indicators; (ii) Environmental: 27 indicators; (iii) Social: 16 indicators; (iv) Indicators specific to cooperatives organizational design: 19 indicators; and (v) Trade relations: 8 indicators (Marcis et al., 2017a).

3 - Case studies research protocol

3.1 PHASE 1: Design task

Step 1: Presentation of the work and contact with the cooperatives

Step 2: Diagnosis of cooperative indicators (questionnaire, interview)

Through a task sheet (WS1) the indicators selected through the literature and refinement by specialists are verified by the cooperative, which makes a diagnosis of the indicators used, of those that can start to use them and those that would not use them.

3.2 PHASE 2: Refinement

Step 3: Evaluation of indicators (interviews, observations, documentary analysis)

The WS2 task sheet outlines this step, which evaluates the indicators that are said to be used and those that could begin to be used, listed in WS1, the survey participants verify: a) If the structure for constructing an indicator is adequate in relation to: the objectives, the measurement formula, frequency of measurement, origin of the data, name of the function's sector of the function and of the person in charge, classification of levels: bad, good, unsatisfactory, satisfactory, excellent and target.

b) The performance of the list of indicators to make an overall evaluation of the cooperative, classifying what would be a poor, good, unsatisfactory, satisfactory and excellent level of use.

c) Checking if an ineffective indicator was considered and if it is necessary to include any other indicator in the assessment.

3.3 PHASE 3 – Revision of processes

Step 4- Revision

In this step, actions to improve the process are adopted.

SAAC, and it is fully described at Marcis et al. (2017a).

The model presents five dimensions: (i) Economic with 8 indicators; (ii) Environmental with 27 indicators; (iii) Social with 16 indicators; (iv) Indicators specific to cooperatives with 19 indicators; (v) Trade relations with eight indicators, having a total of 78 indicators as it could be visualized in Table 1.

It is necessary to test the sustainability performance assessment system of agricultural cooperative operations. The results are presented below, individually in each case study, and Table 3 presents the list of cooperatives studied as well as some relevant information for the year of 2016.

The information retrieved from the five cases permit to answer the following questions: 1) What are the sustainability performance indicators adopted by the cooperatives? How their information are used in the decision making process?; 2) According to SAAC model, what are the indicators that are significant to be adopted by the cooperative?; 3) What are the sustainability indicators proposed by SAAC model that are not relevant to the cooperative?

The initial data collection is done by questionnaire. Which identifies the adopted indicators that lead to other evidences as complementary interviews, documents analysis and direct observation of sustainability actions.

4.1. Cooperative A

Cooperative A was used as a pilot test for research protocol. It is one of the largest agricultural cooperatives in Brazil and Latin America, it has 118 facilities located in 68 municipalities in the states of Parana, Santa Catarina and Mato Grosso do Sul, with soy beans being the main processed agricultural product, followed by corn, wheat, coffee among other grains.

Having presented the objectives and expected results of the research to the executive director of the cooperative, two people were assigned to give information to the researcher, but altogether, it was necessary to involve five superintendents and 20 regular managers.

The indicators considered by the SAAC model were verified by the cooperative and the results diagnosed that of the 78 proposed indicators, 61 were chosen as relevant to the formulation of sustainability strategies, representing 78% of the proposed list. Six were chosen to be adopted, which corresponds to 8%. From this diagnosis, cooperative A assigned the utilization profile of the number of indicators of a sustainable assessment model according to Fig. 1, considering five levels: poor, good, unsatisfactory, satisfactory and excellent. Therefore, by this assessment, cooperative A is positioned in the excellent region of SAAC model adoption and adding up the indicators already used and those that could begin to be used, the performance would maintain its operations at the excellence level.

According to Whitehead (2016: 402), “sustainability indicators tend to reveal symptoms rather than causes” and, in this way, it was verified that among the indicators of the dimensions that stood out the most were: in the current economic performance, in which all indicators are used, as can be seen in Fig. 2. In relation to the intended performance, the dimension of commercial relations stands out considering the adoption of all in view the proposed indicators.

The important indicators that can start to be used are related to the dimension of specific indicators of the cooperatives, four indicators (57, 64, 67, 70); followed by an indicator (10) of the environmental dimension; and an indicator (74) of the commercial relations dimension.

Cooperative A described 11 indicators as not relevant, seven of which are related to the environmental dimension (9, 13, 31, 32, 33, 34, 35), since many preservation actions are carried out by the members themselves. In the social dimension, two indicators (42, 44) would not be used, and in the specific indicators of the cooperatives, indicators (59, 66) are not relevant. This was in line with what cooperative A highlighted, declaring that it does not consider the use of environmental indicators very important to formulate strategies in a general sense. However, Cooperative A has a specific environmental policy that outlines its perception regarding environment issues, since the interviewee stated:

“[…] The cooperative adopts environmentally correct practices, as it believes that food production and sustainability depend on a positive relationship with the environment."

In cooperative A it was possible to observe actions directed to water resources management with the reuse practices, and the management of solid residues, as the discarded clay is allocated from oil refining to potteries in several municipalities for the production of bricks. This cooperative has received the Ecology Expression Prize called “Green wave,” given by FIESC - Federation of Industries of the State of Santa Catarina, for the development of the program.

In relation to how to structure a method for constructing an indicator, Cooperative A did not suggest any improvement in the SAAC record sheet. There is a considerable diligence by Cooperative A in creating an indicator that represents the development of the cooperative members, yet it involves a range of other indicators that have been sought unsuccessfully to date.

From the pilot test, the SAAC model was assessed and revised, and it was decided not to withdraw the 11 indicators not used by the cooperative. Considering that the agricultural cooperatives that accepted to participate in the research act in the market differently and have different products, despite being from the same sector, they can possibly use these indicators. The structure for the construction of the model has remained unaltered and a specific study

Table 3
List of cooperatives.

Cooperative	Cooperative members	Effective employees	Main processed	Annual Revenue 2016	Financial surpluses reverted to the cooperative members 2016
A	28,051	7343	Processed agricultural product, soybeans being the main followed by corn, wheat, coffee among others.	US$ 3.5 billion	US$ 103 million
B	45,475	6755	Operates in the pork and dairy industrialization market	US$ 785 million	US$ 7.9 million
C	10,261	8758	Processes and distributes food with its own brand of approximately 300 products (canned, frozen, cuts of chickens, as well as grains, corn and soy beans).	US$ 1.4 billion	US$ 22 million
D	1100	300	Works with the storage and commercialization of grains and agricultural supplies,	US$ 156 million	US$ 368,522
E	860	2700	Works with agricultural and industrial processes related to meat, dairy, potato, wheat and bean products.	US$ 890 million	US$ 11.97 million

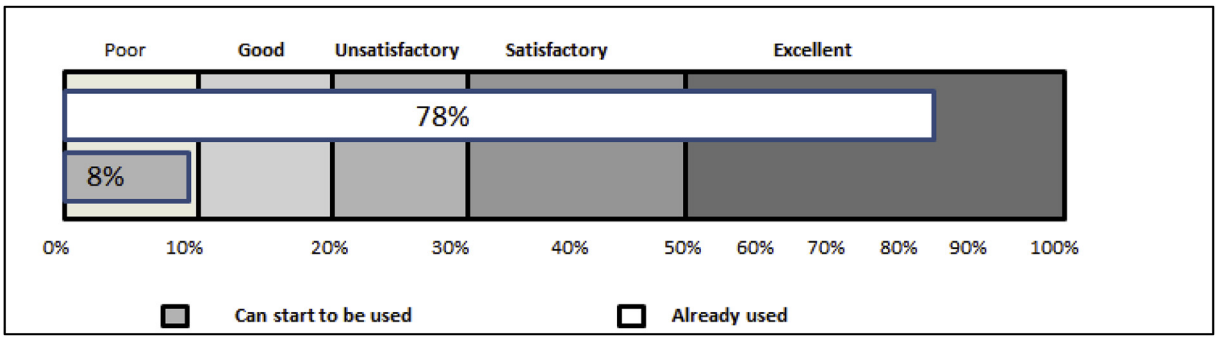
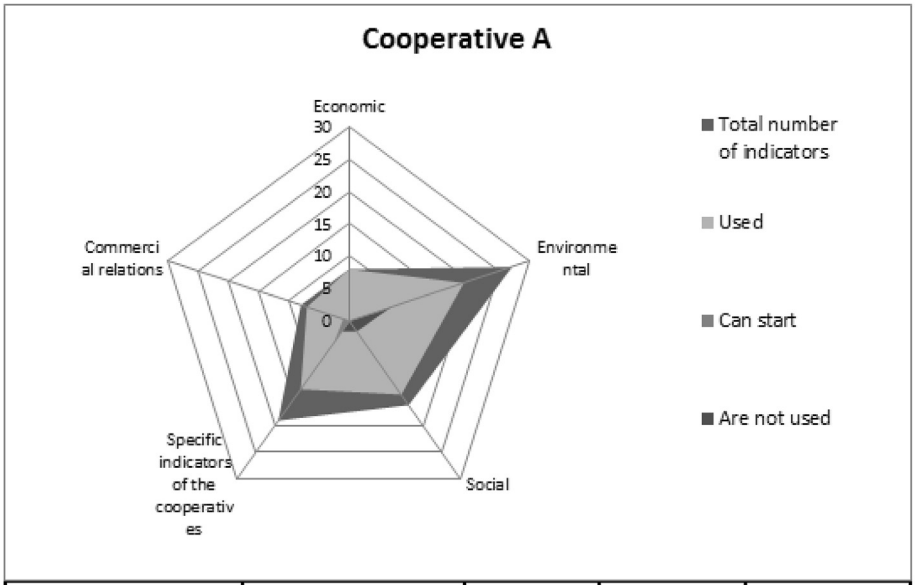


Fig. 1. Performance of the model- Cooperative A.



Dimensions	% Current performance	Current Profile	% Intended	Intended profile
Economic	100.00	Excellent	100.00	Excellent
Environmental	70.00	Excellent	74.07	Excellent
Social	88.00	Excellent	87.05	Excellent
Specific indicators of the cooperatives	68.00	Excellent	89.47	Excellent
Commercial relations	88.00	Excellent	100.00	Excellent

Fig. 2. Use of the model - Cooperative A.

regarding the development of cooperative members is necessary in the future. It was also necessary to wait for the general assemblies and the finalization of the cooperatives' annual reports. In this way, the application of the research occurred according to the availability of each cooperative.

In order to refine the proposal of sustainable performance assessment indicators for agricultural cooperatives, case studies were carried out in Cooperatives "B", "C", "D", and "E" between February and May of 2017.

4.2. Cooperative B

Cooperative B operates in the pork and dairy industrialization market with more than 370 commercialized products, it is a central cooperative formed by five cooperatives from Parana state. It has five manufacturing plants distributed in the states of Parana and Santa Catarina, one milk reception station in Mato Grosso do Sul and eight other sales branches in the states of Parana, São Paulo, Rio de Janeiro, Santa Catarina, Rio Grande do Sul, and several distributors and representatives in the main Brazilian State capitals. The cooperative designated two key collaborators to provide the required information, one from the planning area and the other from the environmental area, but altogether it was necessary to involve seven different sectors or departments.

The difference between Cooperative B and the others being studied is that it is a central cooperative, that is, the junction of the five affiliated cooperatives, so there is no direct interaction with the rural producers (Brasil, 1971).

Thus, in the case of Cooperative "B", the specific indicators of the cooperatives that include the sub-categories cooperative member

management, cooperative member quality of service, cooperative member benefits, education and qualification do not apply since the cooperative is a central one.

Cooperative B also assigned the utilization profile of the quantity of indicators of a sustainable assessment model, eliminating the specific indicators of the cooperatives, that is, 19 indicators. In this case, there would be only 59 indicators for the cooperative, of which only five indicators (16, 17, 28, 42, 44) would not be relevant, 39 indicators are already used and 15 could be adopted. Thus, the SAAC model would be at an unsatisfactory level (66%) but adding the indicators it already uses and those that it could use, the model would be at an excellent level at 91% (see Fig. 3). It is believed that the indicators used and those that can start to be applied would be important for strategic planning and development of their strategies, as well as enable an overall performance assessment of the cooperative.

In relation to the use of the model regarding its dimensions according to Fig. 4, the economic performance is highlighted in the current performance, in which all the indicators are used. In relation to the intended performance, the commercial relations dimension is highlighted in view of the use of all the indicators.

Cooperative B emphasized that the study assisted in the identification of new indicators to be used, with a total of 15 indicators of different categories, highlighting the environmental category with seven indicators (9, 11, 19, 22, 29, 30, 32) that were identified as important to start using. In addition, a perspective was created to rethink its actions and indicators in relation to the satisfaction of affiliated cooperatives, based on the verification of the specific indicators of the cooperatives.

In cooperative B, it was possible to observe actions directed to the management of water resources, solid residues, atmospheric emissions, environmental education actions, and innovations in relation to inexhaustible sources of energy. According to information from cooperative B, the search for sustainable growth permeates all stages of management with alignment to the promotion of 'cooperativism', transparency and clarity in strategic positioning and decisions. Furthermore, its management is based on the standard ISO 14.001 (International Organization For Standardization (ISO), 2017) for atmospheric emissions, water supply, liquid effluents and solid waste in all of the manufacturing facilities.

Regarding how to structure a method for designing an indicator, Cooperative B indicated that it would add the revision information of the indicator. It was verified that the cooperative usually does not use a structure for indicators design, which was valued by the cooperative, and this model was requested to be extensively used.

The indicators that were not in the list and which the cooperative felt were missing: EBITDA x Debt, Productivity, Quality, Consumption, Average Selling Price, Contribution Margin, Market Share. However, it should be noted that in the list presented, there are already indicators that correspond to EBITDA, Market Share, Quality and Productivity, but the cooperative was requesting some sort of derivative measure.

It was verified that the cooperative is mature in relation to strategic planning and already has several indicators, besides having well-defined environmental strategies carrying out environmental actions that are not yet disclosed in the annual management reports on its home page. However, there is an internal report on sustainability that the researcher had access to, as well as the possibility of observing these actions described in the report, which enabled the emphasis that the case study makes the research more complete by obtaining more effective information.

4.3. Cooperative C

Cooperative C processes and distributes food with its own brand of approximately 300 products (canned, frozen, cuts of chickens, as well as grains, corn and soy beans). It has twenty-seven facilities, of which thirteen are located in the state of Parana, thirteen in Mato Grosso do Sul and one in Santa Catarina. This cooperative is also a co-founder and co-owner of another cooperative in the western region of Parana, working with mills, a terminal of containers refrigerated in a dry port, and a grain terminal and customs structure in the Port of Paranagua. In addition, it is one of the five cooperatives affiliated with cooperative B studied in this work. The cooperative assigned an interlocutor for providing access to required information that involved six different sectors.

Cooperative C, according to Fig. 5, the utilization profile of the quantity of indicators of a sustainable assessment model SAAC, where the results of the indicators it already uses is 8%, that is, 6 indicators. Thus, the model is in the poor performance level, but it was pointed out that 40 indicators (51%) could be adopted, which would make the performance move to excellent (59%). It is believed that the indicators used and those that can be adopted could support the strategic planning and development of their sustainability strategies.

In relation to SAAC use with respect to its dimensions according to Fig. 6, the economic dimension stands out in the current performance, in which 63% of the indicators are used. In relation to the intended performance, the economic dimension is highlighted, which would use all the indicators, although it should be pointed out that all the dimensions would obtain a substantial improvement.

Cooperative C emphasized that its strategic planning is still in the process of structuring and that it is initiating the use of several indicators in a slow and conservative way so as not to impact its organizational culture. According to Ax and Greve (2017), when implementing administrative innovations, if these meet organizational values and beliefs, the change of organizational culture is more accepted. It was also stressed that it would be important to use all the indicators listed in the SAAC model, but it is not possible to determine if the efforts made to characterize and specify all 78

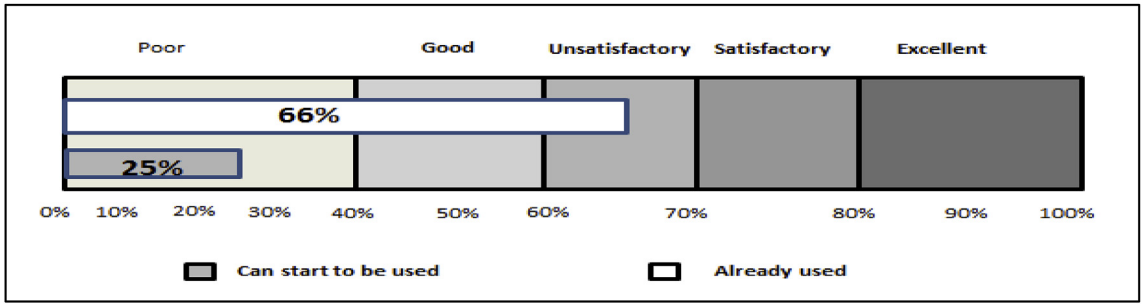
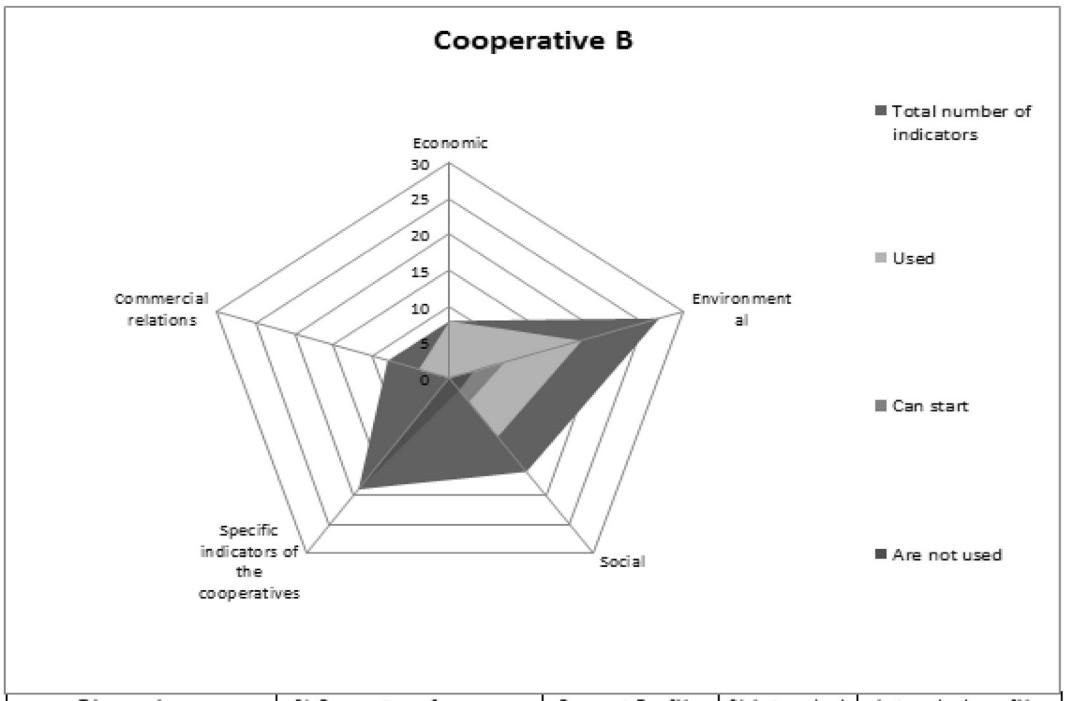


Fig. 3. Performance of the model- Cooperative B.



Dimensions	% Current performance	Current Profile	% Intended	Intended profile
Economic	100,00	Excellent	100,00	Excellent
Environmental	63,00	Unsatisfactory	88,89	Excelente
Social	63,00	Unsatisfactory	87,50	Excelente
Specific indicators of the cooperatives	-	Do not apply	0	Do not apply
Commercial relations	50,00	Good	100,00	Excellent

Fig. 4. Use of the model - Cooperative B.

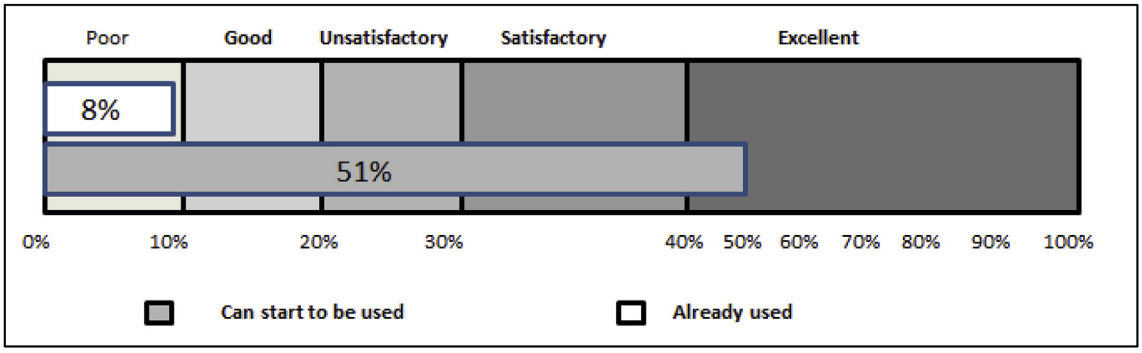


Fig. 5. Performance of the model - Cooperative C.

indicators would provide an important result for the cooperative. Only the exercise of use and time could clarify this, but it is believed that all would be important for strategic planning and an overall performance assessment of the cooperative.

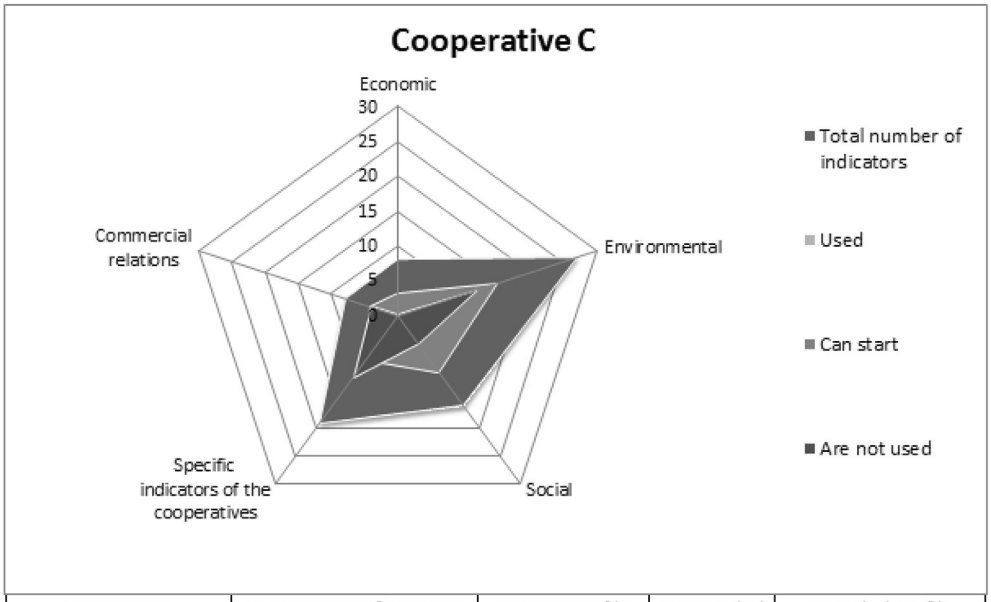
In cooperative C, it was possible to learn about the administrative structure and verify its sustainability policy that seeks to promote the economic and social development of the associates and the community, in a sustainable way, through the aggregation of values to agricultural production. It has the Environmental Priority Program, with socioenvironmental indicators for the Strategic Planning 2014–2024, which is being implemented slowly, in view of the culture of the cooperative and acceptance of the actors involved.

Regarding how to structure a method for designing an indicator, Cooperative C did not mention the need to add another type of information in the form, which has been using a similar structuring model, mentioning again that its planning is being structured at the moment.

The indicators that were not on the list and that the cooperative felt were missing, the interviewee mentioned: Optimization of the Structure and Inventory Turnover.

4.4. Cooperative D

Cooperative D works with the storage and commercialization of grains and agricultural supplies, with the purpose of making the



Dimensions	% Current performance	Current Profile	% Intended	Intended profile
Economic	63,00	Unsatisfactory	100,00	Excellent
Environmental	-	Poor	55,56	Good
Social	6,00	Poor	68,75	Unsatisfactory
Specific indicators of the cooperatives	-	Poor	42,11	Good
Commercial relations	-	Poor	50,00	Good

Fig. 6. Use of the model - Cooperative C.

rural activities feasible for the cooperative members that cultivate soy beans, corn, wheat, barley and beans. The company has 11 units, with nine located in the state of Parana and two of them in the state of Santa Catarina. The cooperative assigned an interlocutor to provide the access to required information, and this process covered 10 different sectors.

The results of the cooperative indicated that of the 78 indicators, 38 are already used, which represents 49%, and 19 could be used, which corresponds to 19% (See Fig. 7). From this diagnosis in Fig. 7, cooperative D assigned the utilization profile of the quantity of the model's indicators at a good level of performance and adding the indicators that are used and those that could be adopted, the performance becomes satisfactory at 68%. It is believed that the indicators used and those that could be adopted would lead the cooperative to high levels of overall performance regarding sustainability.

Analysing the use of SAAC model in relation to its dimensions, according to Fig. 8, the economic dimension is highlighted in the current performance, in which 100% of the indicators are used. In relation to the intended performance, the social dimension is representative, which would use all the indicators, but it is worth noting that all dimensions would be substantially improved.

It was possible to learn about the administrative structure of cooperative D, and it was emphasized that its strategic planning is still in the process of internal structuring and that indicators, mainly financial, are already used. Besides, it does not yet have any kind of strategy for sustainability issues, which is in accordance with the studies of Benos et al. (2016), who identified that performance assessment studies of agricultural cooperatives have focused on financial analysis, especially financial statement evaluations. It was declared by the agricultural cooperative that it does not really consider the environmental pillar of sustainability, although there are small actions directed to social assistance and the donation of tree saplings. In this way, Whitehead (2016) points

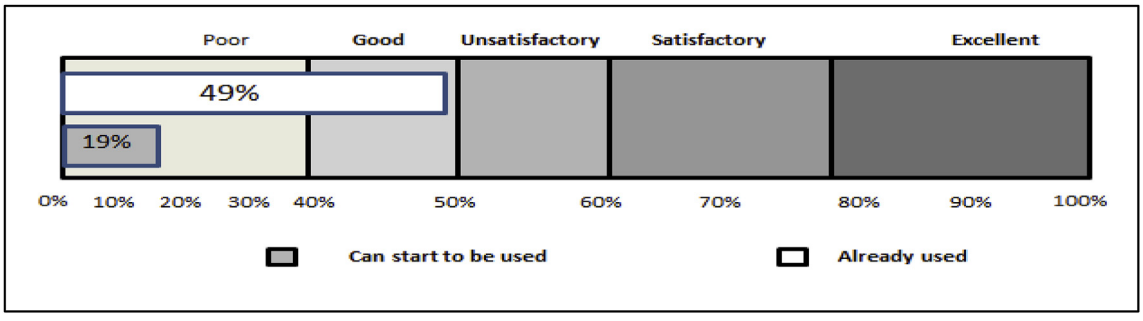
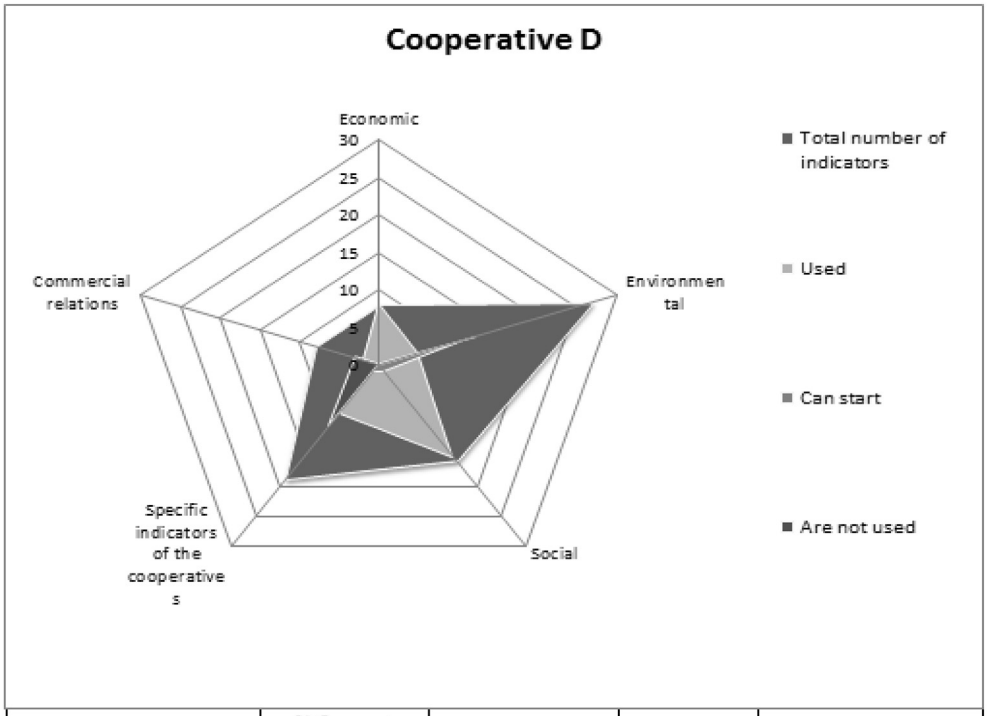


Fig. 7. Performance of the model - Cooperative D.



Dimensions	% Current performance	Current Profile	% Intended	Intended profile
Economic	100,00	Excellent	100,00	Excellent
Environmental	19,00	Poor	55,56	Unsatisfactory
Social	94,00	Excellent	100,00	Excellent
Specific indicators of the cooperatives	42,00	Good	47,37	Good
Commercial relations	25,00	Poor	62,50	Satisfactory

Fig. 8. Use of the model - Cooperative D.

out that the ways to improve sustainability are not clear and that is why many small and large organizations verify the enormity of the challenge to implement these actions in their operations and thus postpone them.

Regarding how to structure a method for developing and assessment, Cooperative D did not verify anything to add another type of information in the record sheet, but believes that the information generated by the indicator should be visual, that is, represented in charts. The cooperative does not have a similar structuring model to that, but only uses name and objective, and demonstrates their indicators graphically.

It was found that Cooperative D and Cooperative A envision being able to create an indicator that represents the social development of the cooperative members and, mainly, how to obtain this information.

It was observed that the dissemination of management information and sustainable actions meet the aspirations of Fasan and Mio (2016), which explain that the organizations that generate greater environmental impact tend to divulge more their actions from the environmental point of view, since they receive more public pressure from current regulations and from their own customers. This can be perceived in cooperative D, since it is smaller in relation to the others studied and it is a newcomer in activity as well. However, the cooperative has sought to structure its strategic planning jointly with OCEPAR and has the intention of externalizing management information and sustainable actions next year.

In addition, the interviewee pointed out that a performance assessment creates criteria and scales that are very subjective, so what is good for one person or cooperative is not for another. This confirms Singh et al. (2009), whose differing points of view between stakeholders and decision makers during the development of a measurement can generate problems related to subjectivity.

4.5. Cooperative E

Cooperative E works with agricultural and industrial processes related to meat, dairy, potato, wheat and bean products. It has facilities in 20 other cities of Parana, Sao Paulo and Rio de Janeiro, and exports products to 14 countries. It has cooperation with two other cooperatives from Parana in its dairy, meat and wheat operations. One person was assigned to provide the required information, but altogether it involves 15 people and eight different sectors.

The results of the cooperative indicated that of the 78 indicators, 42 are already used, which is equivalent to 54%, and 45 could be adopted, which corresponds to 45%. From this diagnosis, Fig. 9 of cooperative E indicated that the utilization profile of the quantity of indicators of the assessment model is at the satisfactory performance level and, once adding the indicators used and those that could start being used, performance would be excellent, with a percentage of 99%. It is believed that the indicators used and those that can start to be used would be important for the strategic planning and a macro performance evaluation of the agricultural cooperative. These indicators are a source of data of a macro performance and would be the source for structuring micro indicators

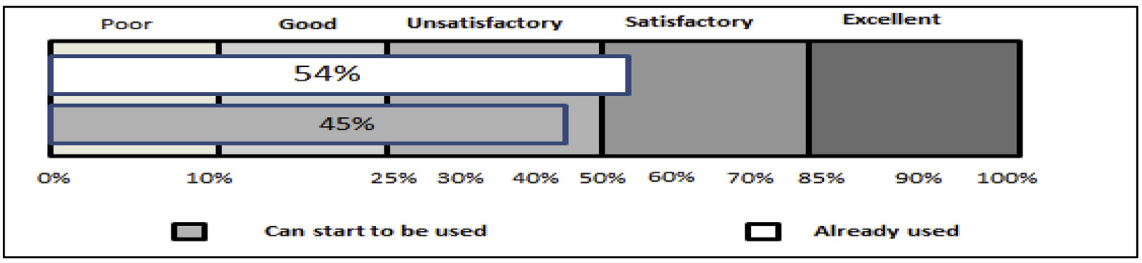


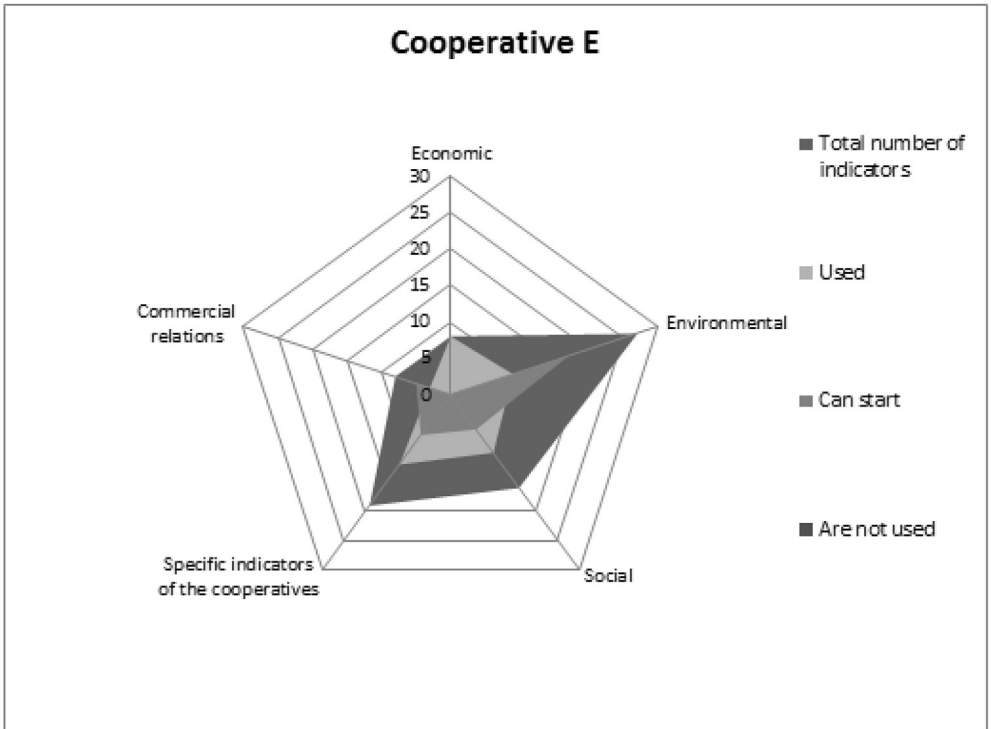
Fig. 9. Performance of the model - Cooperative E.

of their operations. Wang et al. (2009) pointed out that each agricultural cooperative has different processes, operations and actions and there is a need for differentiated and adequate construction of these.

However, the SAAC model was highlighted by the manager interviewed as "fantastic" for an agricultural cooperative that is structuring its strategic planning and "it would be insane" not to use almost all the indicators by the need to maintain their market, meeting the certifications and the needs of their clients.

In relation to the use of the model referring to its dimensions, according to Fig. 10, the economic performance is highlighted in the current performance, in which 100% of the indicators are used. In relation to the intended performance, the social dimension is emphasized, as well as specific indicators of cooperatives and commercial relations that would use all the indicators. It is noted that all the dimensions would obtain a substantial improvement.

Cooperative E highlighted that the list of indicators of the SAAC model was in line with what the cooperative was seeking in structuring itself in an innovative way, mainly in the area of environmental management, considering that it is currently developing studies of innovations and efficiency of energy potential in relation to inexhaustible sources of energy and management of water resources. In addition, it has an integrated management system that is structuring the management for the development of actions focused on areas of safety, environment and quality. In this sense, the cooperative is also developing the G4 sustainability report



Dimensions	% Current performance	Current Profile	% Intended	Intended profile
Economic	100,00	Excellent	100,00	Excellent
Environmental	33,00	Unsatisfactory	96,30	Excellent
Social	63,00	Satisfactory	100,00	Excellent
Specific indicators of the cooperatives	63,00	Satisfactory	100,00	Excellent
Commercial relations	38,00	Unsatisfactory	100,00	Excellent

Fig. 10. Use of the model - Cooperative E.

(Global Reporting Iniative (GRI), 2017), starting to deal with its most critical environment issue, the refrigeration technologies, seeking to improve its management, decision making and to communicate its sustainability impacts in the facilities that use them. Lopes et al. (2017) clarify that an organization with an open innovation character that is able to absorb ideas, share technologies and use existing resource collaboration can achieve rapid results in relation to sustainable innovation. In this way, it is verified that collaboration is already one of the premises used to the extent that the research was well accepted where the indicators presented were of extreme relevance to the cooperative, which is with all subjects related to the SAAC model highlighted. This can be proven to the extent that the cooperative indicated that only one indicator in the list is not used, number 16, since its fleet of cargo vehicles is outsourced.

An important highlight regarding the SAAC model is that it consults and meets the Management Excellence Model (Fundação Nacional Da Qualidade (FNQ), 2017), which is used by the agricultural cooperative, as well as the GRI and the current legislation, both labor and environmental.

Regarding how to structure a method for designing an indicator, Cooperative E did not pointed out any new information to be added to the record sheet, and has being adopted a similar structuring model. In relation to indicators that were not in the list, the cooperative did not highlight any.

Described the results of SAAC model adherence assessment, it could be discussed some points in terms of sustainability conceptual framework and practical implications (see Table 3).

5. Discussions

After presenting the results of the cooperatives, in order to allow a greater comparability of results, Table 4 was developed for a cross case analysis.

It is verified that the results are in accordance with contingency framework for strategic management system design, as observed by Chenhall (2003), since the evaluations of SAAC model application patterns, and the performance indicators of the current and intended use of each cooperative are different, depending on what the organization considers relevant in their sustainability strategy. It could be noted that the reality of each individual cooperative implies in choosing indicators to ass that are totally different among them, as there was no verification of the non-use of any indicator for all five cooperatives. It was thus observed, like in the research conducted by Ness et al. (2007), that the way sustainability is assessed depends on the way it is perceived. Sustainability strategy is contingent to cooperatives business strategies, and there is no homogenous set of performance indicators that could be generalized. However, there is a set of sustainability performance indicators that delimit the choice that cooperatives can make in designing their sustainability performance measurement systems. On the other hand, economic indicators seem to be more standardized and operates according compliance and transparency requirements.

The use of the indicators of the SAAC model in management systems is not equally defined for each cooperative. Nothing is absolute in the organization and management decisions, since, according to Klug and Kmoch (2014), the indicators must present attributes relevant to the decision-makers and not necessarily for a specialized public. In addition, in most of the cooperatives studied, performance measurement systems are in the process of being structured accordingly to their ongoing strategic planning process, and as observed by Youn et al. (2016), the indicators used by them reflect their focus, practicality and applicability. In this way, the SAAC sustainable model cannot be generalized, as each cooperative uses it in an individual and specific way according to the influences of contingency factors, considering as noted by Germain et al. (2008) that each cooperative is an open system in constant interaction with its environment.

Among the cooperatives researched, it is possible to verify that many of them are structuring or reviewing their strategic planning. In addition, it was possible to observe that in general, all the cooperatives have presented significant materiality in their actions regarding sustainability. However, cooperatives B and E stand out, the first of which is highlighted for being ISO 14001 certified, and the second for producing a sustainability report based on GRI version G4 (International Organization For Standardization (ISO), 2017; Global Reporting Iniative (GRI), 2017).

The results also meet the indications of Searcy and Elkhawas (2012) in which, although the performance of indicators of the economic dimension has stood out in relation to the other dimensions, there is an increasing emphasis on social and environmental criteria, commercial relations and specific indicators for cooperatives investments decisions. Cooperatives produce great impact on environment and this is a topic not so easy to discuss and sometimes not directly addressed in their strategic priorities, but some of the studied cooperatives have been recognized for their environmental actions, particularly by environmental/sustainability awards. The social side, internally and externally, are in the DNA of the cooperatives, but they are still looking for performances measures to properly assess the impact of their actions.

From the point of view of the process used and the lessons learned, the research was supported in Platts (1993), which established three evaluation criteria: feasibility, usability and utility. In relation to the feasibility, it should be noted that the initial proposal for the refinement and test process of the SAAC model included the stage of formalizing the indicators according to record sheet and covering the measures adopted by the studied cooperatives. However, this proved to be inadequate, as there was no great effort in presenting and contextualizing the measures management process in the agricultural cooperatives in Stage 1, particularly observed in cooperative A. Besides that, as much as

Table 4
Cross case analysis.

Performance	Coop A	Coop B	Coop C	Coop D	Coop E
% Current performance of the SAAC model	78	66	8	49	54
Current profile	Excellent	Unsatisfactory	Poor	Good	Satisfactory
% Intended of the SAAC model	86	91	59	68	99
Intended profile	Excellent	Excellent	Excellent	Satisfactory	Excellent
Indicators that could be added	Development of cooperative members	EBITDA x Debt; Productivity; Quality; Consumption; Average price of sale; Margin of contribution; *Market Share*.	Optimization of the structure; Inventory turnover	Development of cooperative members	None

completing the forms helps to review the strategic planning, it would not be possible due to the lack of time that would be spent. Thus, the process was revised, leaving the completion of the files for future study that should be directed to the strategy and management of each cooperative individually. The adjusts contribute to create procedures that could be fully applied to sustainability performance assessment.

In the refinement process, it was verified that the end and beginning of the year period make the collection process troublesome. This is because there is a need to gather information for the annual report and communicate results in cooperative members assemblies, but only after approval of the accounts is disclosure to society possible and there are still many fiscal obligations at that time. Adequate awareness, preferably at the higher level of decision of the cooperative, opens space for better participation. From these modifications, the process proved adequate to be followed.

Regarding usability, it was verified that the refinement with the specialists in the construction and organization of the indicators that consider the model was of great value insofar as the organization and the understanding of the dimensions, categories, subcategories and indicators were praised by some cooperatives, converging to the definitions of Kurka and Blackwood (2013), whose information for measuring, quantifying, qualifying and transmitting information must be made in a way that is easy to understand. The structuring of the indicator record sheet presented was requested to delineate existing indicators of one of the agricultural cooperatives. In this way, it is perceived that there was a good understanding of WS1 and there were no difficulties of understanding or use.

The process has also proved useful since cooperatives A, C and D are in the process of reviewing their strategic planning, and at least two are doing this jointly with OCEPAR that is responsible for cooperatives coordination and development, while cooperatives B and E are feeding back their strategic planning and seeking to add environmental aspects to it. Thus, if the SAAC model is evaluated by the cooperatives after the structuring and formalization of the internal indicators, the result of the study may be different. However, until now, the process has proved useful in contemplating the sustainable aspects with the operations of the agricultural cooperatives, which are in line with the structuring or feedback of the strategic planning of all cooperatives, and it has also been found to contribute to the development of other sustainable reports, highlighting the G4 sustainability report cited by cooperative E.

Thus, for the agricultural cooperatives studied, the SAAC model can be useful for the elaboration of a sustainability strategic planning for the agricultural cooperatives researched and can also be a source for cooperatives that do not yet have a sustainability performance assessment for their sustainability strategy.

It is important to synthesize some conclusions regarding the results in general:

1) There are no clear evidences that connect the proposed dimensions of sustainability performance to economic results, although there is in general a consolidated view of their financial performance.
2) A ‘material’ based analysis of indicators utility only could be assessed by its use, and it was clear that there is a learning path that connects sustainability strategy development and its performance assessment.
3) Social dimension is embedded in organizational design, but an emergent view of shared value is being consolidated in the governance structure and involved actors' transactions.
4) There is some cautious in defining a clear perspective that connects sustainability strategy and environment issues, although there is compliance in their actions regarding gas emission, the use of land, solid residues and renewable sources of energy. Another important aspect is the importance given to environment education.
5) Although sustainability performance assessment could vary according to the developed strategy, it is evident the requirements for benchmarking and create a structure for governance and coordination. Reference models could be established in terms of defining categories and indicators scope, but content is contingent to strategy as well as some unique requirement for strategy assessment.

The contribution for theory is characterized by their extension to agricultural cooperatives application, creating in fact an instance of sustainability assessment. The adopted approach is based on a contingency framework that is bounded by a set of proposed indicators that proved to be a consensus regarding sustainability assessment. Practice is influenced by having a reference model that guides the process of formalizing the performance measurement system by selecting and adopting standards measures that could be customized by cooperatives resources and management systems.

6. Conclusion

The objective of this research is to test the adherence of sustainability performance indicators to an assessment model for agriculture cooperatives, through a proposed model - SAAC, to verify if the indicators of this model are adequate to the sustainability practices in the operations of agricultural cooperatives and for use in the formulation of sustainability strategies for agricultural cooperatives, for which studies were carried out in five agricultural cooperatives in the state of Parana-Brazil.

The test of the model proved to be feasible, practical and useful, indicating an adherence to agricultural cooperatives performance measurement systems. The studied indicators have an important rate of use and potential adoption, which indicated that they were adequate to the sustainability practices in the operations of agricultural cooperatives. It was possible to verify that there was no identification or exclusion of an indicator simultaneously by the five cooperatives studied, nor was there an ineffective indicator.

Thus, the SAAC model was not modified, since it is supported by the contingency approach, that is, performance indicators are adopted or selected according cooperative sustainability strategy. In relation to the content and structure for a sustainability performance indicator design, the model was adequate, and the revision procedures could be detailed.

Theoretically, the work contributed by applying the process approach to review a content model that frame a set of indicators to assess sustainability in agricultural cooperatives. The research strategy uses SLR, experts’ discussions and case studies to develop, refine and test the proposed framework.

The model was considered as an initial step in the process of cooperatives' performance assessment, help in the structuring of business and functional strategies, decision making and in the development of the cooperatives’ sustainability report, since the indicators cover the different areas of the cooperative and allow the overall assessment of the cooperative results. It is also worth mentioning that the literature has few works that directly address the assessment of sustainable operations performance of agricultural cooperatives, which motivates the research to propose an assessment model for cooperative operations. The model looks for a balance and integration of performance in the economic, social and environmental aspects within the conceptual framework of cooperatives.

Many of the agricultural cooperatives surveyed are structuring their strategic planning and carrying out significant actions to

incorporate sustainability in their operations, some more than others. However, the openness to carry out this research in the many themes that sustainability addresses, mainly the environmental aspect, demonstrates that there is already awareness and actions are already being developed. In addition, there was no concern about disclosing information, which is highlighted to the extent that the study was rejected by cooperatives for addressing environmental issues. However, in order to really be able to keep the resources available today for future generations, effective and urgent strategic actions are necessary, and in this sense the SAAC model can delineate them. For practice the model contributes to a more efficient process for designing the sustainability performance measurement system based on a reference set of performance indicators that are contingent to cooperative resources, image, and mission. However, it is not only agricultural cooperatives that must carry out effective sustainable actions, but all sectors of the global economy, since it is already possible to see great degradation and depletion of natural resources which can aggravate natural disasters, as well as increase the already numerous existing inequalities.

Although the model developed has been studied in cooperatives in the state of Parana, it can be extended to any Brazilian cooperative to serve as a basis for the delimitation of strategic indicators for agricultural cooperatives, with the proviso that the self-assessment of the cooperative studied is limited, so propositions about populations cannot be generalized.

It is suggested that future work be developed in looking for indicators that apply only to the development of the cooperative members, since it is one of the desires of the cooperatives and to date they do not exist yet. Future studies are required in the applicability of the sustainability performance assessment model – SAAC, to the agricultural cooperatives' operations, completing the indicator record sheet individually in accordance with their sustainability strategies.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jclepro.2019.06.170.

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