

## Brazilian National School Food Program as a promoter of local, healthy and sustainable food systems: evaluating the financial implementation

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**Abstract** *This study aimed to analyze the financial investment used for the procurement of food for the Brazilian National School Food Program (PNAE) in a city in the South of Brazil. The bidding process, the public calls and accountability reports of the PNAE were analyzed in the following variables: I) municipal financial complementation values; II) percentage of resources used to purchase foods from Family Farmer (FF), and Recommended, Restricted, Prohibited and others foods. The comparison of proportions was employed as a test to identify differences between investments. The municipal financial complementation was 65% of the total. The total amount used to purchase foods was distributed as follows: 65.5% for the Recommended, 27.9% for the Restricted, 6.5% for the Other and 0% for the Prohibited. The expenditure on Recommended foods was higher ( $p < 0.001$ ) compared to the remaining groups. FF provided only Recommended foods, representing 12.1% of total (municipality and federal) expenditure and 29.5% of total federal funds. The direct purchase from FF contributed to the purchase of recommended foods. The municipal financial complementation was not geared to FA, which can compromise the potential of the school food program to promote healthy and sustainable food systems.*

**Key words** *Public policies, Nutritional quality, Local development*

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## Introduction

Increasing overweight and obesity rates have been observed in recent years, reflecting the general health status of the population and the incidence of Chronic Non-communicable Diseases<sup>1-4</sup> (CNCD), which are among the leading causes of death in Brazil<sup>5</sup> and worldwide<sup>6</sup>. The prevalence of overweight and obesity has more than tripled in 34 years<sup>7</sup> among Brazilian children and adolescents. These changes are related to new eating habits, such as the increased consumption of processed foods with high levels of salt, sugar and fat<sup>1,7-9</sup>. In this context, the relevance of policies that limit the availability of these foods for schoolchildren<sup>8</sup> is evident, especially since school is an essential environment for the establishment of eating habits that tend to remain throughout adulthood<sup>10-13</sup>. It is also worth noting that, in 2014, the World Health Organization and the Pan American Health Organization established among their goals the improvement of meals provided by schools<sup>3</sup> through the Action Plan for the prevention of obesity in children and adolescents.

The implementation of the Brazilian School Food Program has been modified to improve the quality of food served in various aspects. Some concern about the adequacy of food habits and the inclusion of fresh food from the strengthening of the local economy has been noted since the beginning of the decentralization process in 1994<sup>14</sup>. During this period, the management was transferred to the municipalities, which exceed 5,500 throughout the Brazilian territory<sup>15</sup>. The supply of local foods began to stand out among the goals and guidelines of this policy<sup>16</sup>. However, the decentralization process was not sufficient to ensure the incentive to the local economy, respect for eating habits and assurance of the nutritional quality of school foods<sup>14,17</sup>.

In 2009, the National School Food Program (PNAE) suffered another critical change in its implementation. It has become mandatory to use at least 30% of the financial resources from the National Education Development Fund (FNDE) to purchase food from family farmer, as well as to prohibit and limit the acquisition of certain foods<sup>18</sup>. The purchase of low-nutrition content beverages, such as soft drinks, artificial refreshments, guarana or gooseberry concentrates and ready-to-drink teas was forbidden. Also, a restriction was imposed on the application of financial resources for the acquisition of canned food, sausages, confectionery, compound foods,

semi-prepared or ready-to-eat preparations and food concentrates<sup>19,20</sup>.

The PNAE is one of the most comprehensive school food programs in the world, and by 2014 was responsible for providing daily meals to 42.2 million students<sup>21</sup>. In that same year, it counted on a federal budget from the FNDE, of approximately 3.7 billion Brazilian Reals per year<sup>21</sup>. Besides federal funds, the Program's regulations establish the mandatory complementary financial investment from the municipal sphere<sup>20</sup>, which contributes to the good implementation of the Program<sup>22</sup>.

The legal advances of the PNAE towards the promotion of a healthy diet for schoolchildren are observed, whose core is the central regulation of the application of the federal financial funds to the acquisition of foods. Nevertheless, a gap of scientific knowledge on the subject is noted, specifically studies that aim to verify and analyze how these guidelines are implemented at the local level (municipalities). In this perspective, and as per governmental guidelines for the financial implementation of the National School Food Program, the study aimed to analyze the financial investment for the purchase of food for the PNAE supply in a municipality in the south of Brazil.

## Methods

A cross-sectional, descriptive, analytical and exploratory study was carried out based on consultations with secondary sources. The study was conducted in a municipality in the state of Paraná with approximately 30 thousand inhabitants, where the public school network had 23 elementary schools, responsible for the daily attendance of 4,031 students. Based on the documentary analysis, public calls (purchase modality used to acquire food from family farmers), bids (purchase from other suppliers) and the rendering of accounts of the 2010 program obtained from the responsible for the program were studied.

The study variables were: (I) Percentage of the financial resources used to purchase Recommended, Restricted, Prohibited and Other foods. (II) Percentage of the resource used to purchase food from family farmers. (III) Percentage of the amount of the municipal financial complementation (R\$). The definition of the variables was based on the governmental recommendations for the financial implementation of the program (Law N° 11.947/2009, Resolution N° 26/2013).

The information of the financial investment from the FNDE, the municipality's investment for the purchase of food and the amount of resources from the FNDE for the purchase of food from the family farmer were extracted from the rendering of accounts, called the Physical and Financial Implementation Summary Statement. The quantities (kg), unit values (R\$) and origin (from family farmers and other suppliers) of the food purchased for the annual supply (two hundred school days) of the school food program were extracted from the bids and public calls.

The shopping lists were analyzed regarding the Method of Evaluation of the Procurement of Foodstuffs (AGA)<sup>23</sup>. Based on current PNAE regulations and national healthy eating recommendations, the method facilitates the inspection of the adequacy of the school food shopping list to these standards and recommendations. Thus, the food shown in bids and public calls are grouped according to their origin and nutritional characteristics. Foods are divided into two categories according to nutritional characteristics: (1) Recommended Foods (included in a nutritionally healthy diet and quantitatively recommended by the PNAE legislation). (2) Restricted Foods (related to unhealthy and restricted or financially prohibited the PNAE legislation, they include foods with high concentrations of sodium, sugar, saturated/trans fats). In addition to that proposed by the AGA method, categories 3 and 4 were established: (3) Prohibited (with acquisition prohibited by the PNAE legislation: soft drinks, artificial refreshments, guarana or gooseberry concentrates, ready-to-drink teas and other similar beverages). (4) Other (foods that are not restricted by program legislation. However, their consumption in large quantities should not be encouraged). Each category, in turn, was divided into subcategories (Chart 1).

The total daily investment in Brazilian Reals for each food group was calculated to analyze the financial investment used to purchase recommended and controlled foods. Thus, the total amounts for each group were counted and were divided by the 200 school days. Subsequently, the corresponding proportions of each food category and subcategory were calculated against total expenditure.

The amounts of each food group were stratified by source (FF/OS), calculating the proportions for FF and OS (against the total of each group) to identify whether these resources were intended for family farmers (FF) or other suppliers (OS).

The financial figures from the FNDE and the municipality were calculated from the information provided in the rendering of accounts of the municipality. With the objective of exploring the use of each resource in the purchase of food from the FF, the percentage of the investment of the FNDE's resources in the rendering of accounts was used as a reference. The financial amount spent on public calls that exceeded this percentage was considered to be from municipal resources.

A descriptive analysis of the data and a test for comparing proportions were performed to identify statistically significant differences between the percentage spent on public calls (family farmers) and on bids (other suppliers) against the total daily amount spent, as well as between the amounts spent on Recommended, Restricted and Prohibited foods. A significance level of  $p < 0.05$  was considered. Data were typed in spreadsheets and analyzed in Stata 11.0 software (StataCorp., CollegeStation, TX, 2011).

## Results

Table 1 shows the daily means of the financial expenditure on the purchase of food in each of the categories and subcategories of the study, as well as the result of the contrast of proportions. We observed a daily investment of around R\$ 3,482 for the purchase of food. Most of the investment was allocated to the purchase of recommended foods (65.6%). The expenses with restricted foods arrived at 27.9%, and with the other foods that did not enter the previous classification 6.5%. The acquisition of low nutritional value drinks that are foods prohibited by the PNAE legislation was not identified.

Among the recommended foods, the groups with the highest financial investment were fruits, followed by lean meats and cereals. Among the restricted foods were the acquisition of foods with high sugar content (sweet biscuit, cereal bar and sugary corn cereal); high fat and sodium sausages (sausage, formed ham and smoked sausage); food concentrates or powdered food for dilution (milk drink preparation mix, gelatin powder, pudding powder and chicken stock) and canned food (canned corn and pea).

Table 2 shows the financial resources from the FNDE and the municipality for the acquisition of food and the respective percentages directed to family farmers. The municipality invested approximately four hundred and fifty-six thousand

**Chart 1.** Subcategories of Recommended, Restricted, Prohibited and Other Foods.

<b>Recommended food</b>	
1) Fruits	Fresh fruits and natural juice
2) Vegetables with low carbohydrate content	Vegetables with up to 10% carbohydrate: lettuce, arugula, broccoli, cabbage, coleslaw, tomato, pea, pod, carrot, beet, pumpkin
3) Vegetables with high carbohydrate content	Vegetables with more than 10% carbohydrate: cassava, yam, potatoes
4) Supplementary herbs, spices and vegetables	Garlic, parsley, chives, thyme, mint
5) Cereals, bread, pasta, flours and ferments	Unsweetened morning cereal, bread, pasta, wheat and corn flour, yeast
6) Whole foods	Whole cereals, whole bread
7) Low-fat meats and eggs	Meat with fat content less than 50% of the total caloric value; lean beef and pig cuts, poultry and fish in general; and eggs
8) Legumes	All in natura legumes
9) Milk and dairy products with reduced saturated fat content	All types of milk, ricotta, white cheese, natural yogurt
10) Seasonings used in small quantities in the preparations	Vinegar, balsamic vinegar, olive oil
<b>Restricted foods</b>	
11) Fatty meats, sausages or processed meat products, cheeses and sauces with high sodium content or saturated fat	Meat with a fat content greater than 50% of total caloric value, sausage, salami, ham, sour cream, butter, margarine, mayonnaise, hydrogenated vegetable fat, cheeses and a large amount of oil
12) Foods with high sugar content and sugary products	Jam, jelly, sweet creams, yogurt, sweet biscuits, cereal bar, cake with filling, sweetened cereals
13) Biscuits and salted products	Crackers, toasts, processed snacks
14) Compound foods	Yogurts with cereals for later mixing, pasta with sauce powder, chocolate covered cake
15) Semi-finished or ready-made preparations	Stuffed pasta, ready-to-eat meatballs, industrialized pre-fried potatoes, instant noodles, ready-to-eat sauces, industrialized cheese bread, spiced manioc flour mixture
16) Concentrated, powdered or dehydrated foodstuffs and mixtures for the preparation of foods	Mixture for cake making, milk drink powder
17) Canned and pickled foods	All canned and pickled foods
<b>Prohibited foods</b>	
18) Low nutritional content drinks	Soft drinks, artificial refreshments, concentrates based on guarana or gooseberry syrup, ready-to-drink teas and other similar beverages
<b>Other foods</b>	
19) Beverages in the form of roasted and ground beans or infusion drinks	Tea and coffee
20) Oil	Soybean, sunflower, canola, corn oil
21) Sugar	White, brown, demerara
22) Salt	Coarse, fine, seasoned

Adapted from Martinelli et al.<sup>23</sup>.

Reals, almost twice the amount transferred by FNDE (R\$ 240,000.00) during 2010 for the implementation of the Program.

The purchase from family farming accounted for 12.1% of the total food expenditure. It was observed that 29.5% of the resources from the

FNDE and 2.9% of the financial complementation by the municipality were allocated to the FF purchase. It should be noted that the total amount of funds allocated to the purchase of FF food was used to purchase recommended foods.

## Discussion

The amount invested in the purchase of restricted foods was within limits stipulated by FNDE's regulations, and all of these foods were purchased by bidding from other suppliers than family farmers. On the other hand, only recommended food from family farming was acquired, suggesting that this direct purchase can contribute to the school food quality. In this perspective,

**Table 2.** Financial resources from the FNDE and the municipality for the procurement of foods and the respective percentages geared to family farmers, 2010.

Resource used to purchase foods	
Value transferred by the FNDE * (%)	34.5
Financial complementation of the municipality for the acquisition of foods * (%)	65.5
Amount spent on the acquisition of foods from family farming as a proportion of the amount transferred by the FNDE * (%)	29.5
Amount spent on the acquisition of foods from family farming as a proportion of the total resource used to purchase foods (%)	12.1
Amount spent on the acquisition of foods from family farming as a proportion of the financial complementation of the municipality (%)	2.9

\* Declared value in the rendering of accounts.

**Table 1.** Total daily invested for the purchase of food in each category and subcategory of studied, 2010.

Category	Total daily expenditure R\$ (%)	FF (%)	OS (%)	P
Overall invested amount	3,481.65 (100.0)	12.1	87.9	< 0.001
Total Recommended	2,282.57 (65.6)	12.1	53.5	< 0.001
Fruits	659,29 (18,9)	9,1	9,8	0,255
Vegetables with low carbohydrate content	175,48 (5,0)	2,3	2,7	0,369
Vegetables with high carbohydrate content	39,89 (1,1)	0,6	0,5	0,393
Supplementary herbs, spices and vegetables	50,49 (1,5)	0	1,5	-
Cereals, bread, pasta, flours and ferments	398,95 (11,5)	0	11,5	-
Whole foods	0 (0,0)	0	0	-
Low-fat meats and eggs	548,90 (15,8)	0	15,8	-
Legumes	112,32 (3,2)	0	3,2	-
Milk and dairy products with reduced saturated fat content	294,9 (8,5)	0	8,5	-
Seasonings used in small quantities in the preparations	2,35 (0,1)	0	0	-
Total Restricted	971,21 (27,9)	0	27,9	-
Fatty meats, sausages or processed meat products, cheeses and sauces with high sodium content or saturated fat	302,99 (8,7)	0	8,7	-
Foods with high sugar content and sugary products	453,20 (13,0)	0	13,0	-
Biscuits and salted products	0 (0,0)	0	0	-
Compound foods	0 (0,0)	0	0	-
Semi-finished or ready-made preparations	0 (0,0)	0	0	-
Concentrated, powdered or dehydrated foodstuffs and mixtures for the preparation of foods	198,56 (5,7)	0	5,7	-
Canned and pickled foods	16,45 (0,5)	0	0,5	-
Total Prohibited	0 (0,0)	0	0	-
Low nutritional content drinks	0 (0,0)	0	0	-
Total Other	227,87 (6,5)	0	6,5	-
Beverages in the form of roasted and ground beans or infusion drinks	143,21 (4,1)	0	4,1	-
Oil	18,87 (0,5)	0	0,5	-
Sugar	60,64 (1,7)	0	1,7	-
Salt	5,15 (0,2)	0	0,2	-

FF: Family Farmer. OS: Other suppliers.

a low percentage of financial resources geared to the purchase of family farming food can jeopardize the promotion of Food and Nutrition Security (SAN) and the development of a local, sustainable and healthy food system.

The acquisition of restricted foods, even within limits imposed by legislation, may represent a risk to the health of the population. This is because their nutritional characteristics (higher energy density, saturated and trans fat, sugar and sodium content)<sup>24</sup>, associated with their low cost<sup>25</sup> and the increasing consumption of these foods by children and adolescents are related to increasing overweight and obesity cases in Brazil<sup>7</sup>.

On the other hand, in line with previous studies, the results suggest that the acquisition of foods from local agriculture can contribute to the supply and intake of healthy foods in schools<sup>26-28</sup>. This is because only the purchase of recommended food from family farms has been observed, and these are associated with a healthy diet<sup>8,25</sup>. Thus, the approximation of family farming production with school food consumption seems to be an essential policy for the promotion of a healthy diet and can contribute positively to the fight against the increasing childhood obesity rates. Also, by providing stable markets to farmers, buying via a public call can generate positive impacts on agriculture<sup>29-32</sup>, while contributing to the development of sustainable local agrifood systems<sup>33,34</sup>.

However, the low percentage of global investment (12.1%) identified for the acquisition of FF food may jeopardize the potential of the benefits of this food purchase. This result could be explained by the fact that the FNDE guidelines for the financial implementation of the program refer only to the use of FNDE resources<sup>20</sup> and not from the municipality, stipulating a minimum investment value of 30% for the purchase of family farm. Also, the short time elapsed since the implementation of current program regulations and data collection, coupled with the organizational hindrances of the processes of change for

their implementation could explain this result.

Supporting policies to draw family production closer to food consumption in schools positively and internationally highlights Brazil's SAN policy<sup>35</sup> and evidences the efforts of the Brazilian government to support more sustainable forms of production/consumption. Although this policy is a significant advance, it seems necessary to articulate and add different purchase criteria and agrifood policies to the existing policies to enable the consolidation of healthier and sustainable food systems. Also, other medium- and long-term studies are required to identify the effects generated by the normative modifications of PNAE in local food systems.

According to Government guidelines, food classification represented a difficulty in conducting this study due to the lack of clear categorization criteria. However, the use of the AGA method enabled such classification, facilitating the clustering of foods according to nutritional features and their origin. The information analyzed in the documents was not recorded by the researchers, which should be considered when interpreting the results. However, they are official sources of the municipality's food purchase records, prepared homogeneously for all purchases made and recorded by the responsible professionals. Also, public calls and bids used as information sources are purchase planning tools and may be modified during the implementation of the program. However, the financial values extracted from these instruments were contrasted with those in the municipal rendering of accounts, which enabled the analysis of how the financial resources allocated to the purchase of foods are being used at the municipal level.

Conclusively, the purchase of food from family farmers in this municipality contributed to the acquisition of healthy food. However, the financial complementation of the municipality seems not to be directed at this productive segment, which may compromise the PNAE's potential to promote local, sustainable and healthy agrifood systems.

## Collaborations

P Soares and SS Martinelli participated in the study design and drafted the first version of the manuscript. All authors interpreted data, contributed with ideas, and revised and approved the final version of the manuscript.

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