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Organic and/or agro-ecological foods in school meals in municipalities in Rio Grande do Sul, Brazil

Alimentos orgânicos e/ou agroecológicos na alimentação escolar em municípios do Rio Grande do Sul, Brasil

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Abstract

Objectives: Describe the insertion of organic foods for The Brazilian School Feeding Program in the municipalities of Rio Grande do Sul state, Brazil. *Methods:* Cross-sectional study, with electronic questionnaire sent to 497 municipalities in the state, which included: whether there has been buying organic in 2014, main difficulties, factors that influenced the choice, certification and purchased food. *Results:* Responses were obtained from 362 municipalities, and of these, 94 (26.0%) reported buying organic products, which represent 18.9% of all municipalities in the state. The main difficulties identified for the purchase of these foods were low amount (54.4%; n = 197) and variety (51.9%; n = 188); the main motivations were, in general, centered on the concern with health and the environment, reported by more than 60% of the municipalities. These municipalities, 60.6% (n = 57) reported that the products had no certification or were unaware. The most purchased products were lettuce, oranges and cabbage. *Conclusion***:** Although low percentage, organic foods are being included in the school feeding in the state. There is a need for articulation between technical managers, farmers and other stakeholders so that this practice can be developed and effective.

Keywords: School Feeding. Food and Nutrition Security. Organic Food.

Resumo

Objetivo: Descrever a aquisição de alimentos orgânicos e/ou agroecológicos para o Programa Nacional de Alimentação

Escolar nos municípios do estado do Rio Grande do Sul, Brasil. *Metodologia:* Estudo transversal, com envio de questionário eletrônico aos 497 municípios do estado, que contemplava: se houve compra de orgânicos e/ou agroecológicos em 2014, principais dificuldades, fatores que influenciaram a escolha, certificação e os alimentos adquiridos. *Resultados:* Foram obtidas respostas de 362 municípios, sendo que destes, 94 (26,0%) referiram comprar produtos orgânicos e/ou agroecológicos, o que caracteriza 18,9% do total de municípios do estado. As principais dificuldades apontadas para a compra desses alimentos foram a baixa quantidade (54,4%; n=197) e variedade (51,9%; n=188); as principais motivações foram, de forma geral, centradas na preocupação com a saúde e o meio ambiente, relatadas por mais de 60% dos municípios. Destes, 60,6% (n=57) relataram que os produtos não tinham certificação ou a desconheciam. Os produtos mais adquiridos foram: alface, laranja e repolho. *Conclusão:* Embora com percentuais baixos, alimentos orgânicos e/ou agroecológicos estão sendo incluídos na alimentação escolar do estado. Há necessidade de articulação entre responsáveis técnicos, agricultores familiares e demais envolvidos para que essa prática seja desenvolvida e efetivada.

Palavras-chave: Alimentação Escolar. Segurança Alimentar e Nutricional. Alimentos Orgânicos.

Introduction

Organic foods are fresh foods or pesticide-free processed foods, produced in an organic system of agricultural and/or industrial production which promotes the health of soils, ecosystems and people.[1,2] By comparison, agroecology is a science developed in contradistinction to agribusiness; it is dedicated to the study of the productive relations between man and nature, e.g., ecological, economic, social, cultural, political and ethical sustainability. It is based on small farms, family labor and complex production systems adapted to local and regional food production conditions.[3,4] Thus, although the terms agroecology and organic agriculture are not synonymous, pesticides are not used in either of them; moreover, the terms are related because they refer to production systems which are an alternative to conventional agriculture.

In Brazil, as a protective measure for farmers and consumers, these products must be certified by the Brazilian System of Organic Conformity Assessment, which establishes three forms of certification: by Participatory Guarantee Systems, by social organization control and by auditing.[5,6] Conversely, the Law No.11.947/2009, which regulates Brazil's National School Meal Program (PNAE), determines

that at least 30% of the funds transferred by the National Education Development Fund must be intended for the purchase of food produced by family farmers (at local, regional or national levels).[7] The bidding process can be waived and the purchase can be made through the so-called call for proposals, which is ruled by specific laws.[8] Additionally, the Law provides that the organic and/or agro-ecological foods should be included among priority purchases,[7] and their cost is allowed to have an increase of up to 30% compared with the prices established for conventional products, when specific market price research cannot be performed for these products.[7,8]

Despite the laws and decrees which encourage the purchase of non-conventional foods, Brazil has been the greatest consumer of pesticides in the world for seven years, and it has increased the purchase of agricultural inputs by 190% in the last decade. The Brazilian Association of Collective Health published the dossier *Um alerta sobre os impactos dos agrotóxicos na saúde* ("An alert on the impacts of Agrochemicals on Health") in 2015, in which production, exposure to and consumption of conventional foods, as well as consumption of pesticide-contaminated water, are related to acute and chronic poisoning, occurrence of neoplasms, malformation, neuropathies, immunotoxicity, endocrine disorders, and disorders affectingpeople's reproductive system, development and growth.[9] For this reason, the consumption of organic and/or agro-ecological foods should be encouraged and it is defined as a healthy dietary practice.[2,10]

The purchase of food from family farmers leads to increased variety and inclusion of freshor minimally processed foods in school meals, which encourage the formation of healthy eating habits.[11,12] The consumption of organic and/or agro-ecological products has been described as a healthy dietary practice.[10] This concept is in line with the key principle of PNAE, which is to foster growth, development, learning, students' academic performance and formation of healthy eating habits.[13] The guidelines of PNAE encourage the use of organic and/or agro-ecological foods for promotion and implementation of food and nutrition security and the Human Right to Adequate Food.[14] In this perspective, the aim of this study was to describe the purchase of organic and/or agro-ecological foods for Brazil's National School Meal Program in municipalities of the state of Rio Grande do Sul (RS).

Method

This is a cross-sectional study which is part of the Research Project entitled *O processo de compra e venda de gêneros alimentícios da agricultura familiar para a alimentação escolar no estado do Rio Grande do Sul* ("The process of purchase and sale of food products produced by family farmers for school meals in the state of Rio Grande do Sul"), developed in partnership with the School Food and Nutrition Collaborative Center of the State of Rio Grande do Sul.

All the municipalities in RS (n=497) were invited to answer an online questionnaire through the tool *SurveyMonkey*®, sent to the e-mail address of the respective Municipal Departments of Education. The invitation was aimed at the officials of the Department who actively participated

in the purchase of products from family farmers, e.g, Secretary of Education, chief nutritionist or representative of municipal management.

The questionnaire was designed in an electronic format and was sent along with an introduction letter which described the research objectives. The questionnaire was resent twice to all officials who had not replied to the invitation. They were also sent a telephone number through they could ask questions and confirm receipt. By responding to the online questionnaire, the officials were assumed to have agreed to participate in the study and the municipalities which had refused to participate were not contacted anymore.

The questionnaire contained 35 questions about the purchase of food products from family farmers; they were created on the basis of the current legislation.[7,8,15] There were questions about the method of purchase, resources in use, purchased products, etc. To analyze the purchase of organic and/or agro-ecological products from family farmers, the following five specific questions on this subject were selected:

Questions with a checkbox (simple question that enabled respondents to select several answers in a defined list of options, plus an option for open description ("Other"), in case respondents needed to use it):

- In 2014, did the municipal council purchase ORGANIC AND/OR AGRO-ECOLOGICAL products?
- Regardless of whether or not the municipal council has purchased ORGANIC AND/OR AGRO-ECOLOGICAL products, which are the main barriers to purchasing these products?
- If the municipal council purchased ORGANIC PRODUCTS AND/OR AGRO in 2014, what influenced the purchase decision?
- If the municipality has bought ORGANIC AND/OR AGRO-ECOLOGICAL products in 2014, were these products certified?

Questions with a comment box (enabled the collection of data from open answers)

- If the municipal council bought ORGANIC AND/OR AGRO-ECOLOGICAL products in 2014, please mention which ones (specify them in the respective food groups: 1 - vegetables, legumes and leafy greens, 2 - fruits, 3 - beverages, 4 - cereals, bread, pasta, and tubers, 5 - meat, fish and eggs, 6 - milk and dairy products (yogurt, yogurt drinks, cheese, etc.), 7 - legumes (beans, lentils, chickpeas, soybeans, etc.), 8 - fats and oils (lard, olive oil, etc.) and 9 - sugars and sweets.

For the purpose of geographical distribution, the participating municipalities were divided into seven mesoregions, according to the Brazilian Institute of Geography and Statistics: Northeast, Northwest, Mid-West, Mid-East, Metropolitan Area of Porto Alegre, Southwest and Southeast of the state of Rio Grande do Sul.[16]

Data collection was performed from August to October 2015. The data extracted from the electronic tool were tabulated in *Excel*® 2013 and analyzed descriptively, by means of absolute and relative frequencies, median, minimum and maximum number of products purchased by municipality.

The research was approved by the Research Commission of theSchool of Medicine, Federal University of Rio Grande do Sul (Protocol no. 27,815).

Results

Out of 497 municipalities from the state of Rio Grande do Sul, 371 participated in the research. The analyses in this study were made of 362 (72.8%) answers to the questions about the purchase of agro-ecological /organic food products.

When asked about the purchase of organic/agro-ecological products in the year 2014, 94 municipal councils (26.0% of those which responded to the survey and 18.9% of the municipalities of the state) stated that they had purchased this type of food. Also, 84 out of the 362 municipalities (23.2%) reported that they had not made a purchase as a result of problems with documentation and certification, while 201 (55.5%) did not find organic farmers with an interest in being suppliersto the Program. Other reasons were reported by two municipalities (0.6%).

As regards geographical distribution and number of municipalities that compose each mesoregion, the respondents were distributed as follows: 84.6% (n=22/26) in the Southeast region; 79.6% (n=43/54) in the Mid-East; 75.9% (n=41/54) in the Northeast; 74.7% (n=162/217) in the Northwest; 66.3% (n=65/98) in the metropolitan area of Porto Alegre; 64.5% (n=20/31) in the Mid-West; and 52.9% (n=9/17) in the Southwest. Respectively, for these mesoregions, 6, 14, 19, 21, 31, 1 and 2 municipalities responded that they had purchased organic and/or agro-ecological foods, which represents 27.3%; 32.6%; 46.3%; 13.0%; 47.7%; 5.0% and 22.2% of the total number of municipalities that make up the region and which responded to the survey. However, when taking into account the total number of responses (n=362) and comparing them in each of the mesoregions, it can be seen that most answers were sent by the North-West: 44.8% (n=162). This is justified by the fact that this mesoregion has the largest number of municipalities (n=217) of Rio Grande do Sul, followed by the metropolitan area of Porto Alegre (18.0%), Mid-East (11.9%), Northeast (11.3%), Southeast (6.1%) and Mid-West (5.5%). By contrast, the mesoregion with the lowest percentage of responses (2.5%; n=9) was the southwest, which has the lowest number of municipalities (n=17).

Table 1 shows the main barriers to the purchase of organic and/or agro-ecological foods among the participating municipalities (n=362) and among those which purchase these products (n=94). The barriers are similar when the groups are compared; the most frequent one is to find sufficient quantity and variety of foods on the market (above 46% of the municipalities).

Table 1. Main barriers/obstacles to the process of purchase of organic and/or agro-ecological products for Brazil's National School Meal Program in municipalities in the state of Rio Grande do Sul, 2014.

Major barriers to purchasing organic foods	Total no. of respondents	% total no. of respondents	No. of respondents that purchase organic food products	% of respondents that purchase organic food products
Finding sufficient amounts of organic foods in the market	197	54.4	44	46.8
Finding sufficient variety of organic foods in the market	188	51.9	59	62.8
High price of organic foods	153	42.3	39	41.5
Farmers do not have all the documents required (e.g. Declaration of Aptitude to PRONAF (certification, invoice, etc.)	140	38.7	24	25.5
Difficulty in distribution logistics	59	16.3	12	12.8
Other	46	12.7	5	5.3
No difficulty	24	6.6	11	11.7

PRONAF: Program for Strengthening Family Farming. Source: designed by the authors.

Although the municipal councils (n=94) have asserted that they buy organic and/or agro-ecological products, 23.4% (n=22) reported that the products purchased were not certified and 37.2% (n=35) of them reported that they did not know the type of certification of the products. The certification most often cited by those who were aware of it was participatory systems through social control organizations (18.1%; n=17), as shown in Table 2.

Table 2. Certification and reasons to purchase organic and/or agro-ecological products by the municipalities in the state of Rio Grande do Sul to Brazil's National School Meal Program, 2014.

Certification of products purchased by the municipalities	**N**	**%**
Unknown certification	35	37.2
No certification	22	23.4
Participatory systems through social control organizations	17	18.1
Participatory Guarantee Systems	15	16.0
Auditing	5	5.3
No answer given	1	1.1
Main reason for purchase	**N**	**%**
Concerns about the health of the population assisted by Brazil's NationalSchool Meal Program	87	92.6
Healthy habit forming	81	86.2
Requested by nutritionist	70	74.5
Environmental protection	62	66.0
Increased environmental awareness	57	60.6
Interest in stimulating the local economy	49	52.1
Incentive to residence in rural areas	42	44.7
Incentive from municipality	37	39.4
Improvement of farmers' health	34	36.2
Guaranteed sale of produce	26	27.7
Competitive price	7	7.4
Other	2	2.1

Source: designed by the authors.

Table 2 also shows the main reasons for the choice of these products by municipalities that have purchased them. The main factor that influences purchase decisions was a concern with the health of the schoolchildren assisted by PNAE (92.6%; n=87). Other reasons frequently cited are two major motives, namely, health and the environment: concern with formation of healthy habits (86.2%; n=81), nutritionist's request (74.5%; n=70); environmental protection (66.0%; n=62) and greater environmental awareness (60.6; n=57).

As regards food variety, only four municipalities did not describe the products that they purchase. Vegetables were the most frequently cited foods (55.3%; n=52), with reports of 31 varieties in the item "vegetables, legumes and leafy greens". The products most often sold in this group were: lettuce, cabbage, carrot, broccoli, and beet. In the group of fruits, the most cited were: orange, tangerine and strawberry, and grape juice was reported by 24.5% of municipalities. Other foods frequently mentioned were rice and cassava, cabbage, parsley and beans. The meat group and the milk group were cited by only 5.3% of the municipalities, and the group of fats and oils was the only one which had no reports of purchase of organic and/or agro-ecological products (Table 3). The maximum number of foods purchased by a municipality was 55, and the minimum, one; the median of products purchased was four (P25-P75).

Table 3. Main organic and/or agro-ecological products sold to Brazil's National School Meal Program in the municipalities in the state of Rio Grande do Sul, 2014.

Food groups	No. of municipalities	%	No. of varieties	Amount purchased	Main products sold
Vegetables, legumes and leafy greens	52	55.3	31	290	Lettuce (43.6%), Cabbage (31.9%), Carrot (28.7%), Broccoli (25.5%), Beet (24.5%), Kale (20.2%), Parsley (18,1%), Cauliflower (16,0%), Garlic (12,8%), Pumpkin (12.8%), Onion (9.6%), Chayote (7.4%), Spinach (7.4%), Arugula (7.4%), Green beans (7.4%), Maize (7.4%), Tomato (7.4%), Bell pepper (5.3%), Zucchini (5.3%), Squash (5.3%) and Cucumber (4.3%).
Fruits	45	47.9	16	116	Orange (31.9%), Tangerine (28.7%), Strawberry (16.0%), Banana (9.6%), Persimmon (5.3%), Lemon (4.3%), Peach (4.3%), Avocado (3.2%) and Papaya (3.2%).
Beverages	40	42.6	7	32	Grape juice (24.5%), Fruit juice (12.8%), Orange juice(3.2%), Peach juice (3.2%), Açaí pulp (3.2%) and Passion fruit pulp (3.2%).
Cereals, bread, pasta and tubers	40	42.6	10	58	Rice (19.1%), Cassava (19.1%), Sweet potato (16.0%), Potato (9.6%), Cookies (3.2%) and Bread (4.3%).

continue

Food groups	No. of municipalities	%	No. of varieties	Amount purchased	Main products sold
Sugars and sweets	20	21.3	10	28	Jam (8.5%), Fruit preserve (5.3%), Sugar (5.3%), Banana preserve (4.3%), Dulce de leche (3.2%), Molasses (3.2%) and Honey (3.2%)
Legumes	17	18.1	2	18	Beans (18.1%), Peas (3.2%).
Other (Specify)	10	10.6	6	12	Tomato purée, tomato sauce, peanut, garlic paste.
Meat, fish and eggs	5	5.3	3	6	Eggs (5,3%), Chicken (1.1%) and Beef (1,1%).
Milk and dairy products	3	3.2	4	5	Cheese (2,1%), Yogurt drink (1.1%), Whole milk (1.1%) and Powder milk (1.1%).
Fats and oils	0	0.0	0	0	-

Source: designed by the authors.

Discussion

The results of the present study show that some municipalities in RS purchase organic and/or agro-ecological products, in accordance with the Law No.11.947/2009.[7] When purchase volume is compared between Rio Grande do Sul and Santa Catarina, it appears that there are similarities between the two states. According to data from the study by Silva e Souza, in 2005, 17.7% (n=52) of the municipalities of Santa Catarina purchased organic products, while this percentage is 18.9% (n=94) in RS, according to the data reported in the present study.[17]

In Brazil's *Cadastro Nacional de Produtores Orgânicos* ("National Database of Organic Farmers"),1,662 organic farmers are registered in RS. Most of them (51.4%; n= 855) live in the mesoregion of the Metropolitan Area of Porto Alegre, which could justify that 33.0% of affirmative answers about the purchase of organic and/or agro-ecological products came from this region.[18] The Mid-West mesoregion had the lowest number of farmers in the above-mentioned database (1.0%; n=16); therefore, it was the mesoregion in this study where only one municipality purchased organic and/or agro-ecological foods for PNAE.

The greatest difficulties cited by the respondent municipalities were the quantity (54.4%) and the variety (51.9%) available on the market. According to a survey conducted by the census of the Brazilian Institute of Geography and Statistics in 2006, the volume of organic food production in Brazil is low, as it represents only 1.8% of total production.[19] However, there was an increase in 2013, when the number of farms increased by 22% compared with the previous year. The Southern region has the second largest number of organic farms and the fifth largest area used for family farming in Brazil.[20]

The high price of organic and/or agro-ecological foods ranked third (42.3%) as a relevant barrier. The Dossier of the Brazilian Association of Collective Health also indicated price as the main obstacle, and other studies related high prices to low production capacity, difficult control of pests and climatic adversities faced by producers of organic and/or agro-ecological foods.[9,21,22] In addition, expenditure on transport and high costs of certification reinforce the data found by studies carried out in the states of São Paulo and Santa Catarina.[17,23] Research indicates that investments in organic production, for example, technical support and training of persons involved in the process, could reduce the prices of these products.[22]

The requirement of organic certification leads to greater consumer credibility and greater transparency of the practices and principles used in production.[5,22] However, the costs of certification and the difficulties in implementing it are reported as the major reasons for the small number of farmers on the National Database of Organic Products.[24] Therefore, these barriers reduce the availability of regulated food (certificates) for subsequent marketing in programs such as PNAE.[25] Problems with documentation and certification were identified by 38.7% of the

respondent municipalities as reasons for not purchasing organic and/or agro-ecological foods, as also reported by 25.5% of the municipalities which already make such purchase. Equivalent data were reported in the study of Silva[17] in the state of Santa Catarina: 66.7% (n=64) of the farmers had no certification, compared with 11.5% (n=11) who were certified.[17] As to type of certification in RS, 18.1% of the products were certified through social control organizations; this is possible when products are sold directly to consumers (PNAE, in this case), without the need for certification; guarantee is attested by an organization previously registered with a regulatory agency.[5] By comparison, the Participatory Guarantee System, formed by farmers, consumers, subject-matter expertsand researchers who certify one another, was reported by 16.0% of municipalities. Auditing, in which certification is awarded by an institution that inspects technical, social and environmental conditions of production and checks if they are in accordance with the requirements of regulations for organic production, was cited by only 5.3% of the respondents.[5] According to the National Development Bank,[22] "Participatory Certification" was developed so that the regulation of farmers with few financial resources could be made accessible. This can be seen in studies that show this type of certification as the most prevalent.[17,26]

The main factors highlighted in this study as an influence for the purchase of organic and/or agro-ecological foods were the concern with health and the formation of healthy habits by the population assisted by PNAE, which indicates that municipal managers are aware of the relationship between these foods and health.

The organic and/or agro-ecological foods which were most often purchased by municipalities in RS were vegetables and fruits, particularly, lettuce, cabbage, orange, tangerine and carrot. According to the Program for Pesticide Residue Analysis of Foods of the Brazilian Health Regulatory Agency, foods such as lettuce and orange, when produced by conventional farming, showed high levels of pesticide contamination (approximately 50% of the samples collected in 26 Brazilian states were contaminated by active ingredients which were not authorized or above the authorized limit).[27] Thus, the purchase of organic and agro-ecological products is an important point for a decrease in the consumption of pesticides at schools served by PNAE.

Final remarks

The aim of organic and/or agro-ecological agriculture is to help promote quality of life and health, not only for farmers but also for consumers. The inclusion of safe, contaminant-free and varied foods in school meals through PNAE promotes Food and Nutrition Security of schoolchildren. Also, it serves as a means for generation of income to family farmers who see a market demand in the program. Therefore, the benefits of the alliance between organic farmers and PNAE include health, income and quality of life for all stakeholders involved in this process.

In this study, it was found that the project implementation agencie have been gradually adopting laws and regulations that encourage the purchase of organic and/or agro-ecological foods.There is also a concern about health and the environment. However, the analysis of the results showed that the demand and the supply of these products are imbalanced, which reflects the need to foster further interaction between subject-matter experts, family farmers and other stakeholders who participate in the process of purchase of school meals and to encourage the continuity of government incentives.

Collaborators

Machado LS was responsible for the study design, collection and analysis of data, literature review and writing the article. Rockett FC participated in the design of the project, collection, analysis and interpretation of data, drafting and revision of the manuscript. Pires GC, Corrêa RS and Oliveira ABA participated in the study design, data collection and revision of the manuscript. All the authors have approved the final version of the manuscript.

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