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ORIGINAL

School feeding in Federal Institutes: characterization and analysis of food acquisitions from family farming

Alimentação escolar nos Institutos Federais: caracterização e análise das aquisições de alimentos da agricultura familiar

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ABSTRACT

Objective

The Federal Institutes of Education, Science, and Technology provide Basic Education and, thus, must execute the National School Feeding Program. The study aimed to characterize school feeding in these institutes, focusing on the purchase of food from family farming.

Methods

Cross-sectional study with Brazilian Federal Institutes that offer Basic Education courses. The characteristics of purchases from family farming in 2019 were analyzed, as well as the type of management of the school food service, the presence of a nutritionist in the unit acting as technical manager, and the presence of a canteen. Pearson's chi-square test was used to analyze the association between the variables, adopting a statistical significance level of 5%.

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Results

A total of 171 campuses, distributed in the five Brazilian regions, participated in the study. Among the participants in the survey, 35.1% did not offer any type of food to their students. The percentage of Federal Institutes that carried out acquisitions from family farming was 48%. The presence of a nutritionist was verified in 33.9% of the campuses and associated with food purchases from family farming. The type of food service management was shown to be related to the diversity of the purchases and the main categories of purchased foods.

Conclusion

The results demonstrate the importance of monitoring the school feeding policy at the federal level, being possible to characterize the school feeding in the Federal Institutes, also showing that more than half of the sample did not make purchases from family farming.

Keywords: Family farming. Federal institutes. Food and nutrition programs and policies. School feeding.

RESUMO

Objetivo

Os Institutos Federais de Educação, Ciência e Tecnologia ofertam Ensino Básico, e, assim, devem executar o Programa Nacional de Alimentação Escolar. O objetivo do estudo foi caracterizar a alimentação escolar nos Institutos Federais, com enfoque na aquisição de alimentos da agricultura familiar.

Métodos

Estudo transversal com Institutos Federais de todo o Brasil que ofertam cursos do Ensino Básico. Foram analisadas as características das compras realizadas da agricultura familiar, o tipo de gestão do serviço de alimentação escolar, a presença de nutricionista na unidade atuando como responsável técnico e a existência de cantina. Para a análise da associação entre as variáveis, utilizou-se o teste qui-quadrado de Pearson, adotando nível de significância estatística de 5%.

Resultados

Participaram do estudo 171 campi, distribuídos nas cinco regiões brasileiras. Entre os participantes da pesquisa, 35,1% não ofertavam qualquer tipo de alimentação aos seus estudantes. O percentual de Institutos Federais que realizaram aquisições da agricultura familiar foi de 48%. A presença de nutricionista foi verificada em 33,9% dos campi e mostrou associação com a compra de alimentos da agricultura familiar, enquanto o tipo de gestão do serviço de alimentação mostrou relação com a diversidade da aquisição, bem como com as principais categorias de alimentos adquiridos.

Conclusão

Os resultados demonstram a importância do acompanhamento da política de alimentação escolar na esfera federal, sendo possível caracterizar a alimentação escolar nos Institutos Federais, além de evidenciar que mais da metade da amostra não realizou aquisições da agricultura familiar.

Palavras-chave: *Agricultura familiar. Institutos federais. Programas e políticas de alimentação e nutrição. Alimentação escolar.*

INTRODUCTION

The *Programa Nacional de Alimentação Escolar* (PNAE, Brazilian National School Feeding Program) is known worldwide for offering food and providing integral assistance to students in Basic Education, a modality that includes elementary and high school, as well as technical programs and Youth and Adult Education (YAE) in Brazil [1,2]. In 2009, the program included all the public schools in Basic Education. Since then, educational institutions have been adapting to the legislation that operates the policy [3]. More than just providing students with healthy food, PNAE targets local social and economic development by strengthening Family Farming (FF). In this sense, 30% of the budget granted by the *Fundo Nacional de Desenvolvimento da Educação* (FNDE, National Education Development Fund) must be employed in products from family farming [4].

Offering high-school-level technical programs, which can be integrated, concomitant or subsequent with high school, and Youth and Adult Education (YAE), the *Instituto Federal de Educação, Ciências e Tecnologia* (IF, Federal Institutes of Education, Science, and Technology) network is obliged to execute PNAE [5]. The IF were created in 2008 and expanded in 2011, currently counting 661 campuses which are part of 38 Dean's Offices in Brazil. In their initial expansion stage, new units were implemented in metropolitan peripheral locations and countryside municipalities distant from urban centers. Only 48 campuses or innovation poles are in capital cities, characterizing the institution's high coverage and decentralization, and its focus on regional development [6,7].

In 2019, IF assisted 254,837 students in Basic Education [8]. Nevertheless, studies evidence that PNAE's execution in federal institutions is not similar to that of states and municipalities. An important difference is that IF are educational autarchies with administrative, patrimonial, financial, didactic-pedagogical, and disciplinary autonomy, which is not the case in cities' executing organs, managed by municipal executive branches of government, or in states, by secretaries of education [9,10]. Moreover, while states and cities are obligated to install the *Conselho de Alimentação Escolar* (School Meals Council) for controlling the program's execution, in IF, this work is led by FNDE itself, the *Tribunal de Contas da União* (Court of Auditors), *Controladoria Geral da União* (Comptroller General), and *Ministério Público* (Public Prosecutor's Office). Finally, funds attributed to IF happen in a single tranche, while cities and states receive monthly transferences [11]. The IF funds that are not spent cannot be reprogrammed for the next civil year, they have to be returned to the Dean's Office (executing entity) and then transferred back to the Union [12].

PNAE-related food acquisition in cities and states has a relevant presence of family farming, providing diversified food items, mostly *in natura* and minimally-processed [13,14]. However, despite their importance and the number of high-school students in IF, information related to the acquisition and provision of foods in these institutes is still missing from the scientific literature. Given the specific characteristics of PNAE's management in IF and the need for regular monitoring of public policy, the present study seeks to characterize school feeding in these institutions, focusing on the acquisition of items from FF. Given the limited information available, the work contributes to characterizing PNAE's execution and limitations in IF, improving the program's direction and effectiveness.

METHODS

This is a cross-sectional study conducted with managers of feeding programs in Brazilian IF campuses. We started in March and April 2020, cataloging the number of units of IF in the Federal Education, Science, and Technology Network by region, which had Basic Education courses, including high-school integrated technical programs, concomitant and subsequent courses, and YAE. According to the Network and IF' websites, 582 campuses with courses on Basic Education existed in that period, distributed into 38 IF in all Brazilian states. For the sample calculation, we considered a 5% error and 95% confidence interval, as well as a heterogenous population. Thus, the necessary sample accounted for 174 campuses. The sample was drawn with a simple random sampling methodology and was proportional to the number of campuses in each region of the country.

The data collection took place between August 2020 and March 2021 using an online questionnaire. It included managers of feeding programs of IF from all Brazilian regions which had the provision of Basic Education. To compose the list of responsible/directors of each unit, we used the information available on each institution's website. The reference year chosen was 2019 because, in 2020, IF had only remote classes, altering the food offer.

A structured questionnaire with a majority of closed questions was used to: (1) characterize the purchases of family farming items in 2019 and the food service's type of management; (2) check the presence of a nutritionist in the unit, as well as a structure for preparing food and eating; and (3) identify the people responsible for elaborating menus. Questionnaires were directed to the managers of feeding programs – nutritionists or, in the absence of one, the person responsible for the execution of programs.

The data were collected with an electronic questionnaire. The invitation to participate was sent to the unit's director, who was asked to forward the invitation to the campus manager of the program. Even when the management was conducted by an outsourced service provider, the questionnaire had to be responded to by one of the institution's workers, not someone from the outsourcer company. After the acceptance to participate, the questionnaire was forwarded to those responsible for the execution of feeding programs in the institution.

The most important variable in the study was the acquisition of food from FF for the execution of PNAE in IF (characterized as "yes" or "no") and which items were purchased. For the collection of the food items, we used a structured question on the type of items acquired from FF, with the following categories: fruit *in natura*; minimally processed fruit (chopped, washed, or available in individual packages); vegetables *in natura*; minimally-processed vegetables (chopped, washed, available in individual packages); bread; cookies and biscuits; fruit pulps; juice; animal protein (beef, pork, poultry, fish, eggs); legumes (beans, lentils, chickpeas); milk and dairy (milk, cheese, yogurt, dairy drinks); herbs and spices; flours (wheat, cornmeal, cassava, maize); rice; sugar; jellies, stewed fruit, or jam; others. We also investigated the following variables: the presence of a nutritionist, the offer of food, the presence of a canteen, and the type of restaurant management in each IF.

A descriptive analysis was performed, followed by an assessment of the association between dependent variables (presence of a nutritionist, presence of canteen, type of management) and categorical independent variables for which we used Pearson's chi-square aided by the program Statistica (version 13.5.0.17), adopting a 5% significance level ($p<0.05$).

The project was submitted and approved by the Ethics Committee of the *Universidade Federal de São Paulo* (Federal University of São Paulo) on June 18, 2020, under opinion nº 4.095.883 (CAAE: 30182420.8.0000.5505). Only managers who agreed to participate in the research and signed an Informed and Free Consent Form at the beginning of the questionnaire were included.

RESULTS

A total of 171 campuses distributed in five Brazilian regions participated in the study, maintaining the proportion of IF in the Brazilian territory. The losses were due to the refusal to participate or lack of response within the established deadline for data collection. Among the participating units, 35.1% did not provide any food to their students. Almost half of the institutions that offered food employed nutritionists (Table 1).

Among the selected campuses, 82 (42%) reported purchasing FF items in 2019. Most of these were in the Southern region (54.8%). The region with the smallest representation of family farming items was the Mid-West (Table 1). Of the total campuses that responded to the question regarding the budget employment in FF purchase (n=74), 62 informed spending 30% or more of the PNAE resources in FF, with 31 affirming that they used 100% of the resources in this type of acquisition (data not included in the table).

Table 1 – General description of the sample. *São Paulo* (SP), Brazil, 2021.

Variables	North		Northeast		Mid-West		South		Southeast		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Number of campuses	22	12.9	58	33.9	19	11.1	31	18.1	41	24.0	171	100
Nutritionist												
Yes	6	27.3	30	51.7	2	10.5	8	25.8	12	29.3	58	33.9
No	9	40.9	10	17.2	3	15.8	13	41.9	17	41.4	52	30.4
Did not respond	7	31.8	18	31.0	14	73.7	10	32.3	12	29.3	61	35.7
Food offer												
Yes	15	68.2	40	69.0	6	31.6	21	67.7	29	70.7	111	64.9
No	7	31.8	18	31.0	13	68.4	10	32.3	12	29.3	60	35.1
Place where students have their meals												
Cafeteria	12	54.5	28	48.3	3	15.8	11	35.5	20	48.7	74	43.3
Center of Conviviality	2	9.1	5	8.6	2	10.5	4	12.9	2	4.9	15	8.8
Patio	1	4.6	2	3.5	1	5.3	2	6.5	4	9.8	10	5.8
Classroom	0	0.0	0	0.0	0	0.0	1	3.2	2	4.9	3	1.8
Common areas	0	0.0	2	3.5	0	0.0	1	3.2	0	0.0	3	1.8
Adapted indoor space	0	0.0	1	1.7	0	0.0	2	6.5	1	2.4	4	2.3
Did not respond	7	31.8	20	34.5	13	68.4	10	32.2	12	29.3	62	36.2
Professional elaborating the menu												
Nutritionist	13	59.1	38	65.5	6	31.6	19	61.3	24	58.5	100	58.5
Other	2	9.1	2	3.5	0	0.0	1	3.2	4	9.8	9	5.3
Did not respond	7	31.8	18	31.0	13	68.4	11	35.5	13	31.7	62	36.0
Canteen												
Yes	12	54.5	38	65.5	13	68.4	19	61.3	30	73.2	112	65.5
No	10	45.5	20	34.5	6	31.6	12	38.7	11	26.8	59	34.5
Type of management												
Self-managed	3	13.6	5	8.6	2	10.5	10	32.2	9	21.9	29	16.9
Self-managed with outsourced service	7	31.8	25	43.1	3	15.8	7	22.6	10	24.4	52	30.4
Outsourced service	5	22.7	10	17.2	1	5.3	4	12.9	10	24.4	30	17.5
Did not respond	7	31.8	18	31.0	13	68.4	10	32.2	12	29.3	60	35.1
FF Acquisition 2019												
Yes	11	50.0	26	44.8	6	31.6	17	54.8	22	53.7	82	48.0
No	11	50.0	32	55.2	13	68.4	14	45.2	19	46.3	89	52.0

Note: FF: Family Farming.

Table 2 shows the categories of food acquired from FF in 2019, as well as the purchases per region. The Northeast was the region that most acquired fruit *in natura* and vegetables, and the South presented the larger acquisition of cookies, biscuits, juice, and bread.

The acquisition of food from FF and the type of products purchased were related to the presence or absence of a nutritionist on campuses (Table 3). Table 3 shows the most acquired food categories and highlights that the items that need to be prepared before consumption, such as vegetables *in natura* and animal proteins, are significantly less present ($p<0.05$) in units without a nutritionist. The presence of a professional responsible for food, a canteen on campus, and the school restaurant's type of management are also related to the purchase and use of food categories coming from FF, as presented in Tables 4 and 5, respectively.

In units with a canteen, the acquisition of products from family farming is larger, as is the frequency and use of different types of foods. Table 4 shows that buying fruit *in natura*, cookies and biscuits, and milk

Table 2 – Food acquired from family farming in campuses in 2019, by region. *São Paulo* (SP), Brazil, 2021.

Variables	North		Northeast		Mid-West		South		Southeast		Brazil	
	n[a]	%	n[b]	%	n[c]	%	n[d]	%	n[e]	%	n[f]	%
Fruit *in natura*	11	100.0	21	80.8	3	50.0	16	94.1	17	77.3	68	82.9
Cookies and biscuits	1	9.1	8	30.8	3	50.0	14	82.4	7	31.8	33	40.2
Vegetables *in natura*	7	63.6	12	46.2	1	16.7	4	23.5	6	27.3	30	36.6
Juice	1	9.1	6	23.1	1	16.7	10	58.8	10	45.5	28	34.1
Bread	2	18.2	4	15.4	3	50.0	7	41.2	4	18.2	20	24.4
Milk and dairy	1	9.1	6	23.1	1	16.7	2	11.8	0	0.0	16	19.5
Fruit pulp	4	36.4	9	34.6	2	33.3	0	0.0	1	4.5	16	19.5
Animal protein	3	27.3	7	26.9	0	0.0	3	17.6	0	0.0	13	15.9
Cakes	1	9.1	8	30.8	0	0.0	2	11.8	1	4.5	12	14.6
Legumes	3	27.3	1	3.8	0	0.0	3	17.6	4	18.2	11	13.4
Flour	3	27.3	1	3.8	0	0.0	3	17.6	1	4.5	8	9.8
Jelly, stewed fruit, or jam	0	0.0	2	7.7	2	33.3	1	5.9	3	13.6	8	9.8
Others	0	0.0	4	15.4	0	0.0	1	5.9	2	9.1	7	8.5
MP fruit	1	9.1	1	3.8	1	16.7	1	5.9	1	4.5	5	6.1
Herbs and spices	0	0.0	2	7.7	0	0.0	0	0.0	2	9.1	4	4.9
Cereal bars	0	0.0	0	0.0	0	0.0	2	11.8	1	4.5	3	3.7
Tapioca	1	9.1	2	7.7	0	0.0	0	0.0	0	0.0	3	3.7
MP vegetables	0	0.0	0	0.0	1	16.7	1	5.9	0	0.0	2	2.4
Rice	0	0.0	0	0.0	0	0.0	2	11.8	0	0.0	2	2.4
Sugar	1	9.1	0	0.0	0	0.0	1	5.9	0	0.0	2	2.4
Roots and tubers	1	9.1	1	3.8	0	0.0	0	0.0	0	0.0	2	2.4
Nuts	0	0.0	1	3.8	1	16.7	0	0.0	0	0.0	2	2.4
Honey	0	0.0	0	0.0	0	0.0	0	0.0	2	9.1	2	2.4

Note: [a]n=11; [b]n=26; [c]n=6; dn=17; [e]n=22; fn=82. Percentages calculated by region. MP: Minimally-Processed.

Table 3 – Food acquisition and most acquired items from family farming in the Federal Institutes campuses in 2009, according to the presence or absence of a nutritionist. *São Paulo* (SP), Brazil, 2021.

Variables	Present nutritionist		Absent nutritionist		Total		p^*
	n[a]	%	n[b]	%	n[c]	%	
Family farming acquisition 2019							
Yes	45	77.6	34.0	65.4	80	72.7	<0.001
No	13	22.4	18.0	34.6	30	27.3	
Family Farming-acquired items							
Fruit *in natura*	35	60.3	31	59.6	66	60.0	<0.001
Cookies and biscuits	16	27.6	17	32.7	33	30.0	<0.001
Vegetables *in natura*	26	44.8	4	7.7	30	27.3	<0.001
Juice	13	22.4	14	26.9	27	24.5	<0.001
Bread	9	15.5	10	19.2	19	17.3	0.008
Fruit pulp	11	19.0	5	9.6	16	14.5	0.002
Milk and dairy	11	19.0	4	7.7	15	13.6	0.005
Animal protein	12	20.7	1	1.9	13	11.8	<0.001
Cakes	6	10.3	6	11.5	12	10.9	0.027

Note: *Chi-square test, $p<0.05$. [a]n=58; [b]n=52; [c]n=110. The table does not include the campuses which did not provide food or did not respond. The percentages were calculated according to the total values of presence or absence of a nutritionist in the campus.

and dairy products are related to the presence of a canteen in the unit ($p<0.05$). More than 45% of the units that do not have a canteen do not offer food to students.

Regarding the student restaurants' management, self-management with partially outsourced service, when the campus buys the food and hires outsourced services for the production and distribution of food,

Table 4 – Provision of food, acquisition, and most important categories of food acquired from family farming in 2019 in the campuses of Federal Institutes, according to the presence or absence of a canteen. *São Paulo* (SP), Brazil, 2021.

Variables	Presence of a canteen		Absence of canteen		Total		p^*
	n[a]	%	n[b]	%	n[c]	%	
Food provision							
Yes	79	70.5	32	54.2	111	64.9	0.034
No	33	29.5	27	45.8	60	35.1	
Family Farming Acquisition 2019							
Yes	60	53.6	22	37.3	82	48.0	0.041
No	52	46.4	37	62.7	89	52.0	
Acquired FF food items							
Fruit *in natura*	53	47.3	15	25.4	68	39.8	0.005
Cookies and biscuit	27	24.1	6	10.2	33	19.3	0.028
Vegetables *in natura*	23	20.5	7	11.9	30	17.5	0.156
Juice	21	18.8	7	11.9	28	16.4	0.247
Bread	16	14.3	4	6.8	20	11.7	0.146
Fruit pulp	10	8.9	6	10.2	16	9.4	0.791
Milk and dairy	15	13.4	1	1.7	16	9.4	0.012
Animal protein	11	9.8	2	3.4	13	7.6	0.131
Cakes	9	8.0	3	5.1	12	7.0	0.472

Note: *Chi-square test, $p<0.05$. [a]n=112; [b]n=59; [c]n=171. The percentages were calculated according to the total values of presence or absence of a canteen in the campus.

Table 5 – Food acquisition and most acquired items from family farming in the Federal Institutes campuses in 2009, according to the restaurant's type of management. *São Paulo* (SP), Brazil, 2021.

Variables	Self-management		Self-management with partially outsourced service		Fully outsourced service		Total		p^*
	n[a]	%	n[b]	%	n[c]	%	n[d]	%	
Family Farming Acquisition 2019									
Yes	22	75.9	43	82.7	17	56.7	82	73.9	<0.001
No	7	24.1	9	17.3	13	43.3	29	26.1	
Family Farming Acquired foods									
Fruit *in natura*	19	65.5	35	67.3	14	46.7	68	61.3	<0.001
Cookies and biscuit	13	44.8	13	25.0	7	23.3	33	29.7	<0.001
Vegetables *in natura*	4	13.8	26	50.0	0	0.0	30	27	<0.001
Juice	8	27.6	12	23.1	8	26.7	28	25.2	<0.001
Bread	7	24.1	9	17.3	4	13.3	20	18	0.003
Fruit pulp	2	6.9	13	25.0	1	3.3	16	14.4	<0.001
Milk and dairy	3	10.3	9	17.3	4	13.3	16	14.4	0.014
Animal protein	1	3.4	12	23.1	0	0.0	13	11.7	<0.001
Cakes	2	6.9	7	13.5	3	10.0	12	10.8	0.041

Note: *Chi-square test, $p<0.05$. [a]n=29; [b]n=52; [c]n=30; [d]n=111. The table does not include the campuses which did not provide food or did not respond. The percentages were calculated according to the total values of each type of restaurant management.

has the largest number of items that require manipulation bought. In units with fully outsourced service for purchase, production, and distribution of food, acquiring food from family farming occurs less and the diversity of food categories is significantly lower ($p<0.05$).

DISCUSSION

Although PNAE's legislation requires so, the offer of food to students in IF with Basic Education courses and the acquisition of food from family farming did not happen fully. In 35% of the campuses

participating in the research, students were not offered any food, and in more than half of the campuses, the purchases did not include products from family farming.

Having meals at school is important for these students' daily food consumption, and healthy meals are relevant in improving their eating habits and diet choices [15]. When this right is not guaranteed, PNAE's implementation is limited, and students' food and nutritional safety is damaged.

Acquisitions from family farming were unequal among the different regions and were smaller than those observed in Brazilian cities. In 2011, 78.5% of the cities acquired food from family farming, with the Mid-West presenting the smallest frequency of purchase and the South the largest [16]. A study on the IF showed that the Mid-West has the poorest performance in the program's execution. This may be due to the region's land distribution, which has the smallest proportion of land for family farming in Brazil [10,17]. When this data is compared with the acquisition from family farming in cities in 2017, however, the North is the region with poorer execution [18].

The absence of acquisitions from family farming in IF may be due to the reduced number of students in these institutions compared to cities and states. Consequently, their PNAE budget is also smaller, as these resources are calculated based on the number of students in each institution [4]. This may be a limiting factor, both in terms of available resources and reduced product offer, involving issues like the frequency of delivery and less financial appeal. However, according to studies focusing on cities and states, these factors are also possible causes of hardship for acquiring family farming items [16,19].

Another factor possibly related to the lack of acquisition from family farming by IF is that these institutions grew from 2011. Some units are still being implemented, and this may cause additional hardship in food-related processes, as can the lack of adequate structure for the acquisition and distribution of food [6].

Regarding financial resources, in 2019, 32.923.484,92 Brazilian reais were attributed to PNAE in IF. If all the entities had acquired family farming products, a minimum of R$ 9.877.045,48 would have been invested in this modality [20]. However, of the 38 IF, only 10 did not return PNAE resources that should have been used for buying food to the Federal Government. This compromises the program's potential as a healthy public policy, the valuation of sustainable food production, and family farmers' permanence in rural areas [21-23].

Regarding the minimum percentage of FF acquisition, all the campuses that carried out such purchases have done so in adequation with the legislation [4]. That is different in municipal resource allocation, where the used percentage varied from region to region [16], or in capital cities, where only the North presented an adequate application of PNAE resources between 2011 and 2017 [19]. The IF' predominant location in countryside towns may have favored acquisitions, as rural producers are closer and the logistics are less complex, something that also appears among cities [6,7,16,24].

In 2019, food acquisition from family farming was mostly comprised of fruit *in natura* and vegetables, and the purchase presented different characteristics in each region. The acquisition of *in natura* and minimally processed foods, such as vegetables, fruit, legumes, leaves, and cereals, was frequent among family farming products, both at the city and state levels [14,23-25].

Also, foods processed to some level, such as cookies and biscuits, juice, bread, and fruit pulps, were frequently purchased by IF. These items, which are mostly for immediate consumption, have a certain aggregate value and may contribute to reaching the 30% requirement of the legislation. Their largest offer may be related to the agricultural and land availability for family farming, each unit's structure, as well as the presence of a professional monitoring the process, including dealing with farmers, managing the resources, and distribution to students [16,17,24].

Having hired nutritionists was a relevant factor for the acquisition of family farming and the amplified diversity of FF items. A nutritionist's presence was also related to the acquisition of more food with less processing and items that need some type of manipulation for the production of meals. Nutritionists exclusively perform some of the tasks related to students' diets, bringing better results to the implementation and execution of feeding in institutions. In their absence, demands related to developing good eating habits are usually not considered broadly, and easier-to-handle items are often prioritized [9]. An example is the elaboration of menus, which will guide food acquisition. When menus are not elaborated or when nutritionists are not present, in touch with local farmers, or have knowledge of local agricultural availability, regional items or dishes are usually excluded from the menus and feeding culture, one of PNAE's pillars, is often not valued [26]. Thus, the lack of a nutritionist who is technically responsible for the process or the inadequacy regarding the *Conselho Federal de Nutricionistas* (National Council of Nutritionists) may compromise the acquisition of family farming items for the elaboration of menus and description of the basic project in the public call, which decontextualizes this project concerning the local reality [27,28].

Another important factor in the acquisition and diversity of products from family farming was the type of management found in the students' restaurants. Self-managed restaurants with partially outsourced service are the ones that buy more family farming products. In this type of management, products with more processing, such as cookies and biscuits, are the least represented among the purchases; the largest amount of food acquired from family farming are *in natura* or minimally-processed foods. This is possibly because these units have enough workers to prepare the food, which might be difficult for self-managed restaurants. There is also more autonomy over what will or will not be purchased, differently from outsourced services, for whom food acquisition is the responsibility of the hired company, and the unit directs the parameters of execution by contract. The type of management is currently seen as a factor of stimulus or limitation for the acquisition of foods from family farming, with fully outsourced services appearing as a limiting factor [29].

Almost half of the campuses that did not have canteens also do not offer students any food, resulting in the complete lack of access to food in the institutions, which has to be brought from home. Food consumption may also be limited by the school's structure available for food consumption, such as kitchenware and devices for heating and keeping meals, especially for full-time students. In this study, the presence of canteens is positively associated with the offer of food to students and the acquisition of products from family farming. However, the types of food related to the presence of a canteen are usually ready-to-eat items, such as fruit *in natura*, cookies and biscuits, and milk and dairy (including yogurt and dairy beverages, among others). This may be because the canteen offers the main meals, which are more complex, and the institution offers the ones in between main meals. However, the offer of foods by canteens is related to the larger consumption of ultra-processed foods with lower nutritional values, reducing the items offered by schools [30].

The particularities of PNAE in IF, such as their autonomy, may influence the program's management. In some units, its execution is the responsibility of the director, who may or may not stimulate it. The Dean's Office transfers PNAE's resources to the campuses that manage these funds in a decentralized fashion, purchasing, preparing, and distributing food. Other particularities are the forms of accountability of resources used for PNAE acquisitions, the recent expansion of IF, with recently inaugurated campuses sometimes lacking the structure and the workers for all the tasks, and other hypotheses raised in this work.

The participation and commitment of IF and campus managers who are familiar with the legislation and its guidelines and are effectively part of the program execution process are fundamental. Also relevant are state actions promoting the minimum conditions for the policy's implementation, including financial

support and employment vacancies for nutritionists in these institutions. The IF have an central role in fostering local development, and the lack of local agriculture purchases in the program compromises the institutions' social role.

The study's main limitation was the application of an online questionnaire, which may have compromised some questions' understanding and led to the lack of responses, generating losses of information. Another factor was the unexpected number of IF that did not provide any food to students. Although this is an important result still not reported in the literature, it also made it harder to apply the multiple analyses.

CONCLUSION

The study clarifies the main characteristics of school feeding in IF, especially regarding PNAE-related purchases from family farming. The results highlight hardship for the policy's full execution in these institutions, along with factors that may be related to the acquisition and guarantee of adequate food to students. Thus, the unprecedented results contributed to evaluating the execution of PNAE in federal spheres, aiding in the execution of the policy with the provision of information on PNAE in IF.

CONTRIBUTORS

JC ARAGI and DH BANDONI worked in the study's conception and design, as well as in data analysis and interpretation. DH BANDONI was responsible for the revision and final approval of the article.

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