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THE EXPERIENCE OF THE AGRICULTURAL SECTOR INTERPRETED APPLYING THE 2030 AGENDA

A EXPERIÊNCIA DO SETOR AGRÍCOLA INTERPRETADA À LUZ DA AGENDA 2030

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Abstract

This paper aims to portray the influence of the second Sustainable Development Goal (SDG) in the agricultural sector of the Metropolitan Region of Campinas (RMC). The study starts by discussing agriculture and society and, later, it covers sustainable development and the 2030 Agenda. It is an exploratory research that follows a qualitative and quantitative approach. From a technical point of view, the investigation deals with published documents. The qualitative approach was used to elaborate an analytical instrument that associates the keywords of SDG 2 and its relative targets, related to agricultural themes, to the LUPA Project indicators. The quantitative character derives from obtaining and analyzing selected LUPA Project data using the developed research instrument. The subject of the analysis is the agricultural production units of the RMC municipalities. The main result was the characterization of the practices that corroborate the inclusion of SDG 2 in agriculture in the region, making it possible to identify elements that can contribute to the generation of public policies for the sector.

Keywords: Sustainable development. 2030 Agenda. Agriculture. SDG.

Resumo

O presente artigo tem por objetivo caracterizar a inserção do segundo Objetivo de Desenvolvimento Sustentável (ODS), elaborados pela ONU, na agricultura na Região Metropolitana de Campinas (RMC). O estudo discorre sobre a agricultura e a sociedade e a caracterização dos ODS e do desenvolvimento sustentável também embasam o trabalho. A pesquisa tem natureza aplicada, de caráter exploratório, com abordagem quali-quantitativa. Pelo procedimento técnico, caracteriza-se como pesquisa documental. Por meio da pesquisa qualitativa, foi possível elaborar um instrumento

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de análise que associa as palavras-chave do ODS 2, e relativas metas, que abordam o tema da agricultura aos indicadores coletados pelo Projeto LUPA. O caráter quantitativo deriva da obtenção e da análise dos dados do Projeto LUPA selecionados, aplicando o instrumento de pesquisa elaborado. O sujeito da análise são as unidades produtivas agrícolas dos municípios da RMC. O resultado principal foi à caracterização das práticas que corroboram para a inclusão do ODS 2 na agricultura da região, possibilitando identificar elementos que possam contribuir na geração de políticas públicas para o setor.

Palavras-chave: Desenvolvimento sustentável. Agenda 2030. Agricultura. ODS.

Introduction

Agriculture is a fundamental sector for providing necessary inputs for feed, contributing to the reduction of hunger in the world, and for generating jobs and income, especially in countries where this sector has a relevant impact on economic activities (VEIGA, 2012).

Historically, the concern with environmental preservation resulted in several international events and meetings to discuss environmental, social, and economic issues. The creation of the Club of Rome, in 1968, and the publication of the report "The Limits to Growth" (VAN BELLEN; PETRASS, 2016) should be highlighted. In 1972, at the UN Stockholm Conference, ecodevelopment was discussed, promoting economic development without environmental degradation. Twenty years later, at the event called Rio 92 or "Earth Summit", "Agenda 21" was promulgated, which included themes such as poverty, consumption, and international economy, in addition to economic and environmental issues. These themes guided the discussions in the following events, in 2002 in Johannesburg and in 2012 at Rio+20, until in 2015 in New York the UN released the 2030 Agenda, where it defined the 17 Sustainable Development Goals (SDGs) and the 169 goals to be achieved by all countries by 2030, guiding sustainable development strategies.

The SDGs reflect an integrated vision of the different dimensions of sustainable development and agriculture occupies a prominent place both for contributing to the social dimension, in the aspect of survival and well-being of society, and in the environmental dimension, due to its close relationship with soil management, in addition to its impacts on the economic dimension.

In Brazil, agriculture is an extremely important economic sector due to its contribution to the production of food and inputs for other sectors, the significant generation of jobs and the large volume of small agricultural enterprises aimed at family farming as traditional, organic and/or agroecological type. Thus, as in other parts of the world, the SDGs have also encouraged reflections and assessments on agriculture in Brazil since the use of pesticides and the degradation of the environment are also present in the sector. However, despite the repercussions, there is still a doubt about conscious or non-conscious actions related to the SDGs and agriculture in the country. Thus, in a context where family farming occupies a significant space in the Brazilian economy, the following question is asked: **Among the practices carried out in Brazilian agriculture, how is Sustainable Development Goal 2 inserted in the Metropolitan Region of Campinas?**

To answer this question, the article was organized into four sections, in addition to this introduction and final considerations. The first part presents the agricultural sector in the context of sustainable development and highlights the importance of agriculture in the 2030 Agenda, with a focus on SDG 2. The second section presents the methodology, the data source used and the research subject. It seeks to verify the influence of SDG 2 on agriculture in the municipalities of the Metropolitan Region of Campinas (RMC). Then, the analysis instrument used to diagnose agricultural production in the RMC, according to the goals of the SDG 2 is described. In the last section, the results of the application of the instrument to identify and characterize the practices developed in agriculture in the RMC, based on the selected SDG 2 indicators and data collected from Agricultural Production Units (UPAs), to highlight the insertion of SDG 2 in their activities and meet the main objective of the research.

Agriculture and sustainable development

Brazilian history is strongly influenced by agricultural activity, especially from the year 1530, with the first reports of sugar production in the Brazilian Northeast. Sugar dominated Brazilian trade until the 1700s, becoming important for international trade, which at that time was based on barter (LIMA, 1970). From 1850 onwards, coffee became the main Brazilian agricultural product. According to Silva (1998), coffee was extremely important to the Brazilian economy, as the large farms of this fruit were responsible for engendering other productive sectors, such as the textile, responsible for the production of coffee bags, by other non-durable consumer goods activities such as hats, and the emergence of a market focused on the repair of tools used in the coffee agricultural process.

The period described above lasted until 1930 when the process of Brazilian industrialization began to be developed by President Getúlio Vargas. Silva (1998) highlights the importance of coffee in its relationship with the financing of heavy industrialization in Brazil, as from this financing it was possible to develop other sectors in the country, such as steel, chemical and iron. During this period, coffee was responsible for developing a logistical infrastructure for its distribution in the domestic market, thus allowing the expansion of roads and railways.

Agriculture underwent important transformations. The Green Revolution, initiated in the 60s, allowed an abrupt agricultural expansion through mechanization, monoculture, use of fertilizers and pesticides and genetic changes in seeds. Still, this model has become the object of criticism due to the devastation of the environment and, consequently, the importance of sustainable agricultural models has grown (MOREIRA, 2000).

There are countless challenges to be faced to overcome the traditional agricultural model. Assad and Almeida (2004) highlight the challenges that need to be tackled, such as the environmental challenge, which is based on reducing the environmental impact of agricultural activities; the economic, whose challenge is to minimize losses and waste; the social, in which the challenge is to generate income for rural workers and food security for consumers; and, finally, the territorial and technological challenge, which is capable of increasing productivity and production without harming the environment.

The current scenario in 2020 is driven by large conglomerates focused on agriculture with the following characteristics: internalization of different agricultural products combined with machinery, seeds with genetic improvements, pesticides, and credit. Together they allowed an increase in agricultural production and productivity, combined with abundant land with low prices (CONCEIÇÃO; CONCEIÇÃO, 2014; THORNTON et al., 2018, EYHORN et al., 2019).

In Brazil, overcoming the traditional agricultural model faces resistance from governments that continue to encourage this model, whose solution to sustainability will be through technical and technological means, leaving aside the social, economic, and political aspects (CLEMENTE, 2015). Sustainable agriculture, according to Ehlers (2016), consists of merging traditional agriculture with the principles of new agricultural models, thus generating productive and social results.

The importance of agriculture for development was present in the Millennium Development Goals (MDG) and gained more space in the 2030 Agenda, in the second SDG "End hunger, achieve food security and improved nutrition and promote sustainable agriculture". The 2030 Agenda represents an opportunity to bring together and direct efforts to change agricultural practices so that they foment sustainable development (EYHORN et al., 2019; NICHOLLS et al., 2020).

The 2030 Agenda addresses issues related to poverty and inequality and meeting the goals of the 17 SDGs, including SDG 2, in an integrated manner with the economic, social, and environmental dimensions of sustainable development (CARPENTIER; BRAUN, 2020).

The elaboration of this Agenda is based on a multidimensional approach and on the recognition of local differences (FONSECA; DOMINGUES; DIMA, 2020). The formulation of sufficiently generalist objectives facilitates their implementation at the national level although makes it difficult to elaborate indicators that allow the monitoring of progress towards sustainable development (GIL et al., 2019). In the case of ODS 2 Gil et al. (2019) point to some limits of official indicators. For example, indicator 2.4.1, which brings together quantitative elements, such as the percentage of agricultural areas, with a qualitative component, such as the sustainable practices adopted. There are several proposals to improve official indicators that, in general, aim to favor international comparisons (SACHS et al., 2021).

In this paper, based on the assumption that policies promoting sustainable development have a subnational focus, an inversion of plans is proposed in the search for indicators related to SDG 2.

Starting from a reading of the second SDG and its goals, an attempt is made to evaluate its influence on agricultural practices at the local level, without being limited to official indicators.

The SDGs seek to contemplate different aspects that involve human beings and planet earth, in everything that man needs in the air, on land and at sea. Agriculture is part of this concern and arouses interest both in its importance as food producer and in soil degradation in its management.

Methodology

The paper is the result of an exploratory research (GIL, 2019) that seeks to identify the influence of SDG 2 in the agricultural production process carried out in the municipalities of the Metropolitan Region of Campinas (RMC). It is a documentary research, whose main sources of information are the 2030 Agenda and the LUPA Project (Census Survey of Agricultural Production Units in the State of São Paulo) (SÃO PAULO, 2019).

The LUPA Project aims to "show who the inhabitants and rural workers are and where they are and how they live in addition to agricultural production and other related variables" (MARTINS et al., 2020, p. 2). The collected data refer to Agricultural Production Units (UPAs). The UPA is defined as "the set of contiguous properties of the same owner(s), located entirely within the same municipality, within the urban perimeter" (MARTINS et al., 2020, p. 2).

The research is characterized by being a mixed method investigation, combining qualitative and quantitative approaches. According to Richardson (2017, p. 74) it can be classified as a "qual-quant sequential exploratory project: starting with data collection and qualitative analysis and, later, carrying out the collection and quantitative data analysis and the interpretation of the entire analysis."

The investigation was developed from an in-depth reading of the SDG 2 to identify issues related to agriculture. Goals that matched the objective of the article were then selected and, after identifying the targets, the keywords that allow highlighting the contribution of agriculture to sustainable development were extracted. The next step was to find indicators in the LUPA Project that related to the keywords. The quantitative character derives from obtaining data, through the LUPA Project, for each city in the RMC. With the tabulation of the data, it was possible to characterize the agricultural production units of the RMC with the selected goals and keywords. Therefore, an identification, data extraction and tabulation work not found in previous works was carried out.

The research subject are farmers who own properties located in the 20 cities of the RMC, where 6884 UPAs are located (SÃO PAULO, 2019). The agricultural units in the RMC tend to be small and medium in size, as just over 50% of them have an area of up to 10 hectares (SÃO PAULO, 2019).

Analysis Instrument

To quantify agricultural production in the RMC, it was necessary to identify the contact elements between SDG 2 and the information collected in the selected database. Five goals from SDG 2 were then selected and the contents that are directly related to agriculture were identified, which, for this study, are identified as keywords and are indicated in bold in Table 1.

Table 1: Agriculture in Sustainable Development Goal 2

GOALS
2.1 By 2030, end hunger and ensure access for all people, in particular the poor and people in vulnerable situations, including children, safe, nutritious, and sufficient food throughout the year.
2.3 By 2030, double the agricultural productivity and income of small food producers, particularly women, indigenous peoples, family farmers, herders, and fishermen, including through secure and equal access to land, other productive resources and inputs, **knowledge**, **financial services**, markets, and non-agricultural value addition and employment opportunities.
2.4 By 2030, **ensure sustainable food production systems** and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen the capacity to adapt to climate change, extreme weather conditions, droughts, floods, and other disasters, and that progressively improve the **quality of land and soil**.
2.5 By 2020, maintain the genetic **diversity of seeds, cultivated plants**, farmed, and domesticated animals and their respective wild species, including through diversified and well-managed seed and

plant banks at national, regional, and international levels, and ensure access and the fair and equitable sharing of benefits arising from the use of genetic resources and associated traditional knowledge, as internationally agreed.
2.a Increase investment, through the strengthening of international cooperation, in **rural infrastructure**, research and extension of agricultural services, technology development, and plant and animal gene banks, to increase agricultural production capacity in developing countries, in particular in the least developed countries.

Source: Elaborated by the authors from UN (2015).

The keywords identified in table 1 were related to the information available in the LUPA Project. The result is shown in Table 2.

Table 2: Agriculture in SDG 2 and LUPA Project data.

GOAL	Lupa Project
2.1 safe, nutritious, and sufficient food throughout the year	• Use Controlled Seedlings • Uses Improved Seed
2.3 (a) financial services (b) knowledge	• Use of Rural Credit • Use of Rural Insurance • Does not use technical assistance • Uses only government technical assistance • Uses only private technical assistance • Uses both government and private technical assistance
2.4 ensure sustainable food production systems	• Use of Soil Conservation Practices, when necessary
2.a (a) Increase investment (b) Rural infrastructure	• Use of Rural Credit • Inhabited dwelling house • Total dwelling house

Source: elaborated by the authors.

For goal 2.1, the keyword identified is *safe, nutritious, and sufficient food throughout the year* and it is related to the indicators "Uses inspected seedlings" and "Uses improved seed" of the LUPA Project. Safe food is important so that there is no contamination through food sold by agricultural producers. Federal Law No. 11,346, of September 15, 2006, demonstrates this concern with safe food as it bases the importance of food safety in the production process, in the generation of quality food for consumers.

Goal 2.3 has as keywords (a) financial services and (b) knowledge. Financial services are related to the data of the indicators "Use of rural credit" and "Use of rural insurance" of the LUPA Project. Credit is one of the most important financial services for the expansion of agricultural activity. As Conceição and Conceição (2014) point out, credit can increase agricultural productivity and production, becoming an ally to agricultural expansion. Regarding the second keyword, knowledge, Snapp and Pound (2017) highlight the importance of knowledge of the soil, climate, and biodiversity, since with these elements the productivity of an agricultural property becomes more efficient. Thus, the greater the knowledge about land and agricultural property, the greater the chance of being productive. This keyword interacts with four database indicators: it does not use technical assistance, it uses only government technical assistance, it uses private technical assistance, and it uses both government and private technical assistance.

Target 2.4 is represented by the keyword *ensuring sustainable food production systems* and is related to the indicator "Use of soil conservation practices, when necessary" identified in the LUPA Project. Roel (2016) emphasizes the importance of studies and sustainable technologies for achieving sustainable food production systems, generating jobs, preserving the environment, and producing food without the risk of contamination.

Finally, two keywords are associated with goal 2.a: (a) *increase investment* and (b) *rural infrastructure*. The increase in investment is related to the LUPA Project through the indicator "Use of rural credit" and rural infrastructure can be associated with the indicators "Inhabited dwelling

house" and "Total dwelling housing". Bianchini (2015) discusses the importance of investments made by family farmers with the granting of credit through PRONAF, making it possible to purchase machinery, tractors, vehicles, and other goods that improved the infrastructure and production of family farmers.

Results and Discussion

Table 3 summarizes the results of the twelve selected indicators related to SDG 2, for the UPAs of all municipalities in the MRC.

Assad and Almeida (2004) and Sambuichi (2017) prove the importance of food security in the agricultural production process. The use of inspected seedlings and seeds can be considered as the first step in agricultural production, which aims to ensure safe, nutritious, and sufficient food throughout the year, as quality seedlings and seeds can guarantee food quality and safety, key elements identified for Target 2.1.

Table 3: UPAs of municipalities in the Metropolitan Region of Campinas and selected indicators from SDG 2 (%)

TOPICS SDG/GOALS / MUNICIPALITIES	Use of inspected seedlings	Use of inspected seeds	Use of rural credit	Use of rural insurance	Does not use technical assistance	Uses only government technical assistance	Uses only private technical assistance	Uses only government and private technical assistance	Use of soil conservation practices when necessary	Inhabited dwelling house	Total dwelling house
Americana	13,0	21,7	13,0	-	52,2	34,8	13,0	-	47,8	17,4	34,8
Artur Nogueira	52,9	31,5	19,8	4,6	49,2	18,0	23,3	9,5	74,9	44,5	55,5
Campinas	18,1	16,6	5,8	1,8	69,7	1,1	22,3	7,0	13,2	80,0	89,2
Cosmópolis	43,1	30,1	28,0	9,3	50,8	4,1	42,7	2,4	71,1	55,7	62,2
Engenheiro Coelho	33,1	42,9	29,0	5,0	41,5	19,2	18,5	20,8	89,2	46,7	47,1
Holambra	30,4	34,5	43,7	7,0	58,8	8,9	25,1	7,2	48,2	75,8	75,8
Hortolândia	24,1	48,3	13,8	13,8	55,2	0,0	41,4	3,4	55,2	62,1	62,1
Indaiatuba	11,9	16,3	14,1	18,1	40,3	23,1	29,8	6,7	68,2	78,5	81,7
Itatiba	21,4	13,9	13,1	12,8	56,7	18,1	7,6	17,6	26,5	75,8	81,1
Jaguariúna	14,8	25,2	7,0	3,0	77,4	6,5	12,6	3,5	51,3	77,0	84,3
Monte Mor	13,0	27,8	19,6	5,4	34,8	8,5	10,3	46,4	67,0	66,4	70,5
Morungaba	5,0	10,8	7,9	3,2	76,0	5,4	13,3	5,4	6,1	73,5	76,0
Nova Odessa	2,6	13,8	7,8	4,3	49,1	27,6	20,7	2,6	35,3	48,3	17,2
Paulínia	-	2,5	1,2	1,2	86,4	1,2	12,3	-	23,5	66,7	44,4
Pedreira	3,6	3,6	5,4	-	86,3	1,2	11,3	1,2	6,0	53,0	54,0
Santa Bárbara d´Oeste	68,1	14,2	15,4	5,4	21,9	33,6	19,7	24,8	80,6	35,6	53,8
Santo Antônio de Posse	10,4	32,2	24,2	3,4	55,0	11,7	16,1	17,1	65,8	70,5	75,2
Sumaré	25,5	47,3	51,6	10,9	20,0	46,5	13,5	20,0	71,3	58,2	65,8
Valinhos	8,6	6,2	3,5	0,8	19,2	46,2	4,1	30,5	60,0	97,8	98,6
Vinhedo	6,4	6,4	7,7	3,2	81,4	7,7	8,3	2,6	10,3	72,4	77,6

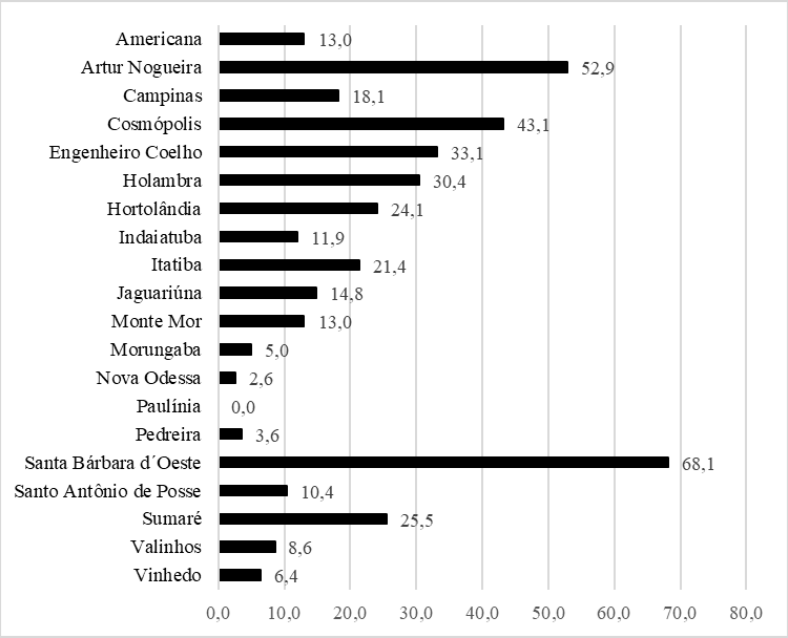
(*) In the publication of the results of the LUPA Project, the total number of dwelling houses is smaller than the number of inhabited dwelling houses.

Source: Elaborated by the authors, data extracted from LUPA Project.

In the RMC, the average of UPAs that use inspected seedlings in production is only 21.4%. According to information in Graph 1, Santa Barbara d'Oeste has the best indicator of use of inspected seedlings, 68.1% of the UPAs, and the city of Paulínia did not have any production unit that declared the use of inspected seedlings. It is observed that less than 10% of the UPAs located in the

municipalities of Nova Odessa, Morungaba, Pedreira, Vinhedo and Valinhos used inspected seedlings, a number much lower than expected, which marks an obstacle to achieving target 2.1 in 2030.

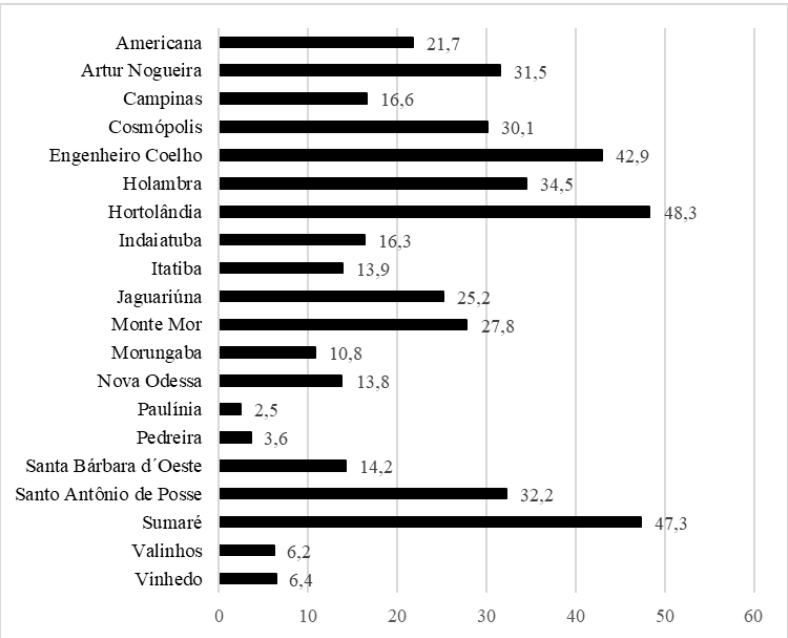
Graph 1: Percentage of Agricultural Production Units using inspected seedlings, municipalities in the RMC, 2016/17



Source: Elaborated by the authors, data extracted from LUPA Project

The use of improved seeds in the agricultural production process interests, on average, 22.3% of the UPAs in the RMC, a percentage value above that related to the use of inspected seedlings, but the data continue to show that there is room for improvement and to contribute to the achievement of goal 2.1. In this regard, according to Graph 2, Hortolândia registers the highest usage rate of 48.3%, followed by Sumaré and Engenheiro Coelho with rates above 40%. On the other hand, the municipality of Paulínia has only 2.5% of the production units that use improved seeds.

Graph 2: Percentage of Agricultural Production Units that use improved seeds, municipalities in the RMC, 2016/17



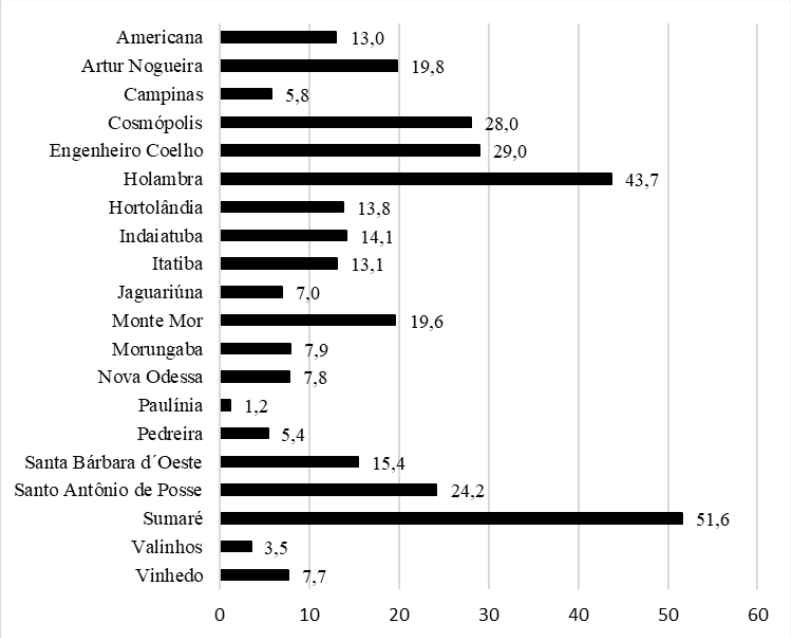
Source: Elaborated by the authors, data extracted from LUPA Project

The expected reach with target 2.3 is: "By 2030, double the agricultural productivity and income of small food producers, particularly women, indigenous peoples, family farmers, herders and fishermen, including through secure and equal access to land, other productive resources and inputs, **knowledge, financial services**, markets and opportunities for adding value and non-agricultural employment".

As pointed out by Conceição and Conceição (2014), credit is an important means to create an opportunity to increase production and productivity, as it enables investments in the production and acquisition of agricultural machinery and equipment. In Brazil, the National Program for Strengthening Family Agriculture (PRONAF), which aims to strengthen small farmers through financing at rates lower than those of the market, is a credit policy that favors the development of family agriculture (GUANZIROLI, 2007). Agricultural insurance is another important financial instrument to protect against adverse events that may occur during the harvest, with losses arising from bad weather, such as drought, rain, and insect invasion.

In the RMC, the average of UPAs that resort to the use of agricultural credit is only 16.6%, a very low percentage for the indicator that contributes to increases in productivity and income. Sumaré is the municipality that stands out with 51.6% of the productive units that use agricultural credit (Graph 3). But in the cities of Campinas, Jaguariúna, Morungaba, Nova Odessa, Paulínia, Pedreira, Valinhos and Vinhedo, less than 10% of the UPAs use agricultural credit.

Graph 3: Percentage of Agricultural Production Units using rural credit, municipalities in the RMC, 2016/17.

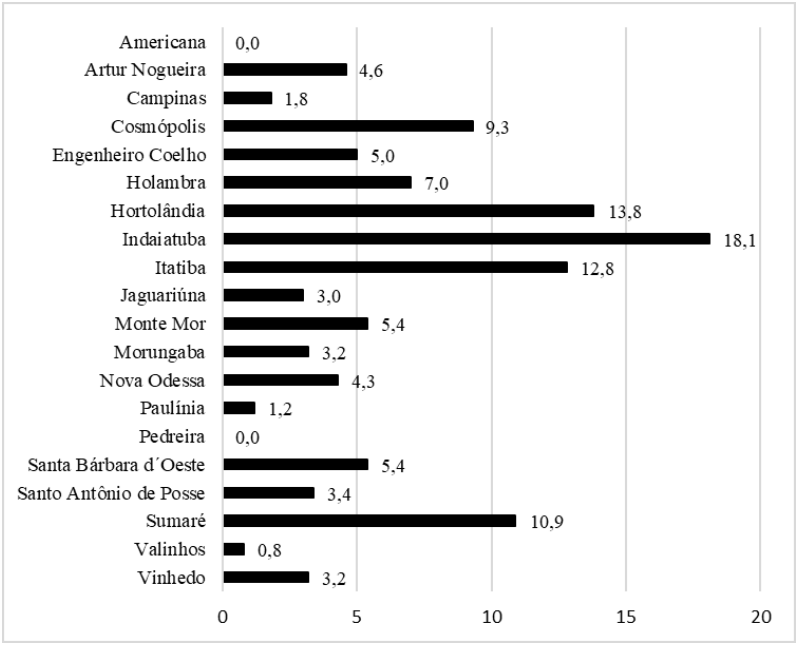


Source: Elaborated by the authors, data extracted from LUPA Project

The average percentage of agricultural insurance use in the RMC is only 6.3%, evidencing the fragility of the productive units in the face of the consequences of bad weather that can happen during the harvest. As pointed out by Ozaki (2008), agricultural insurance minimizes the risk of loss of the producer's income that would be obtained from the sale of production, so with agricultural insurance the producer can maintain the income in case of some unexpected event with the production.

In the RMC, Indaiatuba has the highest proportion of UPAs with agricultural insurance, 18.1%. The municipalities of Americana and Pedreira do not have any agricultural production unit that uses agricultural insurance (Graph 4).

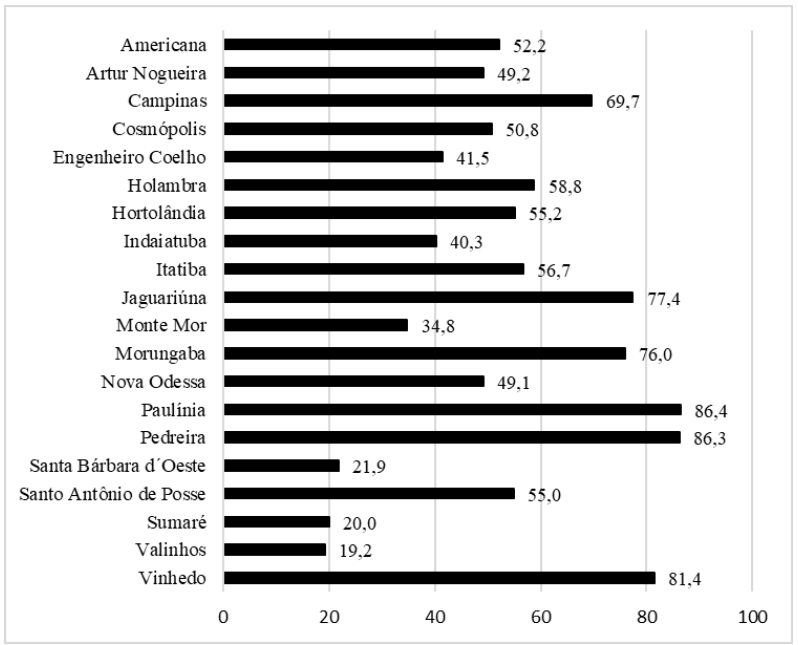
Graph 4: Percentage of Agricultural Production Units that use agricultural insurance, municipalities in the RMC, 2016/17.



Source: Elaborated by the authors, data extracted from LUPA Project

The indicator associated with the keyword knowledge is technical, private and/or governmental assistance. It is important for the farmer as it allows him/her to assimilate new lessons and contributes to improving production by adopting practices that promote sustainability, for example, stimulating biodiversity, reducing land and river pollution (EYHORN et al., 2019; ALTIEIRI; NICHOLLS, 2020). As Wanderley (2003) points out, EMBRAPA has a fundamental role in agricultural technical assistance in Brazil, being responsible for studies and assistance to producers of all sizes. In RMC 54.1% of the production units do not use any type of technical assistance. In the cities of Paulínia and Pedreira, this percentage exceeds 86%, signaling the fragility of these production units in the face of changes in the agricultural production system, without access to new techniques and new processes (Graph 5).

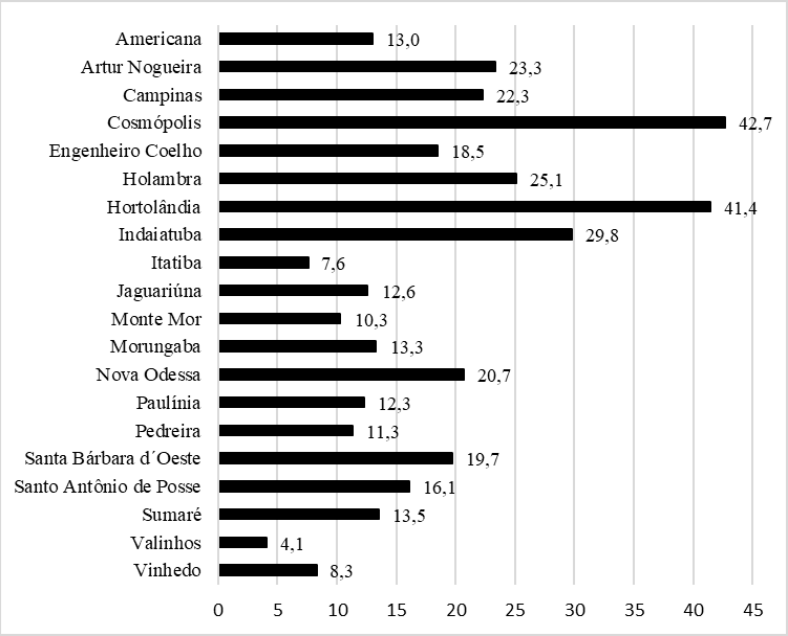
Graph 5: Percentage of UPAs that do not use technical assistance, municipalities in the RMC, 2016/17.



Source: Elaborated by the authors, data extracted from LUPA Project

Only 16.2% and 18.3%, respectively, of the RMC's UPAs use governmental or private technical assistance, percentages far below the ideal for achieving the goal of doubling agricultural productivity. Campinas has the lowest percentage of production units that use government technical assistance, only 1.1%, while in Sumaré this percentage is the highest, 46.5%%. The preference for public technical assistance at the productive units in Sumaré is evident, as only 4.1% resort to private assistance, against 42.7% of the UPAs in Cosmópolis (Graph 6).

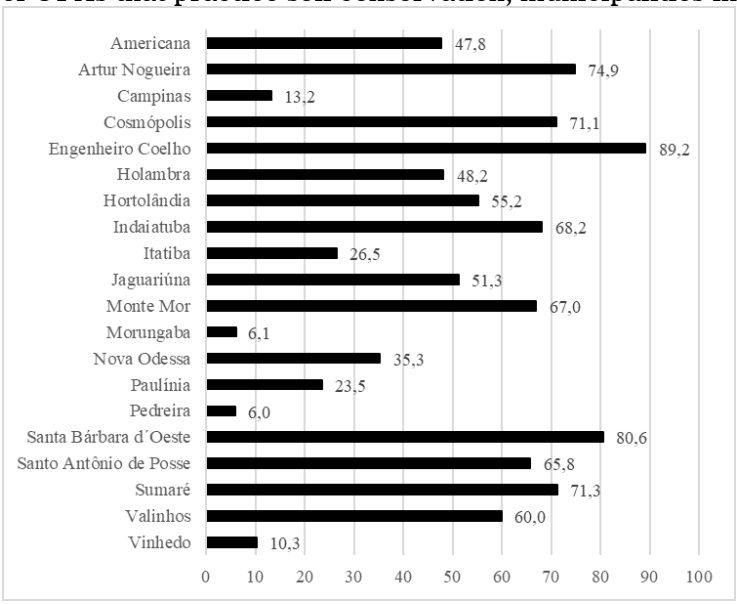
Graph 6: Percentage of UPAs that use private technical assistance, municipalities in the RMC, 2016/17.



Source: Elaborated by the authors, data extracted from LUPA Project

Goal 2.4, whose key word is to *ensure sustainable food production systems and achieve sustainable management*, is associated with the indicator Use of soil conservation practices. The city of Engenheiro Coelho has the best percentage in relation to soil conservation practices with 89.2% of the UPAs carrying out the soil conservation process, and the city of Morungaba only 6.1% of the productive units carry out soil conservation, a very low percentage compared to the city of Engenheiro Coelho (Graph 7).

Graph 7: Percentage of UPAs that practice soil conservation, municipalities in the RMC, 2016/17.

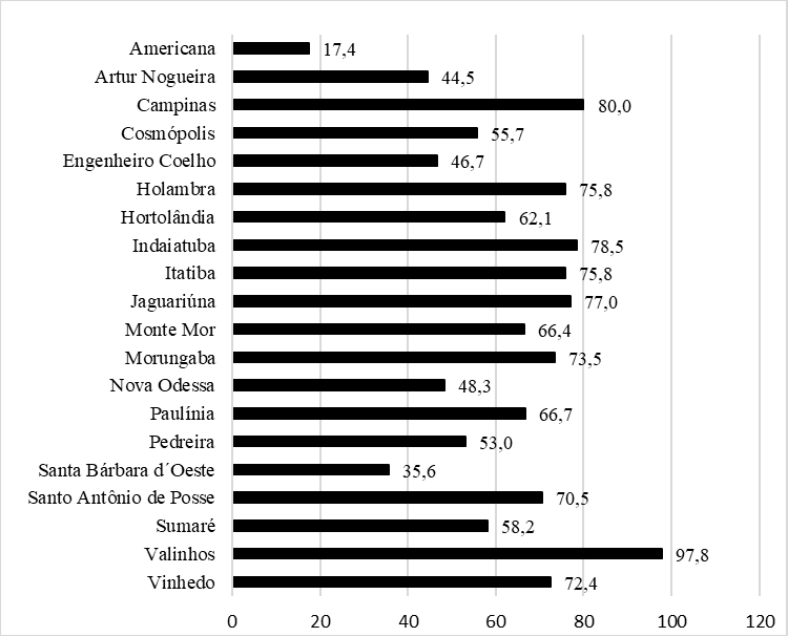


Source: Elaborated by the authors, data extracted from LUPA Project

The final target of SDG 2 points to investment and rural infrastructure to increase agricultural production capacity. Agricultural credit is very important for family agricultural development and Bianchini (2015) highlights the investments of family farmers in modern machinery, tractors and vehicles using PRONAF, which enables better production conditions for family farmers. The use of rural credit associated with the keyword increase investment of goal 2.a was analyzed in this section associated with goal 2.3 that has financial services as a keyword.

Another indicator associated with goal 2.a is the home, which is particularly relevant in the case of family farming with farmers who live in the productive unit. From a total of 759 UPAs, Campinas has 677 with total housing and 607 with inhabited dwelling house.

Graph 8: Percentage of Agricultural Production Units that have inhabited dwelling house, municipalities in the RMC, 2016/17.



Source: Elaborated by the authors, data extracted from LUPA Project

In the city of Valinhos, almost all UPAs has inhabited houses, while the city of Americana has only 17.4% of UPAs with this property.

Final considerations

The importance of agriculture in food production, income generation and employment are recognized. Using the SDG 2 as a guideline for interpreting the data, it is evident that the RMC is still far from achieving the goals set out in the 2030 Agenda.

In the case of food security, synthesis of the first goal, in the RMC the limited use of inspected seedlings and improved seeds points to the need for incentive and guidance policies.

The results point to the need for greater support and education on the use of agricultural credit and public policy to encourage the use of rural credit efficiently, as it is a means with the potential to promote modernization and increase agricultural productivity with the introduction of new machinery and equipment.

Another obstacle to increasing production and productivity in agricultural properties in the RMC is the lack of technical assistance, given that just over half of the producers do not use any technical assistance, whether private or public. The need for public managers to promote public policies capable of encouraging and increasing the use of technical assistance for agricultural producers is recognized, many producers do not have the financial condition to pay technical assistance, however, there is EMBRAPA, which is a public company of reference in the agricultural area.

The use of soil conservation practices is the indicator that showed the best results, allowing us to deduce that, in addition to respecting environmental legislation, agricultural activities are not in contradiction with care for the environment.

Finally, by choosing the indicator related to rural infrastructure, it is possible to identify where there is a greater presence of family farmers.

It is concluded that through the selection of keywords in the text of the 2030 Agenda it was possible to identify the need for the introduction, generation and implementation of new public policies and stimulus to producers in the RMC so that they can achieve the goals established in SDG 2. Considering the year 2030 as the limit for achieving the goals of the SDGs, we can see the difficulty of meeting them with the continuity of traditional production models without the use of credit, good production practices and low structure to increase productivity. Therefore, the adoption of improvements becomes urgent to achieve the goals and improve agricultural indicators in the MRC.

The analysis instrument elaborated is an applicable tool in the analysis of other cities and regions in Brazil with the objective of characterizing the insertion of SDGs in agriculture and analyzing the situation of the chosen region. The instrument is also flexible enough and can be expanded and used to characterize other sectors that have links to the SDGs, such as health assessment, environment, and social issues.

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