



THE NATIONAL SCHOOL FEEDING PROGRAM (PNAE) AS AN INSTITUTIONAL MARKET: POTENTIAL DEMAND AND FOOD PRODUCTION FROM FAMILY FARMING IN RIO GRANDE DO SUL

Jorge Amaral de Moraes¹

Amanda Jung²

Abstract: This article focuses on the National School Feeding Program (PNAE) as an institutional market, addressing the two main variables of these regional markets, family farming food production and the potential demand for school meals, in the nine (9) Functional Planning Regions (RFs) of the state of Rio Grande do Sul. This study is the result of some gaps, especially for policy planners, in the relationship between these two variables in the state, which refer to the results of a comparative analysis of local family farming food production and the regional potential of these institutional markets. The importance of this policy for family farmers, managers and students enrolled in public schools is evident, but in what areas can the program advance? Is family farming sufficient to meet the demand of public schools in the functional regions (RF) of the state? Can the institutional market generated by meals served in schools drive increased production and, consequently, increase the income of family farmers? To conduct this study, quantitative data related to food production by regional family farming were analyzed, based on the 2017 Agricultural Census, compared with the number of students in public schools in Rio Grande do Sul, in these same Functional Regions (RFs) of the state. The demand for school meals was calculated according to the number of students enrolled and the pattern of per capita consumption of schoolchildren, based on the menus suggested according to nutritional needs.

Keywords: Family farming; PNAE; school meals; institutional markets.

O PROGRAMA NACIONAL DE ALIMENTAÇÃO ESCOLAR (PNAE) COMO MERCADO INSTITUCIONAL: Demanda potencial e a produção de alimentos da Agricultura Familiar no Rio Grande do Sul

Resumo: Este artigo tem como tema o Programa Nacional de Alimentação Escolar (PNAE) como mercado institucional, abordando as duas principais variáveis desse tipo de mercado regional, a produção de alimentos da agricultura familiar e a demanda potencial de alimentação escolar, nas nove (9) Regiões Funcionais (RFs) de planejamento do estado do Rio Grande do Sul. Este estudo é resultante da existência de algumas lacunas, especialmente para os gestores do planejamento desta política, na relação entre essas duas variáveis no estado, que se referem aos resultados de uma análise comparativa da produção agrícola familiar local de alimentos e o potencial regional desses mercados institucionais. A importância dessa política para os agricultores familiares, para os gestores e para os estudantes matriculados nas escolas públicas é evidente, mas em quais pontos o programa pode avançar? A produção da agricultura familiar é suficiente para atender à demanda das escolas públicas nas regiões funcionais (RF) do estado? O mercado institucional gerado pelas refeições servidas nas escolas pode impulsionar o aumento da produção e, consequentemente, aumentar a renda dos agricultores familiares? Para realizar este estudo, foram analisados dados quantitativos relativos à produção de alimentos da agricultura familiar regional, com base no Censo Agropecuário de 2017, confrontados com o número de estudantes das escolas públicas do Rio Grande do Sul, nessas mesmas Regiões Funcionais (RFs) do estado. A demanda de alimentação escolar foi calculada conforme o número de alunos matriculados e o padrão do consumo per capita dos escolares, com base nos cardápios sugeridos de acordo com as necessidades nutricionais.

Palavras-chave: Agricultura familiar; PNAE; alimentação escolar; mercados institucionais.

1 Introduction

¹ Agronomist Engineer from the University of Passo Fundo (UPF), Master's degree in Rural Economics and PhD in Rural Development from the Federal University of Rio Grande do Sul (UFRGS). Professor in the Graduate Program in Regional Development at Faculdades Integradas de Taquara (FACCAT). ORCID: <https://orcid.org/0000-0002-8879-0005>. Lattes: <http://lattes.cnpq.br/6307735645925914>. E-mail: jmoraes12@gmail.com.

² Nutritionist, Master's degree in Regional Development from the Graduate Program in Regional Development at Faculdades Integradas de Taquara (FACCAT). ORCID: <https://orcid.org/0000-0002-5188-8199>. Lattes: <http://lattes.cnpq.br/8163545411942081>. E-mail: amanda.jung@hotmail.com.



Since the 1990s, the Brazilian government has endeavored to implement development programs and policies aimed at combating hunger, starvation, and malnutrition. Furthermore, food insecurity is not limited to severe nutritional deficiencies; it also encompasses issues related to poor diet, such as being overweight and obesity, that affect all strata of society.

On the other hand, the development of family farming yields a range of positive outcomes, including the promotion of biodiversity, environmental preservation, enhanced food security, and the conservation of the territory's landscape characteristics and the cultural capital of local communities. Moreover, family farming strengthens family ties and plays a pivotal role in curbing rural-to-urban migration, thereby contributing to the stability of rural communities and to global sustainability (Panzutti; Monteiro, 2014).

More recently, Resolution CD/FNDE No. 6 of May 8, 2020, mandated an increase in the supply of fruits and vegetables while restricting the purchase of processed and ultra-processed foods. These regulations have come to represent significant public policies ensuring the quality of food provided to students in public schools, while also creating an institutional food market and offering the potential for increased income for family farmers (Brasil, 2020).

One of the institutions working with family farming on a global scale is the Food and Agriculture Organization (FAO), which uses the international term "Home-Grown School Feeding" (HGSF) to describe this new model for School Feeding Programs. This model is designed to provide children in schools with safe, diverse, and nutritious food sourced from local family farmers (FAO, 2013). HGSF aims to align the goals of increasing farmers' income, fostering local development, and improving public health through feeding programs such as the PNAE (Baccarin, 2017).

However, despite representing both an achievement and an opportunity, the institutional market created by the PNAE also poses a major challenge for family farming producer organizations. In Brazilian metropolitan regions, this challenge is even greater; due to high levels of urbanization, the number of local family farmers is significantly lower, and the operational challenges associated with the PNAE, such as a lack of knowledge regarding the program and the market, as well as infrastructural and logistical deficiencies, are immense.

Years after the implementation of the National School Feeding Program (PNAE) in Brazil, efforts are underway to establish a solid link between family farming production and this institutional food market. Understanding production capacity and potential food consumption in schools within a specific region is crucial for the PNAE's success in *Rio Grande do Sul*. Such knowledge would enable the creation of school menus aligned with the foods that local and regional family farming can supply.



The question addressed by the study underlying this article concerns the balance between food production by family farms and potential food consumption in public and philanthropic schools across all functional regions (FRs) of *Rio Grande do Sul*. The results aim to assess the PNAE's potential as an institutional market, identify key parameters of these regional markets, and pinpoint bottlenecks in the balance between regional production and potential food consumption in schools within each of the state's functional regions.

Thus, the study's primary objective was to analyze the balance between the PNAE's potential as an institutional market and food production by family farms in *Rio Grande do Sul*. More specifically, the study sought to identify the potential for school meal consumption in each of the state's functional regions (FRs) and to provide an overview of current family farming production in those areas. This was achieved through a comparative analysis of two territorial variables, potential food demand for schools and family farming production, within the context of the territories defined by the state's nine (9) functional planning regions. To this end, it was necessary to identify and quantify, within each of the State's functional planning regions, the physical output of foods produced by family farming (comprising around 55 products, some processed via family agro-industry and others unprocessed) capable of meeting school meal demands in those regions. Additionally, the potential for food consumption was mapped. Additionally, the potential demand for school meals within each of these Regional Units (RFs) was mapped.

Beyond this introduction and the concluding remarks, the study is divided into three further intermediate sections. The next section addresses the theoretical underpinnings of the PNAE as an institutional market, including considerations regarding family farming in Brazil and research findings on its participation in PNAE procurement in Rio Grande do Sul. The third section presents a summary of the research methodology employed. Finally, the following section describes the study's main results, based on an analysis of data from the 2017 Census of Agriculture and information available on the website of the National Institute for Educational Studies and Research Anísio Teixeira (INEP) regarding the year 2021. Furthermore, the potential demand for school meals within each of these Functional Regions (RFs) was mapped.

In addition to this introduction and the concluding remarks, the study is divided into three further intermediate sections. The next section addresses the theoretical underpinnings of the PNAE as an institutional market, including considerations regarding family farming in Brazil and research findings on its participation in PNAE procurement in Rio Grande do Sul. The third section presents a summary of the research methodology employed. Finally, the following section describes the study's main results, based on an analysis of data from the 2017 Census of Agriculture and information available on the website of the National Institute for Educational



Studies and Research Anísio Teixeira (INEP) regarding the year 2021.

2 The National School Feeding Program (PNAE) as an institutional market

Several authors have examined the results of family farming participation in the National School Feeding Program (PNAE), addressing both national and regional perspectives (Bacarin et al., 2017; Ferigollo et al., 2017; Gomes, 2021). Furthermore, studies have analyzed the reasons behind varying levels of family farming participation in this market (Triches et al., 2019; Grisa, Elias, & Theis, 2020). Many of these studies indicate that the state of Rio Grande do Sul (RS) stands out nationally, showing significant levels of family farming involvement in PNAE procurement compared to other Brazilian states.

This link between school meals and family farming has played a pivotal role in transforming school nutrition, enabling healthy, locally sourced foods produced directly by family farmers to be incorporated into the daily diets of public-school students across Brazil. Moreover, it is evident that prioritizing family farming in food procurement policies, such as the PNAE, emerge as an advantageous strategy for the productive inclusion and income growth of this socioeconomic group, with significant impacts on local development.

The National School Feeding Program (PNAE) is considered Brazil's oldest public policy and the largest school feeding program in the world, serving a significant portion of the country's youth population, currently estimated at 43 million school-age children. The program is funded through financial transfers from the National Fund for Educational Development (FNDE) to purchase meals for students across all levels of basic education (early childhood, elementary, high school, and youth and adult education) in public and philanthropic schools. This public policy aims to meet a portion of students' nutritional needs while they are at school, while also contributing to reduced dropout rates, the formation of healthy eating habits, and improved learning outcomes.

Decentralization was consolidated with Provisional Measure Nº 1,784 on December 14, 1998. Beyond direct transfers to all municipalities and Departments of Education, the funds began to be transferred automatically, without the need for formal agreements or similar instruments, thereby streamlining the process (Brasil, 1998). For instance, a mandate was established requiring that 70% of federal funds be allocated exclusively to basic food products, taking into account regional dietary habits and each municipality's agricultural strengths. This initiated a process of decentralizing and regionalizing menus, as well as distributing food tailored to the dietary habits of populations across different regions of the country (Brasil, 1998).

Another significant achievement was the creation of a School Feeding Council (CAE) in



every Brazilian municipality to serve as a deliberative, oversight, and advisory body for the program's implementation. A crucial milestone reached in 2006 was the requirement for nutritionists to serve as the program's technical leads, alongside a technical team of such professionals within all Executing Entities (EExs). This led to a significant improvement in the quality of the National School Feeding Program (PNAE) regarding the achievement of its objectives.

PNAE legislation not only fosters local production and encourages short supply chains but also mandates that procurement prioritize specific groups, such as agrarian reform settlers, “quilombola” and indigenous communities, organic/agroecological producers, and those organized into cooperatives or associations, in that order. This means the law incorporates sociocultural, organizational, and environmental aspects into government procurement guidelines.

Furthermore, including locally produced foods in school menus reinforces the integrative nature of local food traditions and cultures. This measure encourages reflection on alternative and healthier ways of producing and consuming food, as well as on the importance of local family farming for economic and social development linked to environmental protection.

2.1 Family Farming in Brazil

According to Schneider (2009), there are four explanatory elements for understanding family-based forms of production in capitalist societies. The first element concerns the nature and use of labor. The workforce employed consists of family members, supplemented occasionally by temporary labor. The second element involves the obstacles imposed by nature, which prevent family farming from developing economies of scale and thus operating like an industrial enterprise. As a third element, the author notes that social theory tends to prioritize macro-social and economic perspectives, often overlooking the capacity of family-based units to adapt to and interact with their social and economic environments. Finally, he highlights kinship and inheritance relations as central elements defining the nature of these agricultural units.

The term “family farming” gained widespread recognition largely due to the development of a federal policy aimed at modernizing agricultural units in Brazil. A key milestone in public sector efforts to stimulate family farming production in the country was Decree No. 1,946 of June 28, 1996 (Brasil, 1996), which established the National Program for Strengthening Family Farming (PRONAF) based on the following guidelines: 1) improving the quality of life within the family farming sector by promoting sustainable rural development, increasing productive capacity, and creating new employment and income opportunities; 2) enhancing the technologies



used by encouraging research, development, and the dissemination of techniques suited to family farming, with the aim of increasing agricultural labor productivity and ensuring environmental protection; and 3) fostering the professional development of family farmers by introducing them to new technological and managerial standards.

Federal Law Nº 11,326 of July 24, 2006, established the National Policy on Family Farming. Under this law, to be classified as a family farming enterprise, the operation must meet specific requirements, notably: a) not exceeding an area of four fiscal modules; b) predominantly utilize family labor in the economic activities of the establishment or enterprise; c) derive family income predominantly from economic activities linked to the establishment or enterprise itself; and d) manage the establishment or enterprise jointly with their family (Brasil, 2006).

Guilhoto et al. (2011) state that the Southern region possesses distinct characteristics that are crucial to the success of rural family farms. Factors inherent to the colonization process and the cultural heritage of European groups enabled producers to develop forms of association, thereby allowing small production units to compete with larger farms that benefit from economies of scale. Despite the importance of family farming, the sector still faces many challenges, particularly regarding the marketing of its products.

2.2 Family farming in PNAE procurement in *Rio Grande do Sul*

According to data from the 2017 Census of Agriculture, Rio Grande do Sul had 293.9 thousand establishments classified as family farms, representing 80.5% of all rural establishments. These establishments occupy only 25.3% of the total land area dedicated to agriculture and livestock but provide employment for 72% of the state's rural workforce, highlighting a significant concentration within the agrarian structure (IBGE, 2019).

By entering the market and establishing conditions for the socioeconomic reproduction of their members, family farming has the potential to strengthen both the social and productive fabric of local development. Although they face obstacles and challenges in marketing their output, family farmers view market access as a key strategy for selling their products. Furthermore, the direct connection between producers and consumers fosters product reliability, serving as a distinguishing factor in the marketing of family farm products, and contributes to the preservation of regional culture (Schneider; Escher, 2011).

Corrêa et al. (2019) analyzed the profile of these product acquisitions in municipalities across Rio Grande do Sul in 2014. The authors found that, by that year, almost all municipalities were already directly purchasing from family farms for the PNAE, and 86% had met the required minimum percentage; nutritionists and farmers' collective organizations acted as the primary

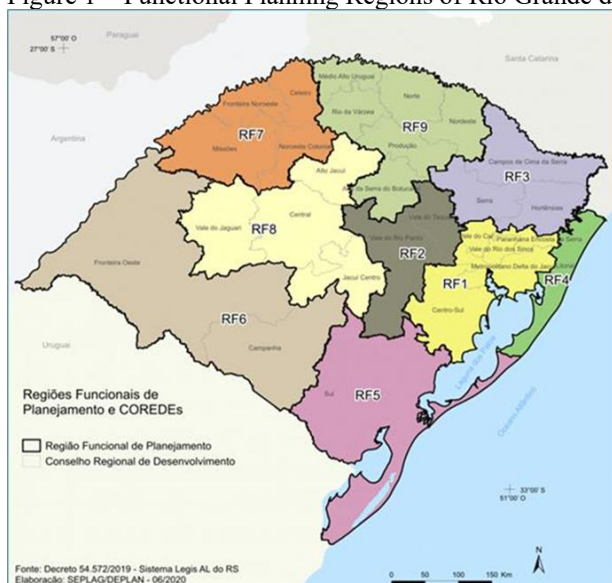
coordinators of this process. A wide variety of foods were purchased, particularly from the "vegetables and greens," "cereals, breads, pasta, and tubers," and "fruits" groups, with the majority consisting of fresh, unprocessed products.

In addition to research studies, data available from the National Fund for Educational Development (FNDE) also demonstrates the positive participation of the state of *Rio Grande do Sul* in purchasing food from family farms. Data on the relative share (in percentage terms) of family farming in the state of *Rio Grande do Sul* between 2016 and 2019 reveal that the state is effectively meeting the percentage established by legislation. Furthermore, a progressive year-on-year increase is evident; this may indicate both the interest of implementing agencies in procuring these products and the capacity of family farmers to organize and meet this demand as the policy becomes consolidated.

3 Methodological procedures

The research underlying this article is grounded in quantitative data regarding family farming and the potential consumption of school meals. In terms of objectives, the research is descriptive in nature. Data compilation initially involved a bibliographic and documentary review, based on the analysis of ordinances and existing legislation concerning the PNAE (National School Feeding Program). The territory providing the geographic and functional framework for the study, which analyzes the relationship between family farming production and the institutional market for school meals, comprises the nine Functional Planning Regions (RFs) of the State of Rio Grande do Sul (Figure 1).

Figure 1 – Functional Planning Regions of Rio Grande do Sul



Source: Secretariat of Planning, Governance, and Management (2020).



The number of students enrolled in the public school system was also categorized by functional regions to estimate the number of potential consumers of school meals. Data were collected from the PNAE website, the Census of Agriculture, the IBGE, and the FNDE. A review of the literature highlights the importance of examining the entities that formulated the program, the actors most directly involved in its local implementation, and the program's beneficiaries.

To estimate the demand for school meals based on student enrollment, the study utilized the daily per capita consumption standard for each food item produced by family farming (AF), calculated using suggested menus based on nutritional requirements and reference values for energy, macronutrients, and micronutrients. Potential annual consumption was determined based on 22 days of consumption per month and 240 days per year. The menu models designed for part-time students meet at least 30% of daily energy and macronutrient requirements when two or more meals are provided.

4 Results

The results derived from data on family farming production in the state of Rio Grande do Sul, as well as on school meal consumption within the state's public and philanthropic school networks, were analyzed and organized according to the nine Functional Regions (FRs) that make up the state. Analysis of the collected information yielded significant insights into the relationship between local production and school meals, providing a deeper understanding of the underlying dynamics, such as the percentage of food purchased from family farms relative to total food purchases for school meals across the nine FRs of Rio Grande do Sul between 2016 and 2019 (Table 1).

Table 1 - Relative share (%) of family farming in PNAE purchases, 2016–2019, across the 9 Functional Regions (RFs) of *Rio Grande do Sul*

RFs	Ano 2016	Ano 2017	Ano 2018	Ano 2019
RF1	40,18	48,9	57,0	64,6
RF2	42,4	49,1	53,2	61,5
RF3	41,8	59,7	59,7	65,1
RF4	30,4	39,1	53,1	62,3
RF5	33,7	41,4	56,0	50,6
RF6	17,9	25,6	39,2	30,7
RF7	39,3	45,6	47,5	63,2
RF8	43,1	52,4	53,6	65,0
RF9	49,0	55,8	65,0	77,0



MÉDIA RS	37,5	46,3	53,8	59,9
----------	------	------	------	------

Source: FNDE data (2016–2019).

The table showing the percentages of expenditure on food purchased from family farms between 2016 and 2019 demonstrates that most functional regions are successfully meeting the minimum percentage mandated by law. A gradual year-over-year increase is also evident; this may reflect both the purchasing interest of the implementing entities and the organizational efforts of farmers to supply this market, as they develop ways to integrate into the system while the policy becomes established.

The requirement to source a minimum of 30% does not preclude or prohibit the procurement of the entire food supply directly from family farmers via public calls. Indeed, the legislative amendments previously mentioned in this study appear to point in that direction. Restrictions or bans on processed and ultra-processed foods not only ensure a healthier menu for students but also favor direct purchasing from producers, given that a large portion of the menu must consist of fruits, vegetables, milk, grains, and meat.

4.1 Demand for school meals in the Functional Regions (RFs)

This subsection presents the demand for school meals within the public education system of the nine Functional Planning Regions (RFs) of the State of *Rio Grande do Sul*, regions formed by grouping the 28 *COREDES*. According to the 2021 School Census, the state of *Rio Grande do Sul* had 2,177,436 students enrolled in the public education system, spanning Early Childhood Education and Elementary Education, who were potential consumers of school meals (Table 2).

Table 2 - Number of students enrolled in the public education system in 2021

RFs	Alunos matriculados Infantil	Alunos matriculados Fundamental	Alunos matriculados Total
RF1	166.131	764.309	930.440
RF2	36.498	50.850	87.348
RF3	51.143	176.592	227.735
RF4	17.823	58.953	76.776
RF5	28.008	142.074	170.082
RF6	29.951	127.459	157.410
RF7	34.890	117.591	152.481
RF8	31.938	127.269	159.207
RF9	49.267	166.690	215.957
TOTAL	445.649	1.731.787	2.177.436

Source: Deed/Inep/MEC (2021)

In this regard, Functional Region 1 (RF1) warrants special mention because it groups



together municipalities with metropolitan characteristics; it concentrates the largest number of students and, consequently, generates high potential demand for food for school meals, accounting for over 42% of the state's total demand (Table 3). *Rio Grande do Sul* has received approximately 5% of national funds allocated for school meals, aimed at benefiting around 2.1 million students. These funds were divided into two portions: 39.7% allocated to the State Department of Education and 60.3% to municipal governments. According to available statistical data, the state department had not engaged in negotiations with family farms prior to 2013.

Data on agroindustrialized products indicates significant room for growth, even though the production of staple school meal items, such as rice, beans, and meat, is sufficient to meet the demands of the PNAE market. Conversely, regarding fresh animal-based products, the challenges related to formalization and delivery logistics, typically involving "point-to-point" distribution to schools while adhering to temperature standards (chilled or frozen), are immense. Therefore, the support and involvement of organizations like *EMATER* are essential to enable the commercialization of these products.

4.2 Production profile of family farming in *Rio Grande do Sul*'s Functional Regions (RFs)

In Functional Region 1 (RF1), family farming production is highly diversified, yet the production of vegetables and certain fruits stands out, specifically spinach, sweet potatoes, and cucumbers, which account for 74.4%, 55.8%, and 53.1% of the state's total production, respectively (Table 4). Furthermore, this region is responsible for 80% of the state's mandarin orange ("*bergamota*") production, almost all of which is concentrated in the municipality of Montenegro. It is worth noting that the nutritionists responsible for menu planning in the municipalities need to coordinate carefully when including this fruit, given its seasonality.

Conversely, family farming in RF1 shows very low production levels for certain foods used in school meals, such as meat, fruit, and milk, necessitating robust logistics to source a large portion of these requirements from other RFs. This creates a significant operational challenge and underscores the need for strong coordination among municipalities and implementing entities to ensure the success of the PNAE (National School Feeding Program) in RF1. Rural activities in RF1 are concentrated primarily in the *Centro-Sul COREDE* and the *Cai Valley*, yet they remain far from meeting the region's total demand.



Table 3 – Potential demand for food (in % and total physical volume) across the 9 Functional Regions (RFs)

CONSUMO Anual (ton/lt/un/dz)	RF1 (%)	RF2 (%)	RF3 (%)	RF4 (%)	RF5 (%)	RF6 (%)	RF7 (%)	RF8 (%)	RF9 (%)	TOTAL (%)	TOTAL ton/lt/un/dz
Abacaxi	37,3	8,2	11,5	4,0	6,3	6,7	7,8	7,2	11,1	100	17.826
Abobrinha	37,3	8,2	11,5	4,0	6,3	6,7	7,8	7,2	11,1	100	2.228
Açúcar mascavo	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	12.680
Aipim	40,3	6,2	11,1	2,9	7,1	7,0	7,5	7,3	10,6	100	43.646
Alface (un.)	41,1	5,7	11,0	2,6	7,3	7,1	7,4	7,3	10,5	100	8.684
Alho	42,7	4,6	10,8	2,0	7,7	7,3	7,2	7,4	10,2	100	8.591
Amido de milho	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	2.536
Arroz	43,2	4,3	10,7	1,8	7,9	7,3	7,2	7,4	10,2	100	203.409
Aveia	37,3	8,2	11,5	4,0	6,3	6,7	7,8	7,2	11,1	100	16.044
Banana	42,7	4,7	10,8	2,0	7,7	7,3	7,2	7,4	10,2	100	223.463
Batata	41,5	5,4	10,9	2,4	7,4	7,2	7,4	7,4	10,4	100	63.894
Batata doce	37,3	8,2	11,5	4,0	6,3	6,7	7,8	7,2	11,1	100	3.343
Bergamota	44,2	5,3	11,4	2,3	7,9	7,6	7,6	2,9	10,8	100	65.824
Beterraba	41,5	5,4	10,9	2,4	7,4	7,2	7,4	7,4	10,4	100	23.822
Biscoito	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	25.360
Bolinho de peixe	43,6	4,1	10,7	1,7	8,0	7,4	7,1	7,5	10,1	100	26.704
Brócolis	41,1	5,7	11,0	2,6	7,3	7,1	7,4	7,3	10,5	100	26.050
Café Solúvel	45,2	3,0	10,4	1,0	8,4	7,5	7,0	7,5	9,9	100	1.268
Carne gado	42,0	5,1	10,9	2,2	7,5	7,2	7,3	7,4	10,3	100	148.922
Carne suína	43,3	4,2	10,7	1,7	7,9	7,3	7,2	7,4	10,1	100	16.580
Cebola	43,3	4,3	10,7	1,8	7,9	7,3	7,2	7,4	10,2	100	98.454
Cenoura	43,4	4,2	10,7	1,7	7,9	7,4	7,1	7,4	10,1	100	82.628
Chuchu	42,8	4,6	10,8	2,0	7,8	7,3	7,2	7,4	10,2	100	27.376
Couve manteiga	41,8	5,2	10,9	2,3	7,5	7,2	7,3	7,4	10,4	100	25.935
Couve-flor	42,5	4,8	10,8	2,1	7,7	7,3	7,3	7,4	10,3	100	19.365
Ervilha	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	4.227
Espinafre	37,3	8,2	11,5	4,0	6,3	6,7	7,8	7,2	11,1	100	3.565
Extrato Tomate	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	30.432
Farinha de milho	43,6	4,1	10,7	1,7	8,0	7,4	7,1	7,5	10,1	100	26.704
Farinha mandioca	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	6.762
Feijão	41,6	5,4	10,9	2,4	7,4	7,2	7,4	7,4	10,4	100	116.878
Frango	42,2	5,0	10,8	2,2	7,6	7,2	7,3	7,4	10,3	100	142.237
Iogurte (litros)	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	63.400
Laranja	43,1	4,4	10,7	1,8	7,9	7,3	7,2	7,4	10,2	100	137.092
Leite em pó	39,2	6,9	11,2	3,3	6,8	6,9	7,6	7,3	10,8	100	191.329
Lentilha	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	8.453
Maçã	42,1	5,0	10,9	2,2	7,6	7,2	7,3	7,4	10,3	100	135.897
Mamão	37,3	8,2	11,5	4,0	6,3	6,7	7,8	7,2	11,1	100	53.478
Margarina	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	3.382
Massa	41,9	5,1	10,9	2,3	7,5	7,2	7,3	7,4	10,4	100	75.575
Melão	20,1	3,4	5,7	1,6	3,5	3,5	3,9	3,7	54,6	100	111.285
Moranga	42,6	4,7	10,8	2,0	7,7	7,3	7,2	7,4	10,2	100	60.486
Óleo (litros)	40,8	5,9	11,0	2,7	7,2	7,1	7,4	7,3	10,5	100	14.401
Ovos (dúzias)	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	19.037
Pão	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	63.400
Pepino	37,3	8,2	11,5	4,0	6,3	6,7	7,8	7,2	11,1	100	12.680
Pera	44,0	3,8	10,6	1,5	8,1	7,4	7,1	7,5	10,0	100	17.826
Pimentão	42,2	5,0	10,8	2,2	7,6	7,2	7,3	7,4	10,3	100	18.002
Repolho	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	23.706
Sal	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	11.412
Suco de Uva (litros)	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	105.667
Sucrilhos	45,2	3,0	10,4	1,1	8,4	7,5	7,0	7,5	9,9	100	33.813
Tempero Verde (un)	44,3	3,6	10,6	1,4	8,2	7,4	7,1	7,5	10,0	100	4.227
Tomate	44,5	3,6	10,6	1,0	8,2	7,5	7,1	7,5	10,0	100	107.355
Vagem	42,1	4,7	10,7	2,0	7,6	7,2	7,2	7,2	11,2	100	9.525
MÉDIA (%)	42,2	4,7	10,7	2,0	7,6	7,2	7,2	7,3	11,1	100	----

Fonte: Elaborado pelos autores, com base em (IBGE, 2023b) e FNDE (2023).

Source: Prepared by the authors based on IBGE (2023b) and FNDE (2023)



Data on agroindustrialized products indicates significant room for growth, even though the production of staple school meal items, such as rice, beans, and meat, is sufficient to meet the demands of the PNAE market. Conversely, regarding fresh animal-based products, the challenges related to formalization and delivery logistics, typically involving "point-to-point" distribution to schools while adhering to temperature standards (chilled or frozen), are immense. Therefore, the support and involvement of organizations like *EMATER* are essential to enable the commercialization of these products.

4.2 Production profile of family farming in *Rio Grande do Sul*'s Functional Regions (RFs)

In Functional Region 1 (RF1), family farming production is highly diversified, yet the production of vegetables and certain fruits stands out, specifically spinach, sweet potatoes, and cucumbers, which account for 74.4%, 55.8%, and 53.1% of the state's total production, respectively (Table 4). Furthermore, this region is responsible for 80% of the state's mandarin orange ("bergamota") production, almost all of which is concentrated in the municipality of Montenegro. It is worth noting that the nutritionists responsible for menu planning in the municipalities need to coordinate carefully when including this fruit, given its seasonality.

Conversely, family farming in RF1 shows very low production levels for certain foods used in school meals, such as meat, fruit, and milk, necessitating robust logistics to source a large portion of these requirements from other RFs. This creates a significant operational challenge and underscores the need for strong coordination among municipalities and implementing entities to ensure the success of the PNAE (National School Feeding Program) in RF1. Rural activities in RF1 are concentrated primarily in the *Centro-Sul COREDE* and the *Cai Valley*, yet they remain far from meeting the region's total demand.

In Functional Region 2 (RF2), family farming production is notable for chicken (33%), bread, "cucas" (streusel cakes), and cookies (22%), beef (27%), and pork (26%). This same region is responsible for producing nearly 100% of the cornmeal generated by family farming across the state.

In Functional Region 3 (RF3), comprising the *Serra* and *Campos de Cima da Serra* areas, family farming is a major, highly diversified food producer. It accounts for significant shares of the state's total output of tomatoes (73%), garlic (87%), bell peppers (55%), zucchini (52%), beets (65%), carrots (80%), chayote (68%), and green beans (65%) (Table 4). Fruit cultivation is also a highlight in RF3; the region is responsible for 99% and 100% of the state's apple and pear production, respectively, primarily in the municipalities of *Vacaria*, *Bom Jesus*, *Muitos Capões*,



and *Caxias do Sul*. These two fruits play a major role in school meals due to their high acceptance, ease of handling (as they can be eaten with the skin on), transport durability, long shelf life, and harvest seasons falling in February and March.

Many fruits produced in large quantities in the state of *Rio Grande do Sul* are not purchased for school meals because their harvest seasons coincide with school holidays, examples being watermelon and peach. Conversely, other fruits included in the proposed menu, such as melon and papaya, are not produced in sufficient quantities to meet total demand (Table 4). Therefore, it is crucial for the nutritionists responsible for menu planning to understand their region's production potential and adjust their choices to favor the inclusion of regional family farming products.

Functional Region 4 (RF4) geographically corresponds to the North Coast region; consequently, it exhibits unique characteristics regarding urban sprawl, a tourism-oriented economy, and environmental vulnerabilities. While this region has a permanent population of approximately 296,000 inhabitants, the number of people present can exceed one million during the summer months. Regarding local family farming output, RF4 accounts for 96% of the banana production and 93% of the pineapple production generated by the state's family farmers.

Functional Region 5 (RF5), located in the far south of the state, has a population of 843,000; local family farming accounts for 69% of the state's total family-farmed onion production. Meanwhile, Functional Region 6 (RF6), situated on the border with Uruguay and Argentina, does not represent a significant share of family farming presence or output due to the characteristics of its agrarian structure; nevertheless, it still accounts for 14% of the rice produced by the state's family farms (Table 4).

Although family-run agro-industries are a growing trend in rural Brazil, they face various challenges in establishing their markets, driven by the need to add greater value to agricultural produce, with informality being a primary obstacle. Studies conducted in *Rio Grande do Sul* indicate that over 70% of these initiatives operate informally, failing to comply with state regulations governing food production, distribution, and consumption (Gazolla; Schneider, 2017).

The defining characteristic of agro-industries lies in their ability to add value to, or multiply the value of agricultural production. This feature is particularly significant given the growing domestic and global demand for foods with varying degrees of processing. This is because processing products, even minimally, can extend their shelf life and facilitate transport between regions. Cassava is one product that offers significant potential for more effective exploitation within family farming for the PNAE (National School Feeding Program). This foodstuff has demonstrated high demand and productivity potential across various regions, as



evidenced by the 2017 Census of Agriculture, which showed that family farming accounted for 80% of the state's total production.

Table 4 - Relative production (%) and total annual physical food production of the 9 Functional Regions (FRs)

PRODUÇÃO anual	RF1 (%)	RF2 (%)	RF3 (%)	RF4 (%)	RF5 (%)	RF6 (%)	RF7 (%)	RF8 (%)	RF9 (%)	TOTAL (%)	TOTAL/ano (t/l/un/dz)
Espinafre	74,4	1,1	12,6	0,5	6,1	2,3	0,2	2,0	0,8	100	610
Ervilha (t.)	20,0	6,7	6,7	-	40,0	13,3	6,7	6,7	-	100	15
Tomate (t.)	4,4	0,3	73,5	2,0	6,9	0,4	0,7	3,7	8,1	100	22.351
Carne gado (t.)	2,2	27,9	6,7	-	1,6	0,6	49,2	10,7	1,1	100	16.466
Abacaxi (milfrut)	2,2	0,1	0,0	93,2	-	-	4,0	0,0	0,3	100	2.607
Alho (t.)	0,6	1,1	87,4	0,0	6,4	0,1	2,3	0,1	1,9	100	5.413
Bergamota (t.)	79,7	1,3	16,5	-	-	0,1	0,0	0,1	2,3	100	41.827
Batata doce (t.)	55,8	2,4	1,5	10,5	22,5	0,4	1,5	2,7	2,8	100	20.343
Pepino (t.)	53,1	9,2	15,5	3,7	7,8	0,3	3,3	1,5	5,7	100	4.951
Pimentão (t.)	36,5	1,6	55,8	1,6	2,5	0,5	0,5	0,0	0,9	100	2.372
Couve-flor (t.)	33,1	3,0	28,5	12,1	7,9	0,0	1,2	0,6	13,6	100	6.648
Alface (t.)	32,8	2,2	31,9	5,2	4,2	4,5	4,2	7,1	7,8	100	20.205
Abobrinha (t.)	29,0	2,0	52,1	5,5	2,1	1,4	1,0	0,9	5,9	100	1.322
Ovos (dz)	28,1	15,3	17,7	0,5	5,1	1,8	11,3	5,1	15,1	100	111.833
Laranja (t.)	26,8	16,5	17,0	0,3	0,3	-	0,5	0,1	38,5	100	45.222
Chuchu (t.)	25,2	1,7	68,1	0,1	0,9	-	1,5	0,3	2,2	100	934
Repolho (t.)	19,6	5,5	34,0	14,6	9,8	0,1	3,5	4,1	8,8	100	20.514
Arroz (t.)	15,6	8,1	0,0	11,6	11,2	14,2	0,3	39,0	0,0	100	442.043
Alpim (t.)	14,5	20,2	1,0	2,6	0,4	1,4	34,1	11,3	14,6	100	332.056
Frango (t.)	14,2	33,3	25,3	0,0	0,0	0,0	1,0	0,4	25,8	100	538.902
Batata (t.)	12,7	2,3	30,0	0,0	8,3	0,2	1,0	2,1	43,4	100	41.049
Cenoura (t.)	11,2	0,6	80,0	0,2	1,1	1,3	1,7	0,4	3,5	100	5.523
Pães Cucas e Biscoito	10,6	22,7	19,5	-	1,7	0,2	19,6	5,8	19,9	100	12.792
Brócolis (t.)	10,4	0,8	34,8	7,8	6,4	0,9	0,7	1,0	37,2	100	14.060
Feijão de cor (t.)	10,2	21,6	23,5	0,5	2,6	1,9	15,2	8,5	16,1	100	422
Beterraba (t.)	9,4	6,5	65,4	4,0	4,6	1,0	1,7	3,2	4,2	100	4.745
Feijão preto (t.)	8,1	15,8	5,4	1,9	8,8	1,1	5,6	12,8	40,5	100	27.425
Suco-Frut(mil l.)	7,6	20,5	17,0	-	1,4	0,1	23,3	5,8	24,4	100	3.418
Carne suína (t.)	2,5	26,0	4,1	-	1,9	0,1	29,8	8,8	26,7	100	15.771
Banana (t.)	2,1	0,4	0,3	95,6	-	-	-	1,6	-	100	23.599
Leite de vaca (l.)	1,8	12,3	8,6	0,1	3,0	2,2	30,2	7,7	34,0	100	3.225.932
Cebola (t.)	0,9	0,8	16,8	0,7	68,9	0,2	0,4	0,2	11,1	100	56.873
Aveia (t.)	0,0	0,6	0,3	-	0,1	0,2	41,2	19,5	38,1	100	114.181
Farinha milho (t.)	-	99,5	-	0,5	-	-	-	-	-	100	188
Maçã (t.)	-	0,8	99,0	-	-	-	-	-	0,2	100	28.106
Pera (t.)	-	-	100	-	-	-	-	-	-	100	1.984
Couve-mant.(un.)	37,4	3,3	20,6	1,2	20,1	9,8	0,7	4,5	2,5	100	5.238
Salsa (unidade)	27,0	2,7	27,0	3,4	8,8	13,7	4,4	6,8	6,3	100	2.055
Vagem (t.)	19,8	2,8	65,4	3,6	3,2	0,2	0,2	2,6	2,4	100	1.230
Moranga (t.)	7,8	16,5	9,8	1,9	24,2	2,9	14,0	4,0	18,8	100	32.460
Açúcar mascavo	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Amido de milho	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Bolinho de peixe	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Café Solúvel	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Extrato Tomate	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Farinha-mand.(t.)	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Iogurte (litros)	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Lentilha (t.)	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Mamão (t.)	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Margarina	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Massa	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Melão (t.)	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Óleo (litros)	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Pão (está junto com	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Sal	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Sucrilhos	0	0	0	0	0	0	0	0	0	A.F. do RS não	
Média (%)	18,7	10,4	29,5	7,1	7,5	1,9	7,9	4,8	12,1	100	5.253.685

Fonte: Elaborado pelos autores, com base em (IBGE, 2023b) e FNDE (2023).
Em vermelho são os alimentos não produzidos pela Agricultura Familiar do RS

Source: Prepared by the authors based on IBGE (2023b) and FNDE (2023)

Another item with untapped potential is fish, a nutritionally vital food, especially for children, due to its status as a source of omega-3. This essential fatty acid plays a fundamental role in the development of the child's nervous system. Widely disseminated scientific studies highlight



that omega-3 is crucial for facilitating learning processes and mental activity in children, yielding positive effects that support both physical and intellectual development during childhood.

Law 11.947/2009 has served as a model for other countries by combining the goals of increasing family farmers' income, stimulating regional development, and improving local public health through school feeding programs (Brasil, 2009). Resolution CD/FNDE No. 6/2020, which introduces changes favoring the procurement of fresh or minimally processed foods, serves as a tool for a policy aimed at enhancing the quality of school meals.

6 Final Considerations

In *Rio Grande do Sul*, family farming holds particular historical significance due to the way the territory was settled, primarily through European immigration. Public policies such as the National School Feeding Program (PNAE) emerge as a highly advantageous option for the productive inclusion and income growth of this socioeconomic group. These policies have significant repercussions for local development, fostered by the interactions between rural and urban areas, dynamics exemplified by the PNAE.

The link between the National School Feeding Program (PNAE) and family farming is established when products are sold to schools. For this process to be effective, coordination and mutual understanding among the various stakeholders involved are required. It is evident that the success of such public policies is intrinsically linked to meaningful collaboration among stakeholders, which is essential to ensure the program's successful implementation.

The data used in this study highlights the positive contribution of schools in *Rio Grande do Sul* regarding the procurement of food from family farms. This practice has been effectively carried out within the limits established by law. A steady year-over-year growth is also evident, indicating rising interest among the responsible entities in purchasing these products. This also underscores the ability of family farmers to organize themselves and meet this demand as the policy gains strength.

When this study was initially conceived, the aim was to understand the scope of the two main territorial variables that make up the National School Feeding Program (PNAE). Upon completing this research, which sought to identify the current state of family farming production in each of the state's functional regions (RFs) and compare it with the potential for school meal consumption in those same regions, several observations can be made.

For rural areas, it is important to promote development initiatives aimed not only at increasing the volume and diversity of crops to meet the needs of municipal schools but also at strengthening state agriculture by enabling farmers to access markets and relevant public policies.



Furthermore, encouraging farmers to form cooperatives allows them to improve their operations and act in a more structured and competitive manner.

It is also essential to actively promote the diversification of agricultural activities, training farmers to professionalize their production and process their goods in order to reach new markets. Although the program encourages the procurement of fresh, unprocessed produce, there is clearly significant demand for minimally processed and processed foods. This demand is driven by consumer acceptance, logistical considerations, ease of preparation, and extended shelf life. However, this is a slow process that faces obstacles rooted in the culture and traditional practices of the producers.

From the perspective of the implementing agencies, planning must be tailored to the specific realities of family farming. This entails taking product seasonality into account and ensuring fair pricing for food items. Additionally, fostering effective dialogue among all stakeholders is crucial, as is creating initiatives to encourage the production of crops not currently grown in the municipality, or items that, if processed, could be incorporated into menus designed by nutritionists.

It was found that greater coordination is needed between municipal PNAE managers and the program's stakeholders, such as extension agents, family farmers, and their representative organizations to identify regional products for inclusion in municipal school meals. Strengthening partnerships with organizations capable of supporting family farmers, expanding municipal inspection services, and recognizing Technical Assistance and Rural Extension services (such as *EMATER*) are also key aspects that warrant consideration. Improving communication with farmers to boost their participation in the program is recommended; this could be achieved through broader outreach efforts, such as announcements on local radio stations and engagement with representative bodies as well as by providing guidance on regional public calls for proposals.

Furthermore, it is important to note that the institutional market created by the National School Feeding Program (PNAE) represents just one of several commercialization options for family farming produce. While there are various markets and rural spaces where family farmers can seek productive inclusion, few facilitate their genuine socioeconomic reproduction, autonomy, and empowerment. The PNAE has proven to be a market that fosters such progress and deserves recognition for its significance.

Despite the study's limitations, it is hoped that this work will contribute to the advancement of the PNAE and family farming in the state of Rio Grande do Sul. Recognizing the opportunity for family farmers to participate in the institutional school-feeding market and understanding that executing agencies can significantly increase their investment in family farming, can help guide the allocation of new resources and the formulation of public policies



tailored to this specific sector.

Finally, the results highlight the growth potential of the institutional market for family farming. It became evident that family farmers have a significant opportunity to expand production and meet the institutional market demand established by the PNAE, particularly regarding agro-industrialized products. Furthermore, it was found that municipal and state implementing agencies need to direct their school meal procurement toward local family farmers, as these producers are generally capable of meeting the potential demand for school meals.

References

- BACCARIN, José Giacomo et al. Indicadores de avaliação das compras da agricultura familiar para alimentação escolar no Paraná, Santa Catarina e São Paulo. **Revista de Economia e Sociologia Rural**, v. 55, p. 103-122, 2017.
- BRASIL. **Decreto nº 1.946, de 28 de junho de 1996**. Cria o Programa Nacional de Fortalecimento da Agricultura Familiar - PRONAF, e dá outras providências. Diário Oficial da União, 1996.
- BRASIL. **Medida Provisória nº 1784, de 14 de dezembro de 1998**. Dispõe sobre o repasse de recursos financeiros do Programa Nacional de Alimentação Escolar, institui o Programa Dinheiro Direto na Escola, e dá outras providências.
- BRASIL. **Ministério da Educação**. Fundo Nacional de Desenvolvimento da Educação. Resolução no 38 de 16 de julho de 2009. Dispõe sobre o atendimento da alimentação escolar aos alunos da educação básica no Programa Nacional de Alimentação Escolar (PNAE). Diário Oficial da União, 2009.
- BRASIL. **Ministério da Educação**. Fundo Nacional de Desenvolvimento da Educação. Resolução nº 6, de 8 de maio de 2020. Dispõe sobre o atendimento da alimentação escolar aos alunos da educação básica no âmbito do Programa Nacional de Alimentação Escolar (PNAE). Diário Oficial da União, 2020.
- BRASIL. **Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira - Inep**. Disponível em: <https://inepdata.inep.gov.br/analytics/saw.dll?Dashboard&PortalPath=%2Fshared%2FIntegra%C3%A7%C3%A3o%20-%20Consulta%20Matr%C3%ADcula%2F_portal%2FConsulta%20Matr%C3%ADcula&Page=Consolidado%20P%C3%ABlico>. Acesso em: 10 jul. 2023.
- CORRÊA, R. S. et al. Family farming and school meals in Rio Grande do Sul. **Revista Ciência Rural**, v. 49, n. 2, 2019.
- FAO - FOOD AND AGRICULTURAL ORGANIZATION. **Alimentación escolar y las posibilidades de compra directa de la agricultura familiar**: estudio de caso de ocho países. Programa de Cooperación Internacional Brasil-FAO. Brasília: Representação da FAO, 2013.
- FERIGOLLO, D. et al. Aquisição de produtos da Agricultura Familiar para a Alimentação Escolar em municípios do Rio Grande do Sul. **Revista de Saúde Pública**, v. 51, n. 6, p. 1- 10, 2017. Disponível em: <http://www.scielo.br/pdf/rsp/v51/pt_0034-8910-rsp-S1518-87872017051006648.pdf>. Acesso em: 12 ago. 2022.
- FNDE - FUNDO NACIONAL DE DESENVOLVIMENTO DA EDUCAÇÃO. **Informações**. Disponível em: <<https://www.gov.br/fnde/pt-br/aceso-a-informacao/acoes-e-programas/programas/pnae#:~:text=O%20repasse%20dos%20recursos%20federais,ou%20por%20elas%20mantidas%2C%20nas>>. Acesso em: 20 ago. 2023.
- GAZOLLA; Marcio; SCHNEIDER, Sergio. **Cadeias curtas e redes agroalimentares alternativas**: negócios e mercados da agricultura familiar. Porto Alegre: UFRGS, 2017.
- GRISA, Catia; ELIAS, Lilian de Pellegrini; THIES, Vanderlei Franck. Partidos políticos e participação da agricultura familiar na alimentação escolar: análise nos municípios do Rio Grande do Sul e de Santa Catarina. **Sociedade e**



Estado, v. 35, p. 605-630, 2020.

GUILHOTO, Joaquim et al. **PIB da agricultura familiar**: Brasil-Estados. Available at SSRN 1803225, 2011.

IBGE - INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. **Censo Agropecuário 2017**. Disponível em:

<https://censoagro2017.ibge.gov.br/templates/censo_agro/resultadosagro/index.html>. Acesso em: 15 ago. 2023.

PANZUTTI, Nilce; MONTEIRO, Ana Victoria. Agricultura familiar e políticas públicas. **Cadernos Ceru**, v. 25, n. 2, p. 131-145, 2014.

SCHNEIDER, Sérgio. **A diversidade da agricultura**. 2. ed. Porto Alegre: UFRGS, 2009.

SECRETARIA DE PLANEJAMENTO, GOVERNANÇA E GESTÃO. **Alterações dos Coredes**. 2020. Disponível em: <https://atlassocioeconomico.rs.gov.br/conselhos-regionais-de-desenvolvimento-coredes>>. Acesso em: 14 jul. 2023.

TRICHES, R. M.; SCHNEIDER, S.. Alimentação escolar e agricultura familiar: reconectando o consumo à produção. **Saúde e Sociedade**, v. 19, n. 4, p. 933–945, out. 2010.

TRICHES, R. M; et al. Condicionantes e limitantes na aquisição de produtos da agricultura familiar pelo Programa de Alimentação Escolar no estado do Paraná. **Redes**, v. 24, n. 1, p. 118-137, 2019.