Programa de Pós-Graduação
Desenvolvimento
Regional
mestrado e doutorado

DOI: 10.17058/redes.v30i1.20000

Cooperatives and sustainable development in Brazil: An analysis of their contribution to the 2030 Agenda

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Resumo
Este estudo avalia a adesão das cooperativas brasileiras aos Objetivos de Desenvolvimento Sustentável (ODS) da ONU. Questionários *online* foram respondidos por 95 cooperativas de três ramos: agropecuário, crédito e trabalho/produção de bens e serviços. Os resultados revelam baixa adesão geral aos ODS, com medianas abaixo de 3 em 15 dos 17 objetivos para a maioria das cooperativas. O ramo de trabalho/produção de bens e serviços se destacou nos ODS 7, 9, 13, 15 e 16. Diferenças significativas na aderência entre os ramos foram detectadas nos ODS 3, 4, 7, 9, 15 e 16. As diferenças podem ser atribuídas à natureza dos ramos, às prioridades estratégicas das cooperativas e ao nível de conscientização sobre os ODS. A pesquisa confirma estudos anteriores sobre o baixo comprometimento das cooperativas com os ODS, devido à falta de conhecimento, recursos, infraestrutura e apoio governamental, o que enfatiza a necessidade de ações concretas para melhoria. As diferenças entre os ramos podem ser abordadas com investimentos em capacitação, parcerias, ferramentas específicas e políticas públicas incentivadoras. Embora as cooperativas brasileiras tenham desafios a enfrentar em relação aos ODS, este estudo destaca seu potencial para promover o desenvolvimento sustentável. Com medidas proativas, elas podem ser agentes importantes na implementação dos ODS no Brasil, impulsionando mudanças positivas rumo a um futuro mais sustentável e inclusivo.

Palavras–chave: Desenvolvimento Sustentável, Agenda 2030, Objetivos de Desenvolvimento Sustentável (ODS), Cooperativas.

Cooperatives and sustainable development in Brazil: An analysis of their contribution to the 2030 Agenda

Abstract
This study evaluates the adherence of Brazilian cooperatives to the United Nations Sustainable Development Goals (SDGs). Online questionnaires were answered by 95 cooperatives from three sectors: agricultural, credit, and work/production of goods and services. The results reveal low overall adherence to the SDGs, with medians below 3 for 15 out of 17 objectives for most cooperatives. The work/production of goods and services sector stood out in SDGs 7, 9, 13, 15, and 16. Significant differences in adherence among sectors were detected in SDGs 3, 4, 7, 9, 15, and 16. These differences can be attributed to the nature of the sectors, strategic priorities of the cooperatives, and awareness levels regarding the SDGs. The research confirms previous studies on the low commitment of cooperatives to the SDGs, due to lack of knowledge, resources, infrastructure, and governmental support, emphasizing the need for concrete actions for improvement. Sectoral differences can be addressed through investments in training, partnerships, specific tools, and incentivizing public policies. Although Brazilian cooperatives face challenges regarding the SDGs, this study highlights their potential to promote sustainable development. With proactive measures, they can be significant agents in implementing the SDGs in Brazil, driving positive changes towards a more sustainable and inclusive future.

Keywords: Sustainable Development, Agenda 2030, Sustainable Development Goals (SDGs), Cooperatives.

Cooperativas y desarrollo sostenible en Brasil: un análisis de la contribución a la agenda 2030

Resumen
Este estudio evalúa la adhesión de las cooperativas brasileñas a los Objetivos de Desarrollo Sostenible (ODS) de la ONU. Se aplicaron cuestionarios en línea, respondidos por 95 cooperativas de tres sectores: agrícola, crédito y trabajo/producción de bienes y servicios. Los resultados revelaron una baja adhesión general a los ODS, con medianas inferiores a 3 en 15 de los 17 objetivos para la mayoría de las cooperativas. El sector de trabajo/producción de bienes y servicios se destacó en los ODS 7, 9, 13, 15 y 16. Se detectaron diferencias significativas en la adherencia entre los sectores en los ODS 3, 4, 7, 9, 15 y 16. Estas diferencias pueden atribuirse a la naturaleza de los sectores, a las prioridades estratégicas de las cooperativas y al nivel de conciencia sobre los ODS. La investigación confirma estudios previos sobre el bajo compromiso de las cooperativas con los ODS debido a la falta de conocimiento, recursos, infraestructura y apoyo gubernamental, lo cual enfatiza la necesidad de acciones concretas para mejorar. Las diferencias sectoriales pueden abordarse mediante inversiones en capacitación, asociaciones, herramientas específicas y políticas públicas de incentivo. Aunque las cooperativas brasileñas enfrentan desafíos en relación con los ODS, este estudio destaca su potencial para promover el desarrollo sostenible. Con medidas proactivas, pueden ser agentes importantes en la implementación de los ODS en Brasil, impulsando cambios positivos hacia un futuro más sostenible e inclusivo.

Palabras clave: Desarrollo Sostenible, Agenda 2030, Objetivos de Desarrollo Sostenible (ODS), Cooperativas.

1 Introduction

In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, a global proposal consisting of 17 Sustainable Development Goals (SDGs), 169 targets, and their indicators. The SDGs address social and economic development issues, such as poverty, hunger, health, education, gender equality, water, sanitation, energy, urbanization, the environment, and social justice.

The 2030 Agenda approach is designed so that the interconnected, crosscutting, and indivisible goals require public policies capable of transcending the economic, social, and environmental spheres (Rader & Menezes, 2019). This approach highlights the need to understand how actions aimed at one SDG can positively affect others, emphasizing their inherent complexity and interconnection.

Hocayen-da-Silva and Silva (2021) point out that the challenges surrounding the SDGs highlight the need for responsible public governance to meet the social, economic, and environmental demands essential for the planet. Implementing these actions requires efficiently and consciously applying resources and knowledge anchored in research and innovation. The collective and supportive nature of cooperatives places them at the forefront of driving the SDGs globally.

In the context of the 2030 Agenda, cooperative organizations are essential in promoting development. The International Cooperative Alliance's (ICA) guiding principles, established in 1995, align with the 2030 Agenda's principles of free and voluntary membership, democratic management, economic participation and control by members, autonomy and independence, education, training, and information, intercooperation among organizations, and commitment to the community.

The 2023 Brazilian Cooperativism Yearbook showcases the substantial role of cooperatives in Brazil. There are 4,693 cooperative organizations in the country, comprising 20.48 million members and generating 524,235 direct jobs. These cooperatives operate in seven different economic sectors, ranging from agriculture to health, showcasing their multifaceted capacity for representation and action (OCB, 2023).

Cooperativism's economic organization model stands out for its contribution to and promotion of a more just, equitable, and sustainable economy. Active member participation and democratic control, together with equitable benefit distribution, strengthen cooperatives' transformative potential in local communities (FAO, 2019).

This approach is aligned with the SDGs in improving local communities, promoting financial inclusion, eradicating poverty, and ensuring the responsible use of natural resources. This demonstrates convergence with established goals (OCB, 2023) and makes cooperativism an essential tool for promoting sustainable development by connecting cooperative actions with the 2030 Agenda and achieving global goals.

In the face of contemporary global challenges, cooperatives have emerged as relevant actors in promoting sustainable development because they are based on principles such as self-management, solidarity, and community commitment. Several studies and international organizations have highlighted the potential role of cooperatives in achieving the 2030 Agenda because of their ability to promote decent work, social inclusion, and the responsible use of natural resources. However, despite

this recognition, there are still gaps in our practical understanding of how these organizations position themselves in relation to the SDGs.

In this context, this article aims to analyze how Brazilian cooperatives from various sectors contribute to achieving the SDGs. The article seeks to identify their strategies, challenges, and levels of engagement with sustainable development principles.

To this end, the article is organized as follows: Section 2 presents the theoretical framework of cooperativism and sustainable development based on international documents and specialized literature. Section 3 describes the research methodology. Section 4 presents the results. Section 5 discusses the analysis of the responses to the applied questionnaires. Finally, Section 6 presents the final considerations, highlighting the main findings and suggesting directions for future research.

2 Theoretical Framework

To understand the topic under study, this section focuses on the Sustainable Development Goals (SDGs) and cooperativism, as well as their correlation. In today's global landscape, we are confronted with intricate challenges that transcend national borders and necessitate collective and sustainable solutions. The SDGs evolved from the Millennium Development Goals (MDGs), which were established by the United Nations General Assembly in 2000. The MDGs had specific goals, such as reducing poverty, promoting gender equality, and combating disease. They were to be completed by 2015. While the MDGs were successful in many respects, the need for a more comprehensive and inclusive approach became evident.

In September 2015, the General Assembly officially adopted the 2030 Agenda for Sustainable Development, which includes 17 SDGs addressing various facets of sustainable development, such as poverty eradication and climate action. This agenda promotes an integrated and interconnected approach (United Nations, 2015). Table 1 presents an excerpt from United Nations Resolution A/RES/70/1, which outlines the 17 SDGs (our translation).

Table 1 - The 17 Sustainable Development Goals

ODS	Name	Explanation
1	No Poverty	End poverty in all its forms, ensuring that all people have access to essential resources and opportunities.
2	Zero Hunger and Sustainable Agriculture	End hunger, achieve food security, improve nutrition, and promote sustainable agriculture.
3	Good Health and Well-being	Ensure healthy lives and promote well-being for all, addressing health issues and access to quality medical services.
4	Quality Education	Ensure inclusive and equitable quality education for all, promoting lifelong learning opportunities.

5	Gender Equality	Achieve gender equality and empower all women and girls, eliminating discrimination and promoting equal opportunities.
6	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all, guaranteeing access to safe drinking water and sanitation facilities.
7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all, promoting the transition to renewable sources.
8	Decent Work and Economic Growth	Promote sustainable, inclusive economic growth and decent work for all, addressing labor market challenges.
9	Industry, Innovation, and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
10	Reduced Inequalities	Reduce inequalities within and among countries, addressing issues of income, gender, age, disability, and other forms of discrimination.
11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient, and sustainable, addressing urban and environmental issues.
12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns, promoting responsible practices regarding natural resources.
13	Climate Action	Take urgent action to combat climate change and its impacts, promoting adaptation and mitigation.
14	Life Below Water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.
15	Life on Land	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, and combat desertification.
16	Peace, Justice, and Effective Institutions	Promote peaceful and inclusive societies for sustainable development, ensuring access to justice and building effective institutions.
17	Partnerships for the Goals	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development, promoting cooperation among countries.

Source: United Nations (2015).

Since the SDGs were implemented in 2015, significant progress has been made in several areas. Substantial reductions in extreme poverty, improvements in maternal and child health, advances in education, and effective actions toward gender equality are tangible evidence of this progress. Concentrated efforts on clean

energy and climate action have demonstrated a global response to environmental issues (HOCAYEN-DA-SILVA & SILVA, 2021).

However, the SDGs face persistent challenges in implementation because they require more than simply following international agency guidelines or seeking a good public image. The SDGs are considered essential objectives and mechanisms for promoting comprehensive social development. They have a dynamic agenda that requires a change in attitude among government officials. Officials must develop strategies and define mechanisms to ensure the sustainability of results achieved in reaching these goals (Costa, 2018; Nilsson et al., 2019).

Similarly, political structures must be realigned so future leaders understand the importance of the SDGs and maintain and intensify political action capable of meeting the population's shared goals (Costa, 2018). The pandemic has tested the SDGs' resilience, exacerbating existing inequalities, disrupting supply chains, amplifying food insecurity, and exposing gaps in health systems. However, the pandemic has also highlighted the importance of international cooperation and sustainable development as essential pillars for global recovery (United Nations, 2021).

During the first decade of SDG implementation, technology, and innovation played an increasingly important role in finding sustainable solutions. Advances in artificial intelligence, renewable energy, and access to information have been instrumental in overcoming complex challenges (United Nations, 2021).

Current societal developments are creating promising opportunities, such as accelerating the transition to a green economy, strengthening global partnerships, and incorporating inclusive approaches. Innovations in sustainable business models and growing global awareness suggest significant potential for progress in the effective implementation of the SDGs (United Nations, 2021).

In this context, cooperative organizations emerge as protagonists. Hocayen-da-Silva and Silva (2021) emphasize that cooperatives uphold human values and respect the limits of nature. They seek to balance conscious production and consumption while promoting social well-being and playing an important role in the emancipation of marginalized people in society. A sociopolitical and ideological interpretation of the cooperative movement reveals that its nature extends beyond economics and demonstrates the potential of these organizations to contribute to achieving the SDGs.

Global institutional frameworks support this potential. Cooperatives are recognized worldwide as key players in sustainable development. Resolution 70/129 of the UN General Assembly (2015) explicitly recognizes the role of cooperatives in achieving the SDGs, emphasizing their ability to promote social inclusion, reduce inequalities, and strengthen local economies. Similarly, Resolution 193 of the International Labor Organization (ILO, 2002) emphasizes the importance of cooperatives in promoting decent work. It highlights their democratic management model and equitable distribution of benefits, which align with the principles of the 2030 Agenda. These resolutions support the idea that cooperatives can transform sustainable development.

However, empirical studies reveal challenges. Zampier, Stefani, and Dias (2022), for example, analyzed the actions of 16 cooperatives in relation to the SDGs during the context of the pandemic, identifying low commitment to the SDGs.

Nevertheless, the authors emphasize the importance of cooperatives in generating employment and income in the cities where they operate and their contribution to achieving SDG 8 (Decent Work and Economic Growth). The results also indicate that a significant proportion of cooperatives (37.5%) are not committed to the SDGs, while a smaller proportion (18.75%) have integrated the SDGs into their strategic planning. The majority (67.5%) are aware of the SDGs, but are in the initial stages of analyzing possible future actions.

Imaz and Eizagirre (2020) explore how responsible innovation can support cooperatives in implementing the SDGs and transforming their business models. They also emphasize the need for more research on adapting responsible innovation tools for cooperatives.

Using the Delphi methodology and network analysis, Conde and Rodriguez (2020) identified relationships between cooperative principles and the SDGs in a survey of 16 leaders in the Colombian cooperative sector. The results indicate that a close relationship exists between the principles of cooperatives and the SDGs. This indicates that the Colombian cooperative model contributes to achieving the SDGs by improving its principles.

Gutberlet (2021) highlights the role of Brazilian recyclable material collector cooperatives in the "Work and Production of Goods and Services" segment. When organized and supported by public policies and inclusive governance, these cooperatives can address several SDGs. The author's case study, conducted over five months in 2018 with 21 cooperatives of recyclable material collectors in the São Paulo metropolitan region of Brazil, demonstrates the impact of this work on SDGs 1, 5, 8, 11, and 12.

Fernández-Guadaño et al. (2020) examined the distribution of economic value among stakeholders in cooperative and capitalist enterprises. They found that cooperatives align with the SDGs when generating value in the form of poverty reduction, gender equality, reduction of inequalities, decent work, education, and community development for partners and creditors. However, cooperatives are not significantly different from capitalist enterprises in terms of workers.

Díaz de León et al. (2021) examined the relationship between the social benefits of cooperative organizations and their contribution to achieving the SDGs. The study involved 134 cooperatives in Mexico City. The authors' findings suggest that cooperatives contribute to the achievement of SDGs 1, 3, 4, 5, 8, and 12. They acknowledge that, although the work of cooperatives in Mexico and Latin America has an important socioeconomic aspect, it also has a strong solidarity component.

Finally, Hocayen-da-Silva and Silva (2021) emphasize that cooperatives contribute directly to some SDGs and indirectly to others. They play a significant role in specific SDG areas such as ensuring inclusive and quality education for all, promoting gender equality, stimulating sustainable economic growth, and providing decent work. Additionally, cooperatives work to build resilient infrastructure, promote sustainable production and consumption patterns, and combat climate change. In areas where their impact is more indirect, cooperatives contribute to ending poverty and hunger, promoting healthy lives and access to clean water and sanitation, and reducing inequalities within and between countries.

3 Methodology

A survey was conducted from May to June 2023 among Brazilian cooperatives. Data was collected from cooperative managers using the online tool Google Forms®. A total of 297 questionnaires were sent out, and 110 responses were received.

The questionnaires were structured to collect information about the cooperatives' characteristics, including the respondents' names and positions, addresses, CNPJs (corporate taxpayer IDs), descriptions of activities, and brief histories. Respondents were also asked to evaluate how closely the cooperatives' actions aligned with the 17 UN Sustainable Development Goals (SDGs) using a five-point Likert scale, where 1 represented minimal alignment and 5 represented optimal alignments.

The participating cooperatives were then grouped by sector according to the classification of the Cooperativism Yearbook (ANUÁRIO COOP, 2023). The Yearbook classifies cooperatives into seven sectors: agriculture; consumption; credit; infrastructure; health; work, production of goods and services; and transportation. The Cooperative Yearbook was chosen for its reputation and reliability, as well as for its comprehensiveness and periodic updates. It is a source used in academic and business circles for the classification and analysis of Brazilian cooperatives.

Thus, the 110 responses obtained were classified into six groups: agricultural cooperatives (42); Work, production of goods and services cooperatives (33); credit cooperatives (20); transportation cooperatives (7); infrastructure cooperatives (5); and health cooperatives (3).

To ensure data quality, 15 incomplete questionnaires were identified and excluded. The final sample included 42 agricultural cooperatives, 33 labor and goods and services cooperatives, and 20 credit cooperatives. Details of this sample are presented in Table 2.

Table 2 – Description of the sample according to the sector of activity and state

Sector	PR	SP	MS	MG	RS	MT	SC	ES	TO
Agriculture	3	21	8	5	1	2	1	1	0
Credit	3	7	0	1	5	2	2	0	0
Work, goods, and services	0	21	1	4	6	0	0	0	1
Total	**6**	**49**	**9**	**10**	**12**	**4**	**3**	**1**	**1**

Source: Own elaboration

Based on this sample definition, a descriptive analysis was performed to verify the cooperatives' adherence to the different SDGs, grouped by sector. The most important variables considered were the minimum and maximum values, the separating measures (first quartile, median, and third quartile), and the mode. This is because the score assigned to each SDG is an ordinal qualitative variable on a numerical scale between 1 and 5, so calculating the mean could distort the results.

Next, the nonparametric Kruskal–Wallis test was applied at a 5% significance level to assess significant differences between SDG scores and the cooperatives' different areas of activity. The Kruskal-Wallis H test (HKW) is analogous to the F test

used in analysis of variance (ANOVA), but it does not impose any restrictions on the comparison (Kruskall, 1952).

When significant differences were found, the Dwass-Steel-Critchlow-Falgine post hoc test (multiple comparisons) was used to determine the pairs of branches in which the difference was measured. All calculations were performed using Jamovi® software.

The results revealed how cooperatives in different branches apply the SDGs, highlighting branch-specific differences. All research data were made available via the Zenodo® digital repository (Authors, 2024).

4 Results

The results of our research are organized according to the three main areas of activity of the cooperatives studied. The agricultural sector encompasses various activities, such as extractive activities, agriculture, livestock farming, aquaculture, fishing, and agro-industrial processing. Credit cooperatives, on the other hand, play a fundamental role in providing financial services to their members and facilitating access to financial market instruments. In turn, cooperatives in the "work and production of goods and services" sector encompass workers from various industries.

Specifically analyzing the cooperatives covered in this study, significant diversity is evident in the agricultural sector, including family farming, agro-industrial, coffee, livestock, and dairy cooperatives, among others. In the credit sector, however, variation is limited, and cooperatives maintain a clear focus on the financial market. Recycling cooperatives stand out among cooperatives in the "work and production of goods and services" sector, representing 93% of this segment.

In general, regardless of their sector, cooperatives showed low adherence to the SDGs. The median score for all 17 SDGs is greater than or equal to three, except for SDGs 7 (affordable and clean energy) and 16 (peace, justice, and strong institutions) in the "work and production of goods and services" sector. In both cases, the median value was four. Furthermore, the sample's mode values (the most frequently observed values) are mostly concentrated between one and three, which reinforces the idea that cooperatives have difficulty identifying their practices as compliant with the SDGs. Table 3 presents the data grouped by SDG and the cooperatives' sector of activity.

Table 3 – Description of the 17 SDGs according to the sectors of the cooperatives analyzed

	Sector	Average	Median	Mode	Min.	Max.	Q1	Q3
ODS1	Credit	**2,10**	2,00	1,00	1,00	5,00	1,00	3,00
	Work, production of goods and services	**2,45**	2,00	1,00	1,00	5,00	1,00	4,00
	Agriculture	**2,07**	2,00	2,00	1,00	5,00	1,00	3,00
ODS2	Credit	**2,40**	2,00	3,00	1,00	5,00	1,75	3,00

	Work, production of goods and services	**2,76**	3,00	3,00	1,00	5,00	2,00	3,00
	Agriculture	**2,26**	2,00	2,00	1,00	5,00	1,00	3,00
ODS3	Credit	**1,90**	1,50	1,00	1,00	4,00	1,00	2,25
	Work, production of goods and services	**2,94**	3,00	2 e 3	1,00	5,00	2,00	4,00
	Agriculture	**2,36**	2,00	1 e 2	1,00	5,00	1,00	3,00
ODS4	Credit	**1,75**	1,50	1,00	1,00	4,00	1,00	2,00
	Work, production of goods and services	**3,36**	3,00	3,00	1,00	5,00	3,00	5,00
	Agriculture	**2,67**	2,50	1,00	1,00	5,00	1,00	4,00
ODS5	Credit	**2,40**	2,00	1,00	1,00	5,00	1,00	3,25
	Work, production of goods and services	**2,67**	2,00	1,00	1,00	5,00	1,00	4,00
	Agricultural	**2,55**	2,00	1,00	1,00	5,00	1,00	3,75
ODS6	Credit	**2,45**	2,00	1 e 2	1,00	5,00	1,00	3,20
	Work, production of goods and services	**2,36**	2,00	1,00	1,00	5,00	1,00	4,00
	Agriculture	**1,95**	2,00	2,00	1,00	5,00	1,00	2,00
ODS7	Credit	**2,25**	2,00	1,00	1,00	5,00	1,00	3,00
	Work, production of goods and services	**3,24**	4,00	5,00	1,00	5,00	2,00	5,00
	Agriculture	**2,38**	2,00	1,00	1,00	5,00	1,00	3,00
ODS8	Credit	**1,85**	1,00	1,00	1,00	5,00	1,00	2,00
	Work, production of goods and services	**2,64**	2,00	1,00	1,00	5,00	1,00	4,00
	Agriculture	**1,88**	2,00	1,00	1,00	5,00	1,00	2,00
ODS9	Credit	**2,00**	2,00	1,00	1,00	4,00	1,00	2,25
	Work, production of goods and services	**3,27**	3,00	2 e 5	1,00	5,00	2,00	5,00
	Agriculture	**2,31**	2,00	2,00	1,00	5,00	1,00	3,00
ODS10	Credit	**2,15**	2,00	1,00	1,00	5,00	1,00	3,00
	Work, production of goods and services	**2,61**	2,00	1,00	1,00	5,00	1,00	4,00
	Agriculture	**2,52**	2,00	2,00	1,00	5,00	1,25	4,00

ODS11	Credit	**2,65**	3,00	3,00	1,00	5,00	1,00	3,25
	Work, production of goods and services	**2,55**	2,00	1,00	1,00	5,00	1,00	4,00
	Agriculture	**2,45**	2,00	1,00	1,00	5,00	1,00	3,75
ODS12	Credit	**2,10**	2,00	1,00	1,00	4,00	1,00	3,00
	Work, production of goods and services	**2,55**	2,00	2,00	1,00	5,00	1,00	4,00
	Agriculture	**2,10**	2,00	1,00	1,00	5,00	1,00	3,00
ODS13	Credit	**2,75**	3,00	2 e 3	1,00	5,00	2,00	4,00
	Work, production of goods and services	**2,94**	3,00	1 e 5	1,00	5,00	2,00	4,00
	Agriculture	**2,36**	2,00	2,00	1,00	5,00	2,00	3,00
ODS14	Credit	**3,05**	3,00	3,00	1,00	5,00	2,00	3,00
	Work, production of goods and services	**3,18**	3,00	5,00	1,00	5,00	2,00	4,00
	Agriculture	**2,71**	2,50	2,00	1,00	5,00	2,00	3,75
ODS15	Credit	**2,75**	3,00	3,00	1,00	5,00	2,00	3,25
	Work, Production of Goods and Services	**3,21**	3,00	5,00	1,00	5,00	2,00	5,00
	Agricultural	**2,17**	2,00	1,00	1,00	5,00	1,00	3,00
ODS16	Credit	**2,50**	2,50	3,00	1,00	5,00	1,75	3,00
	Work, Production of Goods and Services	**3,52**	4,00	5,00	1,00	5,00	2,00	5,00
	Agricultural	**2,50**	2,00	2,00	1,00	5,00	1,00	4,00
ODS17	Credit	**2,30**	2,00	1,00	1,00	5,00	1,00	3,00
	Credit	**2,64**	3,00	1 e 3	1,00	5,00	1,00	4,00
	Work, Production of Goods and Services	**2,00**	2,00	1,00	1,00	5,00	1,00	2,70

Source: Own elaboration

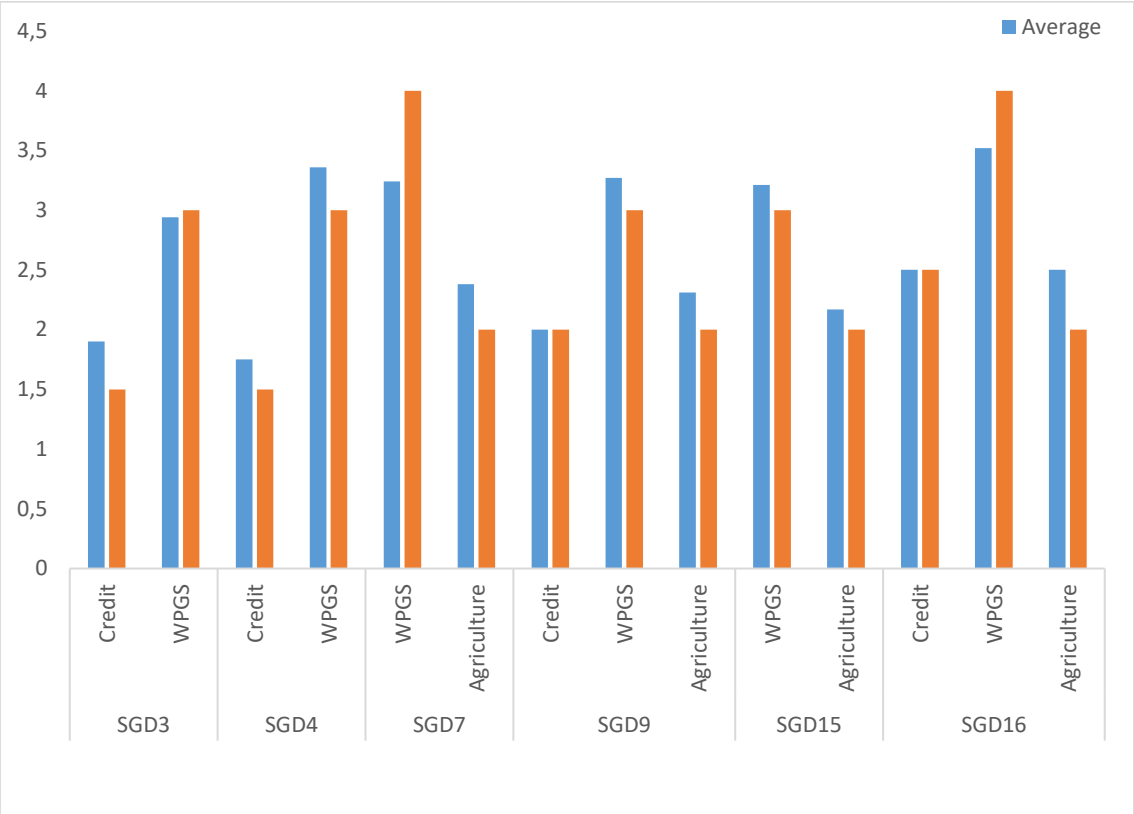
Cooperatives in the "Work, production of goods and services " sector stand out in SDGs 7 (affordable and clean energy), 9 (industry, innovation, and infrastructure), 13 (climate action), 15 (life on land), and 16 (peace, justice, and strong institutions) with a score of five in each. Even with low adherence to the SDGs overall, cooperatives in this sector, stand out due to their maximum scores.

These results underscore the importance of cooperatives actively participating in achieving the SDGs and highlight the need to link the SDGs to the principles and values of cooperatives. The minimum values observed across all SDGs and sectors were one, while the maximum values were five, except in four cases relating to the "credit" sector: SDGs 3 (good health and well-being), 4 (quality

education), 9 (industry, innovation, and infrastructure), and 12 (sustainable consumption and production). None of the 20 cooperatives in this sector obtained the maximum score for these SDGs, unlike the other sectors.

The Kruskall-Wallis test found significant differences (at a 5% significance level) between the aforementioned SDGs (3, 4, 7, 9, 15, and 16). The post hoc multiple comparison test (Dwass-Steel-Critchlow-Falgine) verified the sectors in which these differences were found. The results are presented in Figure 1.

Figure 1 – Average and median values for SDGs 3, 4, 9, 15, and 16



Source: Own elaboration

The first difference observed was between "credit" and "WPGS" (work production of goods and services) cooperatives in SDGs 3, 4, and 9. In all three SDGs, the median and mode values are higher for "work, production of goods and services" cooperatives than for "credit" cooperatives. This is particularly evident in SDG 9, where one of the observed modes is 5. This indicates that nine of the 33 cooperatives received the maximum score for this SDG. In contrast, the score for cooperatives in the "credit" sector is 1, meaning none of the 20 cooperatives in this sector received a score of 5.

Similar differences were found between cooperatives in the "work, production of goods and services" and "agriculture" sectors in SDGs 7 and 15. In these cases, the median and mode values of cooperatives in the "work, production of goods and services" sector were significantly higher than those in the "agriculture" sector.

For SDG 7, the median and mode for cooperatives in the "work, production of goods and services" sector were 4 and 5, respectively, while the median and mode for cooperatives in the "agriculture" sector were 2 and 1, respectively, demonstrating much lower application of SDG 7. SDG 15 showed similar values, except for the median for cooperatives in the "Work, production of goods and services " sector, which was 3 in this scenario.

However, these cooperatives apply these SDGs more effectively, as evidenced by the mode values (equal to 5) in both SDGs: 65% of the maximum score in SDG 7 and 45% in SDG 15.

The test also revealed significant differences between two groups of cooperatives in relation to SDG 16: "credit" versus "work, production of goods and services," and "agriculture" versus "work, production of goods and services." As in the previous cases, cooperatives in the "work, production of goods and services " sector demonstrated a higher degree of applicability than those in other sectors. As before, most cooperatives in the "work, production of goods and services " sector had higher SDG application scores, with median and mode values of 4 and 5, respectively. Fifty-five percent of cooperatives in this sector obtained the highest score. In contrast, credit and agricultural cooperatives had median and mode values of 2.5 and 3.0, and 2.0 and 2.0, respectively.

5 Discussion

Our results, as well as the findings of Zampier, Stefani, and Dias (2022), point to limited action by cooperatives toward global goals. These researchers identified low commitment by cooperatives to the SDGs. Thus, our research underscores the need for cooperatives to demonstrate a stronger and more proactive commitment to the SDGs, particularly given their performance in the work, production of goods and services sectors.

These positive findings align with the conclusions of Gutberlet (2021), who examined 21 wastepicker cooperatives in the São Paulo metropolitan area. In her research, the author emphasizes that cooperatives, including wastepicker organizations, play an essential role in addressing various SDGs, such as reducing poverty, promoting gender equality, generating decent employment, and contributing to sustainable cities and responsible consumption. This aspect deserves special mention, especially since 93% of the cooperatives in the goods and services production sector are involved in recycling, including those operated by waste pickers.

We found a study by Fernandes-Guadaño et al. (2020) that explains how cooperatives can implement actions to achieve maximum scores in SDGs 7, 9, 13, 15, and 16. These actions include promoting renewable energy sources and energy efficiency, local economic development with improved local businesses, sustainable practices and environmentally friendly initiatives, sustainable land use and conservation, biodiversity, democratic governance, and equitable decision-making processes. The authors argue that cooperatives contribute to sustainable development by generating income, promoting the democratization of property, using resources efficiently through economies of scale, and contributing to sustainable rural development and the empowerment of local communities.

Additionally, the cooperative model can create value for stakeholders, including shareholders, workers, the state, and creditors. This is consistent with the goals of promoting inclusive and sustainable economic growth (SDG 8) and reducing inequalities (SDG 10) (Fernandes-Guadaño et al., 2020).

In turn, cooperatives are essential to promoting the SDGs by fostering active citizenship and democratic participation, both of which require substantial changes to promote sustainable development. Imaz and Eizagirre (2020) highlight the crucial role of innovation in facilitating significant changes supporting the SDGs. Our research and the study by Andrieu et al. (2023) provide results on SDGs 9 (Industry, Innovation, and Infrastructure) and 12 (Responsible Consumption and Production) in the context of beekeeping cooperatives. SDG 9 emphasizes the importance of innovation, infrastructure, and information and communication technologies (ICT). Cooperatives demonstrate best practices in diversification, ICT adoption, and credit scores. Regarding SDG 12, the beekeeping cooperative sector's contribution to sustainable production and consumption practices is emphasized, though challenges in obtaining ecological certifications for beekeeping products may arise.

Therefore, we conclude that cooperatives demonstrate significant variations in their commitment to certain SDGs, as evidenced by the Kruskall-Wallis test results. These differences underscore the necessity of a more specific, targeted approach to bolstering these organizations' dedication to these strategic sustainable development goals. Examining the literature on cooperative principles that promote community action, member development, cooperative collaboration, and environmental preservation reveals a connection between cooperative practices and SDG achievement (Conde & Rodrigues, 2020). Therefore, the low adherence observed in our study's results may be related to a lack of knowledge, resources, infrastructure, and government support (Zampiér, Stefani, & Dias, 2022; Gutberlet, 2021; Conde & Rodrigues, 2020).

These differences in adherence to the SDGs among cooperative branches can be attributed to several factors, including the nature of the branches, the cooperatives' strategic priorities, and the level of awareness. We justify this understanding because cooperatives focused on work, production of goods, and services have an intrinsic focus on human development, education, and innovation. These areas align directly with SDGs 3, 4, 7, 9, 15, and 16. This synergy facilitates the integration of SDG principles into the routine and strategic objectives of these cooperatives. The "credit" sector, which focuses on finance and banking services, has a less direct connection with the other SDGs, making adherence less significant. The "agriculture" segment, which focuses on agricultural and livestock production, has difficulty implementing SDGs 7 and 15, which relate to clean energy and life on land. These SDGs require significant adaptations to production processes.

Finally, we can discuss the results from two perspectives: strategic priorities and the level of awareness of the cooperatives studied. Cooperatives in the "work, production of goods and services" segment clearly prioritize SDGs 3, 4, 7, 9, 15, and 16. This reflects their greater investment in and engagement with the implementation of actions related to these goals. Conversely, the "credit" and "agriculture" segments prioritize strategies focused on SDGs 2 (Zero Hunger and Sustainable Agriculture) and 6 (Clean Water and Sanitation). This may explain their lower adherence to the analyzed SDGs. Cooperatives in the "work, production of goods and services "

segment inherently focus on human development, education, and innovation—areas directly aligned with the aforementioned SDGs. This facilitates the integration of SDG principles into these cooperatives' routine and strategic objectives. Conversely, cooperatives in the "credit" sector focus more on finance and banking services, making the connection with other SDGs less direct. Similarly, cooperatives in the "agriculture" sector face challenges in implementing SDGs requiring significant adaptations to their production processes, such as those related to clean energy and life on land.

In terms of awareness, cooperatives in the three studied sectors need to invest more in educating and training all stakeholders (management and cooperative members) on the importance of achieving the SDGs to increase their knowledge, understanding, and engagement with these goals. Capacity building and raising awareness through training and education programs can stimulate practical actions essential for cooperatives' engagement in the 2030 Agenda, regardless of their sector.

6 Final Considerations

This study investigated how well Brazilian cooperatives adhere to the UN Sustainable Development Goals (SDGs). The study was based on an online questionnaire completed by 95 cooperatives from three sectors: 'Agriculture', 'Credit', and 'Work, production of goods and services.

Overall, we found that most cooperatives had low adherence to the SDGs, with median scores below three in 15 of the 17 goals. However, cooperatives in the 'work, production of goods and services' sector performed particularly well in comparison to the other two segments, especially regarding SDGs 7, 9, 13, 15 and 16.

The Kruskal–Wallis test revealed significant differences in adherence between sectors for SDGs 3, 4, 7, 9, 15 and 16. These differences can be attributed to the nature of the sectors, the cooperatives' strategic priorities, and their awareness of the SDGs. Our results corroborate previous studies on the low commitment of cooperatives to the SDGs, which can be explained by factors such as a lack of knowledge, resources, infrastructure, and government support.

Future studies could expand the investigation to other sectors and regions of the country, as well as analyzing the factors influencing adherence to the SDGs in more detail.

We propose measures that could help Brazilian cooperatives improve their adherence to the SDGs, regardless of their sector:

- Invest in training managers and employees on the SDGs and how to incorporate them into the daily activities of cooperatives.
- Seeking partnerships with the government, private companies, and other support organizations to raise and mobilize resources for SDG implementation.
- Develop specific tools to facilitate implementation of the SDGs.
- Create public policies or improve existing ones to motivate, support, and encourage cooperatives to implement the SDGs.

We conclude that Brazilian cooperatives have a long way to go in terms of adhering to the SDGs. However, the study also highlights their potential to contribute to sustainable development, particularly in the area of "work, production of goods and services," by providing training, mobilizing resources, developing tools, and offering government incentives. Cooperatives can play an important role in implementing the SDGs in Brazil.

Cooperative participation is essential to achieving sustainable development in Brazil. This study diagnoses the current situation and contributes to the topic by proposing measures to strengthen these organizations' commitment to the SDGs. Cooperative managers and other stakeholders can use the practical implications of the research to promote the integration of the SDGs into their activities and maximize their potential as agents of positive change.

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