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PERFORMANCE EVALUATION INDICATORS OF AGRICULTURAL COOPERATIVES IN THE STATE OF MINAS GERAIS

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Abstract: This research was carried out with the objective of identifying the main economic, financial and social indicators considered in the evaluation of the performance of agricultural cooperatives in the State of Minas Gerais. To meet the research objectives, 131 cooperatives were analyzed, representing 62% of cooperative organizations affiliated to OCB/OCEMG. In order to evaluate the performance of these organizations, the statistical technique of factor analysis was used, which allowed identifying the level of correlation between the various indicators, making it possible to group them into factors. The Bartlett and KMO sphericity tests were also performed, which confirmed the appropriateness of using factor analysis. The results obtained allowed identifying five factors formed from 14 initial indicators, explaining 83.5% of the total data variance. The five factors were classified as "Structure", "Associate Participation", "Personnel", "Membership" and "Capital and Risk and Profitability". Using the factorial scores of the five factors, cluster analysis was applied, establishing a characterization of agricultural cooperatives and their spatial distribution. Three groups were identified that represent the set of cooperatives in the present study. It is concluded that the use of factorial analysis, in relation to agricultural cooperatives, allows greater security in the choice of indicators and the formation of a smaller number of variables without losing its informational content, effectively enabling the analysis of performance of agricultural cooperatives.

Keywords: Agricultural Cooperatives; Economic and Social Indicators; Performance indicators

INTRODUCTION

Cooperatives play a prominent role in the economic, social and political development of several countries in different sectors of the economy, such as agriculture, financial system, food and beverages (SILVA; PEREIRA; PEREIRA, 2014).

In Brazil, according to the Organization of Brazilian Cooperatives (OCB), cooperatives are present in seven branches of the economy sectors: "Agricultural", "Credit", "Transport", "Labor, Production of Goods and Services", "Health", "Consumption" and "Infrastructure" (ORGANIÇÃO DAS COOPERATIVAS BRASILEIRAS – OCB, 2023). In 2021, Brazil had 4,880 cooperatives distributed in all states, with a greater concentration in the South and Southeast regions (OCB, 2023).

Agricultural cooperatives are part of one of the most representative branches of cooperativism in the country, comprising activities related to agricultural, livestock, extractive and fishing producers. They are considered organizations of great importance for Brazilian agriculture, as they provide producers with storage, commercialization and industrialization of products, as well as technical, social and educational assistance to members.

According to OCB (2023), based on data from the Brazilian Institute of Geography and Statistics (IBGE), agricultural cooperatives have a 48% share of what is produced in the field. These data demonstrate the expression of agricultural cooperatives in the Brazilian economy.

Minas Gerais cooperatives have demonstrated positive performance in both economic and social indicators, which shows the importance of cooperatives in the economy and in the lives of Minas Gerais residents. In 2021, the sector had 800 cooperatives in different branches of activity, with a total of 50,956 employees and 2,396,947 members.

The agricultural sector had 197 cooperatives, with a total of 176,389 members and 18,124 employees, responsible for 20.3% of the state's agribusiness GDP, with emphasis on the share of coffee production (58.5%), natural rubber (45.8%), cotton (41.6%) and garlic (25.5%), with an export value equivalent to R$5.3 billion (ORGANIZAÇÃO DAS COOPERATIVAS DO ESTADO DE MINAS GERAIS – OCEMG, 2022).

Given the economic and social importance of this segment for the state and, consequently, for Brazil, it is important to monitor the management of these organizations in order to make them increasingly competitive.

Thus, this article presents a methodology that uses economic, financial and social indicators that may help in evaluating the performance of these organizations and guide the decision-making of their managers.

AGRICULTURAL COOPERATIVES

Until the 1960s, the large number of cooperatives were predominantly in the consumer, credit and labor sectors, and those in the agricultural sector were few in number. Pinho (1980) states that the decline of some cooperatives in later years led to the strengthening of agricultural cooperatives, due to government support for the sector, the growing domestic and global demand for food and also the importance of agricultural products in the balance of payments.

Composed of rural producers with production in various agricultural activities, agricultural cooperatives are responsible for the entire production chain, which occurs from planting, harvesting, storage, industrialization and marketing of products, in addition to offering members a technical assistance system.

With active participation in the Brazilian economy, agricultural cooperatives, according to data from the Agricultural Census of the Brazilian Institute of Geography and Statistics (IBGE), account for about 48% of what is produced in the Brazilian countryside, considering only wheat, soybeans, coffee, cotton, maize, rice and beans, thanks to the increase in their productivity and competitive capacity in recent years (OCB, 2023).

The agricultural segment stands out among the rest of Brazilian cooperativism not only for the number of cooperatives, but also for the economic movement and the generation of direct jobs (OCEMG, 2022).

Agricultural cooperatives are present in all Brazilian states, with emphasis on Minas Gerais, which has the largest number of cooperatives in this segment.

At the end of 2021, Minas Gerais cooperatives had 800 cooperatives, with a total of 2,396,947 members and 50,956 employees. Regarding the agricultural segment, there were 176,389 members and 18,124 employees, corresponding respectively to 7.3% and 35.5% of the state's total (OCEMG, 2022).

It is worth noting that in 2021 the Agriculture segment had a share of 34.1% of the economic movement of Minas Gerais cooperatives, compared to the year 2020 (OCEMG, 2022).

With regard to agribusiness in Minas Gerais, agricultural cooperatives have played an important role. In 2021, the participation of these cooperatives represented 20.3% of this sector's GDP. The products with the greatest participation in the production of the state were: coffee (58.5%), natural rubber (45.8%), cotton (41.6%) and garlic (25.5%). Another important aspect to consider is exports by cooperatives, which registered a value corresponding to R$ 5.3 billion in 2021 (OCEMG, 2022).

The cooperative sector makes a fundamental contribution to agribusiness, to the Minas Gerais and Brazilian economy, whether through job or income generation. In

this context are the agricultural cooperatives, which participate effectively in the results of the national economy and which are increasingly required to become competitive and efficient to remain in the market. For this, it requires the managers of these organizations to have a balanced and healthy administration, with eyes not only turned to the market, but also to the interests of the members, their greatest asset (OCEMG, 2022).

In this sense, the use of an instrument capable of measuring the performance of these organizations becomes essential to support the decision-making of managers regarding the objectives to be achieved.

PERFORMANCE EVALUATION IN COOPERATIVES

Considering that the present work aims to identify the significant economic-financial and social indicators, this section approaches themes related to the performance evaluation of cooperatives.

In this competitive and globalized world, business administrators or managers increasingly need to seek as much information as possible both for decision making and for cost calculations and investments in new products. Ultimately, the more information is acquired, the greater the gains in results for the organization.

Financial management has the function, among others, of analyzing, comparing and interpreting financial statements, using this information for management and strategic planning. In addition, it must inform administrators of the organization's real economic, physical, financial and social situation, in order to manage current activities and plan future activities. Accounting, in turn, produces information that helps employees, managers and executives make the right choices and improve their companies' performance processes. This way,

accounting is an instrument of control that the company has over its economic, financial and patrimonial life, of great importance for business management (IUDÍCIBUS, 2000).

In this sense, over time, accounting has been used as one of the instruments to support decision-making. Through accounting or financial statements, it is possible to have a picture of the situation of the organization with regard to its patrimonial, economic and financial development.

The use of indices generated based on financial statements has been an important methodology used in analyzing the economic-financial performance of organizations.

From 2000, the measurement of tangible and intangible assets began to be used with the purpose of meeting the needs of the organization's stakeholders (MUNARETTO, 2013).

It can be seen, therefore, that performance indicators have been used by organizations to assist in the continuous monitoring of their processes, serving as support for decision-making by managers responsible for the results to be achieved in the short and long term and as a way of demonstrate that the interests of the organization's parties are being met.

According to the National Quality Foundation - FNQ (2016), an indicator, also known as a "performance indicator", is quantitative or qualitative information that expresses the performance of a process in terms of efficiency, effectiveness or level of satisfaction and that, in general,, allows you to monitor its evolution over time and compare it with other organizations.

Munaretto (2013) assesses that the variables must incorporate indicators aligned with the organization's objectives. In this sense, the objective of the indicators is to show the position of the organization's performance. For performance measurement to achieve its objectives, it must be consistent with the

organization's objectives, relate to individual and organizational objectives, goals of functional areas and the organization, as well as communication at different organizational levels and consider financial and non-financial activities.

Organizations can be considered as those that seek to obtain profit and those that seek to achieve social objectives. Agricultural cooperatives, in turn, in addition to aiming for surpluses in the calculation of their results, also seek to achieve social objectives, through the provision of services and assistance to their members. In this context, the evaluation of its performance becomes more complex due to its dual nature, as it involves economic and social aspects.

Some authors defend the use of social indicators, because, in addition to economic objectives, they consider it important to include social indices in the analyzes for evaluating the performance of these organizations (MENEGÁRIO, 2000).

In cooperative organizations, the decision-making process is completely different from that of other companies, as the objective is to meet the needs of the owners, who are both customers and suppliers and depend on it for the success of their production units. Therefore, considering an organization in the form of a cooperative, its performance must be measured differently from other conventional companies, which aim to make a profit, with their evaluations focused only on economic-financial indicators. In turn, cooperatives aim to provide services and social assistance to their members. Therefore, it is necessary that within the composition of a model for evaluating the performance of these organizations there is not only the economic-financial dimension, but also, in an equitable way, the social one.

According to Oliveira Junior (1996), cooperatives, as companies inserted in a competitive market economy, are subject to a permanent performance evaluation by their members, public, financial agents, government, competition, customers and suppliers.

To understand the efficiency of cooperatives, it is necessary to know the fundamental differences between these companies and the others. According to this author, "few realize that the efficiency of this business segment is directly related to its individual success". Therefore, understanding the differential in the management of cooperatives is decisive for the analysis of their efficiency, since the basis of the efficiency of cooperatives is in the formation of a balanced capital structure and in the time of its accumulation, and one must consider not only economic- financial, but also political and social ones.

From this perspective, Oliveira Junior (1996) proposes an evaluation model that consists of an Assessment of Economic-Financial Efficiency and an Assessment of Political-Social Efficiency. The assessment of economic-financial efficiency is made up of indicators for evaluating liquidity, debt, operational capacity and evaluation of results (gross margin, profitability of assets) and evaluation of product/business performance. The assessment of social efficiency refers to that made up of revenue per member, membership growth, social participation, paid-in capital per member, active members in relation to the total number of members and participation in assemblies. Finally, the Policy and Human Resources assessment would be made up of revenue in relation to the number of employees, staff rotation, number of associates in relation to the number of employees and number of associates in relation to the number of technicians.

Managers or administrators of agricultural cooperatives, when using financial and/or social indicators, will be able to make the

necessary managerial decisions, aiming to correct possible deviations that may affect business performance and competitiveness.

MANAGEMENT OF COOPERATIVES

The management of cooperatives has a different model compared to other companies. It is based on a set of principles that govern cooperativism: the dual condition of the associate, as he is both owner and user, makes the economic process for the cooperative more complex; cooperatives have a self-management model in which the members themselves manage the cooperative; the double objective of the cooperative, as it has to meet the double interest of the member, both economic and social (service provision); decisions in cooperatives take place in assemblies, where each member has one vote, regardless of the volume of capital; cooperatives have specific regulations that guide their activities; cooperatives have a cyclical election process for directors (board of directors and directors), with a four-year term, which can generate a discontinuity in management planning; and cooperatives have decision-making structures completely different from other companies, becoming slow and bureaucratic (PINHO, 1966; ZYLBERSZTAJN, 2002; BIALOSKORSKI NETO, 2005; CRÚZIO, 2002).

This way, business decisions in cooperatives have a broader universe, because what is at stake is the growth of the member. Understanding all these differences in the management of cooperatives is crucial for analyzing the performance of these organizations. It is up to its managers, counselors and board of directors to propagate the principles of cooperativism, and to the associates, as owners, to monitor the results and abide by collective decisions.

In view of the above, it is essential to develop a performance evaluation model that helps managers validate their actions and decisions, enabling the improvement of strategic aspects and the management process.

METHODOLOGY

This is an exploratory type of research, which sought to identify the relevant economic and social indicators in the performance analysis of agricultural cooperatives in the State of Minas Gerais, with the objective of supporting the managers of these organizations in the planning, control and monitoring of their activities. activities.

Due to the expressive number of indicators and the need to verify the degree of dependence between them and their interrelationships, and also the possibility of grouping them into a smaller number of variables, without losing their content, we used a statistical instrument for the treatment of information, which was the Principal Component Analysis (Factor Analysis), rotated (varimax), which deals with the interrelationships or correlations between a large number of variables, identifying their most common dimensions or factors.

Using the dimensions or common factors obtained, we sought to understand the profile or characteristics of the agricultural cooperatives studied and establish a classification (size). To achieve this classification, a statistical tool called cluster analysis, also known as conglomerate analysis, classification or *cluster*, was used, which consists of dividing the elements of a sample, or population, into groups so that elements belonging to the same group are similar to each other in relation to the variables (characteristics) that were measured in them and that the elements in different groups are heterogeneous in relation to these same characteristics.

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VARIABLES AND DATA SOURCE

The indicators used in the survey were relativized by the variable total members, with the aim of establishing a standardization of the data, which are described in Chart 1.

For the development of the work, 15 economic-financial and social performance indicators of agricultural cooperatives in the State of Minas Gerais were calculated, based on variables from the database, made available by the Organization of Cooperatives of the State of Minas Gerais (OCEMG), with the aim of reference year 2012. The data refer to 131 agricultural cooperatives in the State of Minas, out of the 210 existing in 2012, based on variables of accounting and social statements, contained in the census carried out by OCEMG with agricultural cooperatives through its own instrument of data collection. It must be noted that the information obtained corresponds to approximately 62.3% of the existing agricultural cooperatives in the state, which adhered to the aforementioned census, in view of the voluntary participation of these cooperatives.

RESULTS AND DISCUSSION

At first, the result of applying Principal Component Analysis (Factor Analysis) with the indicators used in the research will be addressed, identifying the most relevant factors. Next, a classification of the cooperatives is made through multivariate analysis (*cluster* analysis). Finally, there is the spatial distribution of agricultural cooperatives in the State of Minas Gerais (Figure 1), based on the classification obtained in the *cluster* analysis, aiming at a better understanding of the characteristics of these organizations.

It is worth noting that before the factor analysis, the Kolmogorov-Smirnov test was applied to check whether the indicators have a normal distribution. Results with significance equal to or greater than 5% (0.05) indicate that the variable has a normal distribution. In the case under study, all indicators showed normal distribution, which enabled the application of factor analysis.

COOPERATIVE PERFORMANCE FACTORS

According to Hair et al. (2009), factorial analysis addresses the problem of analyzing the structure of interrelations (correlations) between a large number of variables, defining a set of common latent dimensions, called factors. That is, starting from a large number of variables, factor analysis is capable of generating a smaller number of new variables, called factors, without losing the essence of the original variables. Although there is a considerable number of correlated indicators, it is not guaranteed that Factor Analysis is appropriate for the purposes of this study.

In view of this, and to eliminate this subjectivity, the KMO test (Kaiser-Meyer-Olkin) was applied, whose result was 0.80, and Bartlett's sphericity test, which presented a significance level of less than 1%, according to established for the procedure, demonstrating the adequate use of Factor Analysis.

Initially, the Principal Components Analysis was used with the 15 indicators, which generated five factors, with the *eigenvalue* above 1, and with the explanatory power of 78.4% of the total variations of the economic-financial and social indicators used.

The analysis of the proportion of explained variance of the indicators by the factors was based on the commonality of each variable.

Communal values vary between 0 and 1, where a value of 0 (zero) indicates that the common factors do not explain any variance of the variable, while a value of 1 (one) indicates that the factor explains all of the variance. Through Table 1, it is possible to verify the commonality value of each indicator. It is also observed that the indicator "Resources

Indicator	Formula	Unit	Author
Total revenue	Total Revenue/Number of Members	R$	Elaborated by the author
Net worth	Equity/Number of Associates	R$	Elaborated by the author
total assets	Total Assets/Number of Associates	R$	Elaborated by the author
Leftovers available at the AGO	Leftovers available at the AGO/Number of Members	R$	Elaborated by the author
capital investment	Spending on Equipment and Infrastructure / Number of Members	R$	Elaborated by the author
Financial independence	Shareholders' Equity/Total Assets	R$	Elaborated by the author
Investment in the environment	Spending on the Environment/Number of Members	R$	Elaborated by the author
Return on investments on assets	(Amount of Leftovers Available/Total Assets) x 100	%	Oliveira Junior (1996)
Membership growth	(Number of Members in 2012 – Number of Members in 2011)/Number of Members in 2011	%	Elaborated by the author
Active members by total members	(Active Members/Total Members) x 100	%	Oliveira Junior (1996)
Participation in meetings	(Members who attended the last meeting/Total Members) x 100	%	Oliveira Junior (1996); Smith (1990)
Resources allocated to social responsibility programs and projects	(Community resources + education + training + training of employees and associates + health + culture and leisure + work safety)/(Total Revenue) x 100	%	Pavani Junior e Scucuglia (2011)
Participation of female members	Number of female members/Number of members	Number	Elaborated by the author
Billing per employee	Total Revenue/Number of Employees	R$	Oliveira Junior (1996)
Number of members/number of employees	No. of Members/No. of Employees	Number	Oliveira Junior (1996)

Table 1 - Performance evaluation indicators for agricultural cooperatives in the State of Minas Gerais.

Indicators	F1	F2	F3	F4	F5
Investment in Capital/Total of Associates	**0,995**	0,074	-0,008	-0,018	-0,008
Investment in the Environment/Total Members	**0,996**	0,064	-0,008	-0,015	-0,007
Total Revenue/Total Members	**0,996**	0,077	-0,005	-0,019	-0,009
Shareholders' Equity/Total Membership	**0,994**	0,086	-0,012	-0,024	-0,009
Total Assets/Total Members	**0,996**	0,075	-0,010	-0,019	-0,009
Leftovers/Total Members	**0,974**	0,064	-0,003	-0,012	0,013
Financial Independence (Shareholders' Equity/Total Assets)	-0,004	-0,091	-0,127	-0,086	**0,817**
Return on Investments on Assets (Leftovers/Total Assets*100)	-0,011	0,241	0,135	0,057	**0,734**
Active Members/Total Members	0,029	**0,863**	-0,133	0,030	0,148
Participation in Meetings	0,238	**0,783**	0,024	-0,183	-0,014
Total revenue/ N. Employees	-0,029	0,117	**0,873**	0,017	-0,036
Total Number of Associates/No. of Employees	0,008	-0,417	**0,766**	-0,056	0,047
Membership Growth	-0,010	0,061	0,092	**0,836**	-0,006
Number of Female Members	-0,031	-0,192	-0,124	**0,796**	-0,028

Table 4 - Ratio of factor loadings after indicator rotation

Source: Search results.

allocated to social responsibility programs and projects" presented a commonality value of approximately 0.17. Despite being important in analyzing the performance of any organization, as it demonstrates how much it invests part of its resources in projects aimed at the community, this indicator presented a value below 0.60 in the database studied and, according to Hair et al. (2009), be removed from the analysis.

Indicators	Initial	Extraction
1. Capital investment ratio by total number of members	1,000	0,994
2. Ratio of investment in the environment by total number of associates	1,000	0,994
3. List of total revenues by total number of members	1,000	0,996
4. Ratio of net worth by total members	1,000	0,994
5. Ratio of total assets to total members	1,000	0,996
6. Ratio of leftovers by total members	1,000	0,953
7. Financial independence (shareholders' equity/total assets)	1,000	0,683
8. Return on investments on assets (surplus/total assets*100)	1,000	0,621
9. Percentage of active members by total members	1,000	0,782
10. Participation in meetings	1,000	0,680
11. Total revenue by number of employees	1,000	0,765
12. Total number of members per total number of employees	1,000	0,756
13. Membership growth	1,000	0,699
14. Number of female members	1,000	0,674
15. Resources allocated to social responsibility programs and projects	1,000	0,170

Table 1 - List of commonalities of the 15 indicators

Source: Search results.

A new analysis was then carried out, seeking more expressive results, this time removing the indicator "Resources allocated to social responsibility programs and projects", as it presented a low value of commonality in the first analysis. The results of the second analysis did not suffer major changes in their values, that is, the sphericity remained significant with the value below 1%, and the KMO test presented a value of approximately 0.81.

Although the sphericity and KMO tests, in this second analysis, were unchanged, the total explained variation showed evolution, going from 78.4% with five factors to 83.48% in the accumulated variance, with the same number of factors, as shown in Table 2.

Factor	latent root	% of explained variance	% cumulative variance
1	6,06	43,33	43,33
2	1,84	13,13	56,47
3	1,44	10,29	66,76
4	1,24	8,84	75,61
5	1,10	7,87	83,48

Table 2 - Characteristics of the five factors extracted for the 14 indicators

Source: Search results.

Other attempts were made, withdrawing some indicators, with the aim of obtaining more significant results; however, what happened was a worsening in the results, both in the sphericity and KMO tests, as well as in the total explained variation.

Table 2 shows the results with the five factors and respective variances. Thus, these five factors can be used to analyze the performance of agricultural cooperatives in the State of Minas Gerais, instead of using 14 indicators, since together they are responsible for explaining 83.48% of the data variations.

Table 3 presents the "commonality" matrix, with the values for each indicator. It appears that no variable had a commonality value lower than 0.6, thus demonstrating good explanatory power for these indicators.

Indicators	Initial	Extraction
1. Total revenue/total membership	1,000	0,998
2. Equity/total of associates	1,000	0,995
3. Total assets/total members	1,000	0,998
4. Leftovers/total members	1,000	0,953
5. Active Members/Total Members	1,000	0,786
6. Participation in meetings	1,000	0,704
7. Total revenue/number of employees	1,000	0,778
8. Total number of members/number of employees	1,000	0,766
9. Membership growth	1,000	0,711
10. Financial independence (shareholders' equity/total assets)	1,000	0,700
11. Return on investments on assets (leftovers/total assets*100)	1,000	0,619
12. Number of female members	1,000	0,688
13. Investment in capital/total members	1,000	0,996
14. Investment in the environment/total membership	1,000	0,997

Table 3 - List of commonalities of the 14 indicators

Source: Search results.

Through the rotated Principal Components Matrix, using the orthogonal rotation method (varimax), the composition of the factors extracted in the analysis was obtained (Table 4).

The principle of orthogonal rotation, according to Hair et al. (2009), the simplification of the rows and columns of the factor matrix, thus enabling its interpretation, and its objective is to maximize the factor loadings so that each indicator can be related to just one factor.

air et al. (2009) state that Factor Analysis allows identifying the interrelationships of a set of variables that are represented by a new variable called factor. Thus, it is possible to replace an original set of variables with a smaller and entirely new one, obtained through the factorial scores.

The surrogate variables can provide the subsequent application of other statistical techniques, aiming to meet other objectives. For this, it is necessary to obtain the scores of each observation for each surrogate variable.

In the present work, the factorial scores were obtained and served as a basis to meet the second objective of the work, which is the cluster analysis of agricultural cooperatives in the State of Minas Gerais.

The five factors obtained from the factor loadings were classified into dimensions, taking into account the characteristics of the indicators, which will be discussed in the next section.

ANALYSIS OF THE COMPOSITION OF FACTOR 1 − "STRUCTURE"

The definition of the name "Structure" for factor 1 was based on the characteristics of the indicators that make up this factor, which are related to the cooperative's support base.

The first factor, here called "Structure", obtained through the rotated matrix of components, is composed of the following indicators: Total Revenue, Net Equity, Total Assets, Surplus at the disposal of the Assembly, Investment in Capital and Investment in the Environment.

According to the results of the matrix of rotated factors, factor 1 was responsible for 43.3% of the explanation of the total variations in the indicators used in the research, demonstrating how important they are in the stability and development of cooperatives. These indicators are related to the economic and financial information of cooperatives, which are traditionally the basis for analyzing the performance of these organizations.

ANALYSIS OF THE COMPOSITION OF FACTOR 2 - "ASSOCIATE PARTICIPATION"

Here called "Member Participation", it is associated with the indicators that express the relationship of the member with the cooperative.

Factor 2, characterized as "Member Participation", was responsible for 13.13% of the explanation in the total variations of the indicators and demonstrates the level of participation of members in the life of the cooperatives. The indicators that make up factor 2 are: Percentage of Active Members and Participation of Members in Meetings.

For Bialoskorski Neto (2007), when referring to the participation of members in agricultural cooperatives, it is necessary to consider important issues, such as the total number of members, since the economic growth of a cooperative can cause an increase in the number of members and, consequently, be detrimental to their participation, since the greater the number of members, the lower the relative value of their vote in decisions at General Assemblies, and this fact may not encourage them to participate in the process, that is, promote the their withdrawal from society.

It is important that the member effectively participates in the cooperative, accompanying, knowing its reality, discussing and questioning issues related to it in meetings and assemblies. After all, the members are the owners of the cooperative, and only through their participation can the organization achieve growth and development.

ANALYSIS OF THE COMPOSITION OF FACTOR 3 - "PERSONNEL"

The definition of the name "Personnel" for factor 3 relates to a set of indicators that expressed the number of employees involved in the organization's activities.

With 10.29% of explanation in the total variations of the indicators, factor 3, here called "Personnel", measures the efficiency of human resources in the cooperative and is constituted by the indicators Total Revenue/ Number of Employees and Total Members/ Number of Employees.

Over time, human resource management has been one of the fundamental problems in cooperatives. The lack of a policy for the development of human resources in cooperatives has contributed to their becoming just trainers of labor for other companies. The success of the cooperative depends a lot on the quality of its staff (OLIVEIRA JUNIOR, 1996).

One of the objectives of the cooperative is to serve the interests of its members. In this sense, it must have sufficient human resources to meet the service needs of its members, whether in the transformation of its products or technical assistance in the field.

ANALYSIS OF THE COMPOSITION OF FACTOR 4 - "MEMBERSHIP"

The name "Membership", assigned to factor 4, is associated with the fact that the indicators are related to the composition of the Membership.

Factor 4 is responsible for 8.84% of the explanation of the total variations of the indicators, being composed by the indicators Membership Growth and Number of Female Members.

The sustainability of a cooperative depends on the solidity of its membership, as the capitalization of this organization depends a lot on its members. It is up to the managers to make the effort to work on the evolution of their membership with a view to the development of the organization. In order to promote the growth of the membership, it is of fundamental importance that the cooperative offers an adequate structure for the receipt

and commercialization of the products of its members, as well as the provision of quality services, aiming at maintaining them in its membership and, consequently, encourage new memberships.

ANALYSIS OF THE COMPOSITION OF FACTOR 5 – "CAPITAL/RISK AND PROFITABILITY"

The fifth factor, responsible for 7.89% of the explanation for the total variations of the indicators used in the survey, is characterized by the indicators Financial Independence (Equity/Total Assets) and Return on Investment (Leftovers/Total Assets), here called Capital/ Risk and Return, respectively.

The definition of the name "Capital/Risk and Profitability" for factor 5 is associated with the indicators Net Equity/Total Assets and Surplus/Total Assets, respectively. The first, for expressing the degree of risk of using third-party resources, and the second, for indicating the organization's financial independence relationship.

The Capital and Risk indicator reveals the degree of independence of cooperatives with regard to the use of third-party resources. Thus, the greater the value of this Net Equity/ Total Assets ratio, the greater the financial independence of the cooperative.

In turn, the indicator characterized as Profitability measures the Surplus/Total Assets ratio. This indicator evaluates the cooperative's ability to generate results (leftovers) based on total assets. This index becomes important to measure the average period of return on investments and the opportunity cost of investing resources in operational and permanent assets (OLIVEIRA JUNIOR, 1996). The results of both indicators express their importance in the performance evaluation process of any organization.

Through Factor Analysis, it was possible to obtain the factor scores for each observation of the data sample. According to Pestana and Gageiro (2003), to calculate the factorial load of each observation, it is necessary to use data obtained through a descriptive analysis (mean, standard deviation) and the factorial scores of the matrix of rotated principal components, establishing a weighting. According to Hair et al. (2009), factorial scores can be obtained through statistical programs and used to apply other statistical techniques. In the context of this work, these scores were used in the statistical cluster analysis presented in the next section.

GROUPS OF AGRICULTURAL COOPERATIVES

From the factor scores of the five factors obtained in the Factor Analysis, the statistical technique of *cluster* analysis was applied with the purpose of obtaining a characterization of the cooperatives.

The synthetic characterization of the *clusters* of performance indicators of agricultural cooperatives in the State of Minas Gerais contributed to the analysis and definition of their dimensions, constituting three groups of *clusters*, the first with 80 cases, the second with 5 cases and the third with 36 cases. Descriptive statistics was performed with the five factors obtained from the factorial analysis, according to the three *cluster* groups.

When analyzing the statistics for cluster 1, it can be identified that the factors "Social Framework" and "Capital/Risk and Profitability" presented higher averages when compared to the other clusters. For cluster 2, the factors "Structure" and "Personnel" presented a mean factor score higher than that of the other clusters. Finally, in cluster 3, only the factor "Participation of Associates" presented a mean value higher than that of the other groups.

Thus, the five factors were distributed among the three clusters: cluster 1 is

characterized by the best performance of the factors "Membership" and "Capital/Risk and Profitability"; cluster 2, for the better performance of the factors "Structure" and Personnel"; and cluster 3, for the better performance of the factor "Participation of Associates".

The cooperatives in cluster 1 have 79% of their activities related to the production of milk and dairy products, 8% with cereals and 8.2% with coffee; in cluster 2, 90% of the activities are related to the production of milk and derivatives and 9.1% with coffee; and in cluster 3, 33% of its activities are related to cereals, 16.7% to agricultural inputs, 20% to milk and dairy products, 11% to coffee and 8.3% to vegetables and fruits.

Based on the results obtained in the cluster analysis, it can be stated that the cooperatives in cluster 1 have or are characterized by better performance or better results in the factors "Social Framework and Capital/Risk and Profitability". The participating cooperatives in cluster 2 showed better performance in the "Structure and Personnel" factors. Finally, the cooperatives in cluster 3 showed better performance in the factor "Participation of Members".

Thus, the five factors obtained in the factorial analysis were heterogeneously distributed among the cluster groups. The consistency of the results of the factors obtained in the cluster analysis was verified by carrying out descriptive statistics of the indicators used in the factor analysis in the three groups of clusters. The results of the descriptive analysis corroborated the results of the factor scores in the cluster analysis. The averages of the indicators observe the same configuration of the averages of the factors in terms of distribution in the group of clusters. Thus, it can be stated that there is convergence of the indicators with the factors obtained in the factorial analysis.

With the results obtained, and in line with the cluster analysis, it can be said that there are strong indications that the cooperatives in cluster 1 are small, the cooperatives in cluster 2 are large, and those in cluster 3, medium-sized. In characterizing the size, the reference of the average values of the indicators used in the factor analysis was used, such as: Total Revenue, Shareholders' Equity, Total Assets, Leftovers at the disposal of the Assembly, Investments in Capital and Investments in the Environment, all weighted by the total of associated and combined with the average values of the factors in each cluster.

Figure 1 shows a spatial distribution of agricultural cooperatives in the State of Minas Gerais, according to the clusters obtained in the present study, which allows you to visualize their location.

Considering the possibility of the existence of more than one cooperative in the same municipality, and also that they are in different clusters, cluster 4 was added to illustrate this situation. A concentration of cooperatives can be seen in the regions of ``Triângulo Mineiro`` and ``Alto Paranaíba``, Central Mineira, Metropolitana de Belo Horizonte and Sul and Sudoeste de Minas. The large number of milk and coffee producers can explain the number and concentration of agricultural cooperatives in these regions.
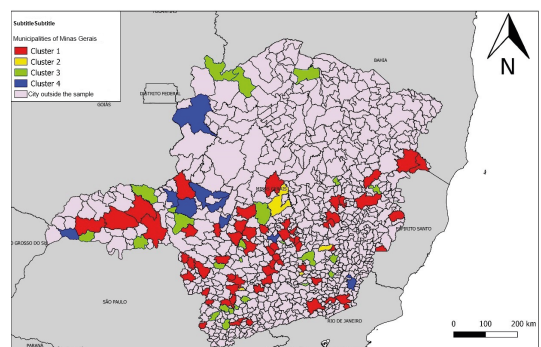

Figure 1 - Spatial distribution of agricultural cooperatives in the State of Minas Gerais, according to group of *clusters*.

Source: Search result.

FINAL CONSIDERATIONS

This work aimed to identify the most significant economic-financial and social indicators for evaluating the performance of agricultural cooperatives in the State of Minas Gerais.

Analyzing the performance of any organization requires the involvement of a large amount of information, covering the different areas of its activity, be it economic-financial or political-social.

Given the difficulty of working with a large number of variables and, at the same time, adopting a selection criterion, it was concluded that the best alternative would be to use a statistical instrument capable of gathering them, working on their interactions and grouping them into a smaller number of variables, without, however, losing their representation capacity.

In this sense, the statistical instrument of Factor Analysis was used, which has the ability to work with the interrelationships of a large number of variables and group them into new variables without losing their content.

Factor analysis provided results that enabled the identification of economic-financial and social indicators capable of measuring the performance of agricultural cooperatives in the present work, represented by factors obtained in the matrix of rotated main components. Five factors were extracted, named as follows: Structure, Member Participation, Personnel, Membership and Capital/Risk and Profitability.

The "Structure" factor, responsible for 43.3% of the total data variance, was the one that contributed most to the model, as it is composed of indicators that are related to the economic-financial dimension of the cooperative, which are the pillars of the organization.

The factor "Participation of Associates" accounted for 13.1% of the total data variance,

which was measured through the indicators Participation in Assemblies and Active Associates. The involvement of members in the life of the cooperative is of fundamental importance, either through their participation in decision-making processes or through their economic relations with the organization.

Responsible for 10.3% of the total variance of the data in the model, the "Personnel" factor is an important indicator in the functioning of any organization. In the context of cooperatives, this indicator is of great relevance, since one of the premises of the cooperative is the provision of services to its members; in this sense, having a staff capable of meeting the demands of associates and the community is essential for its development.

With 8.8% of the total data variance, the "Membership" factor proved to be an important component for evaluating the performance of cooperatives, since the existence of these organizations is related to the structure and soundness of their membership. Being attentive and working for the evolution of its membership is one of the great missions of the managers of these organizations.

The fifth factor ("Capital/Risk and Profitability"), with a participation of 7.9% in the total data variance, is an important indicator in the context of the Performance Assessment of Agricultural Cooperatives in the State of Minas Gerais.

It can be noticed that the selected factors are coherent to evaluate the performance of agricultural cooperatives, since the fourteen indicators represented by the five factors were able to explain 83.5% of the total variations of the indicators. However, one has to consider the scarcity of indicators of a social nature and also of indebtedness, which would allow a more effective analysis.

A possible increase in variables covering information related to social and cultural aspects, both for associates and their families

and for employees, would be of great importance for consolidating the analysis of the socio-political and cultural performance of agricultural cooperatives.

It is believed that the results obtained in this work may be useful to cooperative managers in planning the organization's activities.

Given the above, it can be concluded that the research reached the proposed objective: to identify the most significant indicators for the evaluation of economic, financial and social performance of agricultural cooperatives in the State of Minas Gerais for the year 2012, through the available data and variables, obtained from OCEMG, and the use of the statistical tool of Factor Analysis.

Thus, it is concluded that the use of the Factor Analysis instrument allowed evaluating the behavior of several indicators, reducing and generating new indicators, reducing the degree of subjectivity in the choice of indicators and measuring the interrelationships between the different indicators.

It is also added that, through the use of the statistical tool Cluster Analysis or Conglomerates, it was possible to know the characteristics of the groups of cooperatives in terms of their size, based on the factor scores of the indicators under study.

Finally, it is suggested to the directors of the Organization of Cooperatives of the State of Minas Gerais (OCEMG) that a single instrument be developed that includes the main indicators of the balance sheet and financial statements, as well as information from the political, social and cultural area, configuring as well as a census of cooperatives in the State of Minas Gerais, and that cooperatives are made aware of the importance of this information for strengthening the cooperative system in the state.

It is believed that the database can contribute to the elaboration of complementary reports that will help in the evaluation of the cooperatives' performance and allow OCEMG to establish, together with the directors of these organizations, actions for the alignment of their activities.

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