



Research article

Organic food consumers and producers: Understanding their profiles, perceptions, and practices

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ABSTRACT

The organic food market has been expanding across the globe as well as in Brazil. Therefore, since we considered the collection of information about the organic food market to be relevant, we decided to characterize the organic food market in the metropolitan region of Vitória, Espírito Santo. Accordingly, the aim of this study was to analyze the profile and perceptions of organic producers/traders regarding the production of organic foods, investigate the profile and perceptions of organic food consumers, and identify the factors that influence their consumption. A cross-sectional, descriptive, and exploratory survey was conducted in 2019 with 50 producers/traders and 281 organic food consumers utilizing semistructured questionnaires. A descriptive statistical analysis was performed using percentage values, media, and evaluation of proportion differences. Fisher's exact test was used to analyze differences in proportions. The producers/traders were 76.0 % male, 82.0 % white, 70.0 % married, and 60.0 % attended elementary school. The commercial production of organic foods is mainly motivated by health and financial issues. A lack of labor (52.0 %) and an absence of government/credit support (40.0 %) were the greatest obstacles related to organic food production. The consumers were mostly female (75.1 %), white people (53.4 %), married people (44.5 %), and people with at least one degree (76.5 %). While the consumption of mainly organic fruits and vegetables was motivated by aspects related to health, factors such as poor access to sales points (27.8 %) and price (26.7 %) also limited the increase in consumption. Both consumers and producers/traders related to the consumption and production of organic food with health concerns revealed the important role of these foods in promoting the population's quality of life. However, for this growing market, there is a need for an integration between political authorities, producers, and consumers.

1. Introduction

Conventional agriculture, which is predominant in the modern market, is characterized by the intensive use of pesticides, which are defined as synthesized chemical compounds used in many areas, including the agricultural sector, to control and repel pests. The uncontrolled use of pesticides causes their bioaccumulation in food chains, which leads to a high risk of imbalanced ecosystems and

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soil, air and water contamination [1,2]. Food produced according to this model may contain residues of chemical compounds and may cause damage to the health of consumers and producers directly or indirectly, acutely or chronically. Medical issues can include headaches and stomachaches; skin rashes; respiratory, endocrine, reproductive, neurological, hepatotoxic and endocrine disorders; cancer; birth defects; and Parkinson's disease [1–3]. However, Brazil is among the main pesticide-consuming countries in the world, with an annual consumption of 76 million kilograms, second only to China, the United States, Argentina and Thailand [4].

In contrast, the production of organic food, according to Brazilian legislation, is agricultural production in which specific techniques are adopted that aim at economic and ecological sustainability and the minimization of dependence on nonrenewable energy [5]. These methods integrate cultural, biological, and mechanical practices that promote resource cycling, promote ecological balance, and conserve biodiversity, as opposed to the use of synthetic fertilizers, ionizing radiation, and genetic engineering at any stage of production, processing, and processing, storage, distribution and commercialization [5,6].

The organic production model is becoming popular worldwide; accordingly, this movement is also occurring in Brazil. The area of organic farmland increased from 705,233 ha in 2012 to 1,319,454 ha in 2020. In 2013, 12,526 organic food producers were registered and then kept increasing, eventually reaching 24,975 in 2020 [7,8].

This increase in organic production is driven by the growing consumer demand for products that are nutritious, healthy, and free of chemicals. Moreover, there is also growing distrust within parts of society in relation to modern industry, which significantly expands the handling of persistent chemicals in the environment [9–11].

In that regard, the Human Right to Adequate Food (HRAF), which originated in the International Covenant on Economic, Social and Cultural Rights and is considered a world landmark, was defined as “a human right inherent in all people to have regular, permanent and unrestricted access, either directly or through from financial purchases to safe and healthy food, in adequate and sufficient quantity and quality, corresponding to the cultural traditions of its people and which guarantees a life free from fear, dignified and full in the physical and mental, individual and collective dimensions” [12]. Therefore, the contamination of food by pesticides and the lack of information about consumption constitute violations of the DHAA [13].

In addition, there are difficulties in the production and marketing of organic food, the lack of incentives, the low scale of production, which implies higher costs per unit of product with labor and inputs, poor logistics from the field to the fairs, such as the lack of infrastructure and transportation, and the incipient disclosure of fairs for organic and/or agroecological products, which weakens greater consumer demand [14–16]. Additionally, producers must comply with Brazilian standards for organic production and be registered in the National Register of Organic Producers [17]. However, these adaptations involve financial investments that increase the cost of production and, consequently, contribute to the high prices of organic foods reaching consumers [15,18,19].

With the growth of organic food production, questions arise that need to be investigated: What are the profiles of producers/traders and consumers of organic foods, and what are their perceptions in relation to production and the factors that influence their consumption?

In this way, the present study contributes to discussions about the commercialization of organic foods that can help define governmental public policies to promote the development of the organic sector and promote HRAF. Information related to the profile of consumers and producers can provide a better understanding of their behavior about organic foods and contribute to developing strategies for disseminating information to consumers [20,21]. Accordingly, this study aimed to analyze the profile and perceptions of organic producers/traders regarding the production of organic foods, investigate the profile and perceptions of organic food consumers, as well as identify the factors that influence their consumption.

2. Materials and methods

This study was submitted to and approved by the Research Ethics Committee at the Federal University of Espírito Santo, Brazil, under number 2.849.090.

This was a cross-sectional, descriptive, and exploratory study carried out using semistructured questionnaires. The research was carried out in the municipalities of Vitória and Vila Velha—both in the state of Espírito Santo—because they represent the largest share of organic fairs registered in the state [22].

The questionnaires were administered from January to November 2019 to producers/traders at organic fairs and food consumers in places with a large flow of people (such as the university), food fairs, and supermarkets. Participants in the research were individuals who were 18 years of age or older; notably, in the case of the consumers, those who declared that they had consumed organic foods.

2.1. Sample size

For the sample calculation of consumers, data from the 1st National Organic Consumption Survey in Brazil were used, which resulted in a 10 % prevalence of consumption in the southeast [23]. For the city of Vitória, this prevalence of consumption was used together with a confidence level of 95 % and a sampling error of 5 %, which resulted in $n = 139$ individuals. About Vila Velha, based on the same prevalence, confidence level, and sample error, the calculation resulted in a sample of 139 participants. Therefore, the final sample of the research should include at least 278 individuals. For organic producers/traders, the sample size was convenient and not probabilistic, considering that those who work in Greater Vitória do not reside only in the municipalities of the metropolitan region but produce food in several municipalities in the state of Espírito Santo and travel to the surveyed municipalities to commercialize their products.

2.2. Profile, perceptions, and cultivation of organic food producers/traders

Information about organic producers/traders was obtained by applying a questionnaire containing 20 questions based on research developed by McEachern and Willock [24] and Santos et al. [14]. These studies also investigated questions about the production of organic food through the use of questionnaires. Therefore, they supported the inclusion of questions in this study about the socio-demographic characteristics of producers and traders, motivational factors for production, and types of organic food produced.

Producers/traders were invited to participate in the survey. After the agreement, they signed the written informed consent form (WICF). Information about their sociodemographic characteristics was collected through questions about age, sex, marital status, education level, and income. This last variable was calculated based on the 2019 Brazilian worker minimum wage of R\$998.00 (approximately 238.6 US dollars in December 2019).

Another part of the questionnaire assessed which organic foods were produced by them; the reason for this type of production (necessity, security, family custom, better financial remuneration, health, market price stability, opportunity, autonomy—not depending on the market to buy inputs, increased demand for organic food by consumers); the difficulties encountered (lack of market, seeds, government support, credit, technical assistance and labor, marketing price, high production costs, transportation); certification or declaration of registration of organic food production (social control organization, audit certification or participatory organic conformity assessment systems); and knowledge about the concept of organic food (what is the best concept of "organic food" for the interviewee).

2.3. Profiles and perceptions of organic food consumers

A questionnaire with 27 questions was used to collect data from the participants. This form was prepared based on research developed by Andrade and Bertoldi [20], Roitner-Schobesberger [25] and Santos and Araujo [26]. These studies also investigated questions about the consumption of organic foods through the use of questionnaires. Therefore, they supported the inclusion of

Table 1
Sociodemographic characteristics of organic food consumers and producers/traders.

	Consumers		Producers/Traders		
	n	%	n	%	
City					
Vila Velha	139	49.5	13	26.0	
Vitória	142	50.5	37	74.0	
Gender					
Female	211	75.1	12	24.0	
Men	70	24.9	38	76.0	
Age (years)					
<60	202	71.9	50	100	
≥60	79	28.1	0	0	
Race/color					
Not white rowhead	122	43.4	8	16.0	
White rowhead	151	53.7	41	82.0	
Do not know/Do not want to answer	8	2.8	1	2.0	
Education					
Elementary school	14	5.0	30	60.0	
High school	52	18.5	18	36.0	
Higher education	129	45.9	2	4.0	
Postgraduate (MSc, DSc. or PhD)	86	30.6	0	0	
Marital Status					
Single	86	30.6	11	22.0	
Married	125	44.5	35	70.0	
Stable Union	13	4.6	1	2.0	
Divorced	35	12.5	2	4.0	
Widower	221	4	1	2.0	
Profession					
Salaried employee	45	16.0	–	–	
Unemployed	7	2.5	–	–	
Self-employed	77	27.4	–	–	
Retired	68	24.2	–	–	
Housewife	16	5.7	–	–	
Public server	35	12.5	–	–	
Student	33	11.7	–	–	
MSPC of consumers			MSP of producers/traders		
≤1	37	13.2	≤1	34	68.0
1–3	125	44.5	1–2	7	14.0
>3	64	22.8	≥2	5	10.0
Do not know	55	19.6	Do not know	4	8.0

MSPC = Minimum salary per capita.

questions in this study about the sociodemographic characteristics of consumers, places where organic foods are purchased, their purchase frequency, motivational factors for consumption, types of organic foods consumed, and factors that hinder and limit consumption. The concept of organic food, the impact of cultivation on the environment and the perception of the value of organic food. The researchers went to organic fairs, supermarkets or places with a large flow of people to approach consumers of organic foods about their availability for the study. After the agreement, the interviewees signed the consent form. The researchers went to organic fairs, supermarkets, or places with a large flow of people to approach organic food consumers about their availability for the study. After the agreement, the respondents signed the consent form.

To characterize organic food consumers, sociodemographic data were collected through questions about sex, age, marital status, occupation, education level, and income. This last variable was calculated based on the 2019 Brazilian worker minimum wage of R \$998.00. Some questions were related to the habit of consuming organic foods (frequency of consumption, types of organic food, frequency of purchase of these foods and purchase locations); the aspects that motivate consumption (concern with health, food safety, nutritional value, sensory characteristics - appearance, smell, taste and texture, environmental concern or social concern); and the limited consumption of these foods (lack of interest, lack of information about what organic food is or reliability that the food is organic, price, little access to sales outlets, little variety, inferior quality compared to conventional foods - appearance, size, texture).

Another part of the questionnaire made it possible to analyze, in a descriptive way, consumers' knowledge about the concept of organic food, the impact of this cultivation on the environment (the main consequence of the cultivation of organic products for the environment according to the interviewee's feelings and whether the production of organic food increases or not increases environmental contamination or generates pollution in a similar way to the cultivation of conventional products) and the perception of the price of organic products (fair, expensive or cheap).

2.4. Data analysis

The data obtained were entered and stored in Microsoft Office Excel spreadsheets. These data were analyzed using IBM SPSS Statistics version 22 software, and descriptive statistics were calculated using percentage and average values. The 95 % confidence interval (95 % CI) was used to analyze per capita incomes. The Kruskal–Wallis test was used to analyze scalar and ordinal data from more than two groups, regardless of the data distribution, as long as the samples were independent. Fisher's exact test was used to analyze differences in proportions, as n values less than 5 were obtained for some cells. These evaluations adopted a significance level of 5 %.

3. Results

3.1. Who are the producers/traders and consumers of organic food?

Fifty organic food producers/traders were interviewed, 13 from Vila Velha (26.0 %) and 37 from Vitória (74.0 %). At an average age of 37 years \pm 10.1 years, the majority were male (76.0 %), were white (82.0 %), were married (70.0 %), had primary education (60.0 %), and had a lower monthly net income or equal to one minimum wage per capita (68.0 %) (Table 1), with an average income of R\$950.97 \pm R\$661.63 (95 % CI: 754,49–1147,46), on average 227.3 dollars Americans.

For consumers, 281 individuals, with an average age of 48 years \pm 16.9 years, participated in the survey. The majority were female (75.1 %), aged less than 60 years (71.9 %), and were white (53.4 %). The predominant level of education was higher education (45.9 %). Among the respondents, 44.5 % were married, 27.4 % were self-employed, and 44.5 % reported having a monthly net income between the range of one and less than or equal to three minimum wages per capita (Table 1), with an average of R\$2,501.09 \pm R \$1,605.29 (95 % CI: 2290,67–2711,51) and an average of 598.0 US dollars. Therefore, the per capita income of consumers was significantly greater than that of producers/traders.

For the legalization of organic marketing, the results showed compliance with Brazilian organic regulations [5], as all

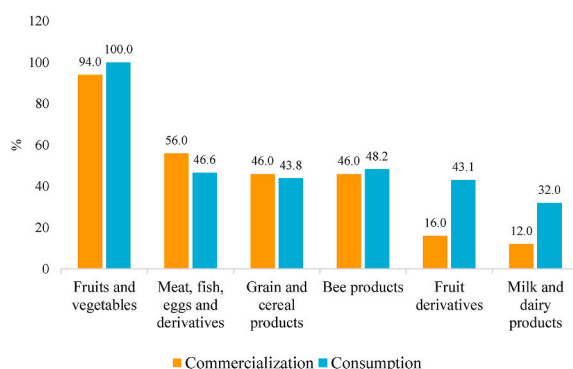


Fig. 1. Types of organic food marketed and consumed.

producers/traders had certification or a declaration of production registration. Audit certification was obtained by 56.0 % of the interviewees; 28.0 % were registered in mechanisms of the Organization of Social Control (OCS), and 16.0 % were certified by participatory organic conformity assessment systems.

Among the types of organic food marketed, fruits and vegetables (94.0 %) and milk and their derivatives (12.0 %) were the most and least mentioned, respectively. Similarly, all consumers reported consuming organic fruits and vegetables, while milk and derivatives were the least mentioned, representing 32.0 % of consumers (Fig. 1).

Some characteristics related to health and economic issues and food safety were the main motivators for producing and consuming organic products (Fig. 2). However, organic food consumption was more frequent among those who mentioned health concerns as the main motivational factor than among individuals who mentioned other factors ($p = 0.044$) (Table 2).

The lack of labor and government support/credit were the most reported limiting factors for production and marketing. Regarding consumption, the main limiting factor was the difficulty of accessing points of sale, followed by price (Fig. 2 a, 2b, 2c and 2d). However, people who cited little access to sales locations, lack of information, or little variety as limiting factors consumed food more frequently ($p = 0.003$) than those who cited other factors limiting food consumption (Table 2). Regarding purchase frequency, 70.1 % of the respondents said they bought organic food once a week. However, most were dissatisfied with the availability, offerings, and variety of organic foods in their city (63.7 %) and reported the desire to increase their consumption of these foods (80.4 %). Therefore, consumers who considered the availability, supply, and variety of food unsatisfactory consumed these foods less frequently than those considered satisfactory ($p = 0.025$) (Table 2).

For 92.5 % of the consumers, the main place of purchase/acquisition was at organic or self-growing fairs, mainly due to ease of access (54.1 %), and the certification seal or organic production certificate/declaration was used as the main means of identifying organic products during purchase ($n = 140$).

Producers/traders conceptualize “organic food” mainly as “food that brings health benefits and that is produced without the use of synthetic substances such as pesticides and hormones.” Regarding consumer knowledge about organic foods, 66.5 % of respondents defined them as “food without pesticides.” For 88.3 % of them, cultivating these foods does not cause environmental contamination.

When analyzing how the possible differences between the various foods sold at the organic fairs about the sociodemographic characteristics of organic food producers/traders, no statistically significant differences were shown between the variables (Table 3). There were also no statistically significant differences between the variety of foods sold at organic fairs in Grande Vitória and aspects of production, commercialization, and perception of the producers/traders (Table 3).

In the present study, people who have a partner, such as individuals who are married or in a stable relationship, consumed organic foods more often than people without a partner ($p = 0.016$) (Table 4). Moreover, this group included people under the age of 60 (71.9 %). This age group, according to statistical calculations, is composed of people who consume organic foods more frequently than those aged over 60 ($p = 0.045$) (Table 4).

Regarding the frequency of the consumption of organic foods and consumers’ perceptions of these foods, it was found that people who buy or acquire these foods at organic fairs or by self-cultivation continually consume them more than consumers who buy at other stores ($p = 0.019$) (Table 2). Furthermore, the interviewees who judged the prices fair consumed organic food more regularly than people who judged the price to be expensive, cheap, or simply did not know how to express the cost ($p = 0.021$) (Table 2).

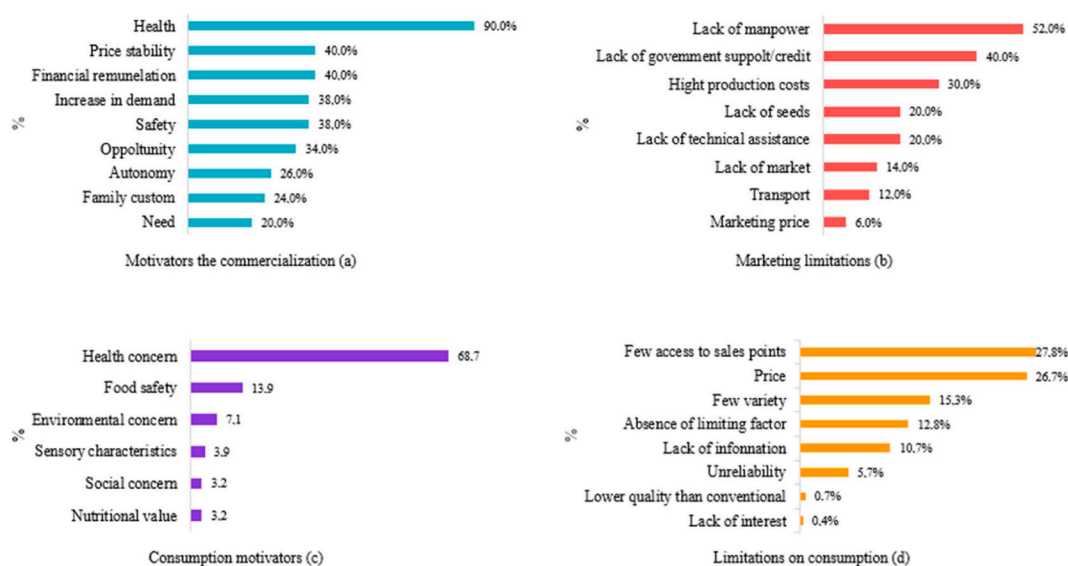


Fig. 2. Motivating and limiting factors for the marketing and consumption of organic food. (a) Motivator the commercialization. (b) Marketing limitations. (c) Consumption motivators. (d) Limitation on consumption.

Table 2
Consumption of organic food according to aspects related to consumption, acquisition and consumer perception, 2019.

Factors	Consumption Frequency		p value
	Daily n (%)	Sporadically n (%)	
Motivational Factor			
Health concern	114 (72.6)	79 (63.7)	0.044
Food security	16 (10.2)	23 (18.5)	
Environmental concerns	14 (8.9)	6 (4.8)	
Sensory and nutritional value	7 (4.5)	13 (10.5)	
Social concern	6 (3.8)	3 (2.4)	
Limiting factor			
Lack of information, access and little variety	91 (58.0)	61 (49.2)	0.003
Price	31 (19.7)	44 (35.5)	
Absence of limiting factor	27 (17.2)	9 (7.3)	
Lack of reliability and interest, inferior quality	8 (5.1)	10 (8.1)	
Availability, offer and variety			
Satisfactory	66 (42.0)	36 (29.0)	0.025
Poor	91 (58.0)	88 (71.0)	
Concept			0.983
Food without pesticides	106 (67.5)	81 (65.3)	
Healthier Foods	28 (17.8)	22 (17.7)	
Natural food	9 (5.7)	9 (7.3)	
Preservative-free foods	8 (5.1)	7 (5.6)	
Planted foods differentiated	6 (3.8)	5 (4.0)	
Purchase location			0.019
Organic fairs/cultivation own	151 (96.2)	109 (88.6)	
Supermarkets/shops/grocery stores	6 (3.8)	14 (11.4)	
Nutrients compared to conventional			0.069
Higher	118 (75.2)	76 (61.3)	
Same	22 (14.0)	25 (20.2)	
Do not know	16 (10.2)	21 (16.9)	
Less	1 (0.6)	2 (1.6)	
Price judgment			0.021
Fair	109 (69.4)	69 (55.6)	
Expensive	36 (22.9)	46 (37.1)	
Cheap	7 (4.5)	2 (1.6)	
Do not know	5 (3.2)	7 (5.6)	

The Kruskal–Wallis test was used to analyze data from more than two groups. Fisher's exact test was applied, and the values in bold are statistically significant ($p < 0.05$).

4. Discussion

In general, women represent consumers, and the majority of organic food producers/traders are men (Table 1). This finding still seems to be linked to the fact that women are responsible for the largest share of domestic activities, which include feeding their families and, consequently, the act of buying food. In addition, socially, paid work has long been assigned to men [27]. According to Nielsen, which is a global consumer analysis company, 96.0 % of those responsible for purchases in Brazilian families are women [28].

From the beginning of the 19th century, with the beginning of European immigration in Espírito Santo, there was the growth of colonies in the state whose main purpose was the introduction and settlement of farmers and their families, the expansion of agricultural frontiers and the dynamization of the local economy. These immigration movements influenced the composition of the state's rural population [29]. At present, the main municipalities producing organic food are European immigrants, and the current white race/color of organic producers/traders may be due to the legacy of pioneer farmers.

The fact that consumers' per capita income was significantly greater than that of producers/traders may be linked to the low valuation of these workers' services and the need for greater purchasing power by people who wish to consume organic food. Thus, these results underscore the need to develop effective strategies that reduce the probability of rural farmers being poor, as more investments in education and providing access to agricultural advisory services can help farmers manage their resources more efficiently. Likewise, financial incentives and support from the government and from other areas, such as road infrastructure and irrigation, can contribute to improving the flow and sale of their products, thus contributing to an increase in their income [30].

With respect to education, people with less education—that is, even elementary school—may encounter some difficulties in purchasing these foods due to less awareness. In contrast, consumer education, based on higher education, is associated with better financial conditions, greater ecological awareness, and knowledge about the differences between organic and conventional foods. These factors allow consumers and their families to lead a healthy lifestyle, which includes better food [31]. Thus, these aspects may explain the identification of graduation as the predominant level of education among organic food consumers in the present study (Table 1).

The opposite was observed among producers/traders, most of whom had a low level of education (Table 1). Therefore, despite the existence of public policy in Brazil, which stipulates access to professional and technological education [32], in practice, the planned

Table 3

Variety of organic foods according to sociodemographic variables, production, marketing and perception of organic food producers/traders.

	Organic foods marketed		p value
	1 type	≥2 type	
Gener	n (%)	n (%)	0.225
Female	4 (40.0)	8 (20.0)	
Men	6 (60.0)	32 (80.0)	
Race/color			0.161
Not white	2 (20.0)	6 (15.0)	
White	7 (70.0)	34 (85.0)	
Do not know/Do not want to answer	1 (10.0)	0 (0.0)	
Marital Status			0.704
No companion	8 (80.0)	28 (70.0)	
With companion	2 (20.0)	12 (30.0)	
Education			0.823
Elementary school	7 (70.0)	23 (57.5)	
High school	3 (30.0)	15 (37.5)	
Higher education	0 (0.0)	2 (5.0)	
Minimum salary per capita			0.480
≤1	6 (60.0)	28 (70.0)	
1 < x < 2	1 (10.0)	6 (15.0)	
≥2	1 (10.0)	4 (10.0)	
Do not know/Do not want to answer	2 (20.0)	2 (5.0)	
Production time			0.297
Less than 5 years	3 (30.0)	13 (32.5)	
5–10 years	3 (30.0)	4 (10.0)	
More than 10 years	4 (40.0)	23 (57.5)	
Motivational Factor			0.258
1 reason	2 (20.0)	3 (7.5)	
2 or more reasons	8 (80.0)	37 (92.5)	
Difficult fator			0.780
1 complicating factor	5 (50.0)	16 (40.0)	
2 or more complicating factors	5 (50.0)	23 (57.5)	
None	0 (0.0)	1 (2.5)	
Price			0.665
Fair	9 (90.0)	32 (80.0)	
Accessible to people	1 (10.0)	8 (20.0)	

The Kruskal–Wallis test was used to analyze data from more than two groups. Fisher's exact test was applied, and the values in bold are statistically significant ($p < 0.05$).

objectives are not achieved effectively. However, farmers' education is valuable because it can contribute to reducing production costs and increasing income, economic stability and market growth based on a better understanding of the agricultural activities they carry out and the maintenance of correct organic management [33].

Proper handling of organic materials provides conditions for expanding production, which makes it possible to increase the variety of crops. The plurality of products, in general, is a characteristic of agroecological/organic production, in which diversity contributes to a better balance in the agricultural system and to the elimination of the use of pesticides [34]. This particularity was perceived in the data of this research, as the production and commercialization of several organic crops were verified (Fig. 1).

In addition to being necessary with regard to compliance with the technical norms of organic agriculture, the elimination of synthetic inputs in plantations also reduces the risk of farmers' exposure to chemical products. Therefore, health can be a determining factor in the decision to organically produce food [35]. This concern on the part of the producers reflects the data released by the Ministry of Health, in which 35.81 % of notifications of exogenous work-related poisoning in Brazil from 2007 to 2016 referred to the use of agricultural pesticides [36].

Moreover, organic agriculture has advantages by reducing the cost of chemical inputs, which are replaced by natural resources, and it therefore allows them to increase the price of their products by adding value. In addition, these workers can sell fresh food and increase their income through the sale of byproducts, which increases their presence in the organic market [37].

Regarding the types of organic food consumed, the results of the Household Budget Survey (POF), from 2008 to 2009, indicated that the consumption of milk by the Brazilian population is far below the recommended allowance [38]. Therefore, the lower consumption of milk and organic dairy products by consumers may be related to the low consumption of these foods by the general population. Furthermore, the low supply, as verified in the present study, can also be an influencing factor since producers/traders reported that they are the least organically produced and marketed foods in the region (Fig. 1).

Organic buyers are also health-conscious and self-focused [39]. According to Massey et al. [40], health is a crucial reason for buying organic food. Consumers' knowledge about healthy habits can also lead them to be concerned about their health, which was the main motivation for the consumption of organic foods mentioned by the interviewees. Studies have shown health benefits due to the consumption of these foods. Baudry et al. [41] reported that a higher consumption of organic foods is generally associated with a reduced risk of cancer. The authors also observed reduced risks for specific types of cancer, such as postmenopausal breast cancer,

Table 4
Consumption of organic foods according to consumer sociodemographic variables.

	Consumption Frequency		p value
	Daily n (%)	Sporadically n (%)	
Gener			
Female	118 (75.2)	93 (75.0)	1.000
Male	39 (24.8)	31 (25.0)	
Race/color			
Not white	66 (42.0)	56 (45.2)	0.147
White	89 (56.7)	62 (50.0)	
Do not know/Do not want to answer	2 (1.3)	6 (4.8)	
Age (years)			
<60	105 (66.9)	97 (78.2)	0.045
≥60	52 (33.1)	27 (21.8)	
Marital status			
No companion	69 (43.9)	73 (58.9)	0.016
With companion	88 (56.1)	51 (41.1)	
Education			
Elementary school	9 (5.7)	5 (4.0)	0.920
High school	30 (19.1)	22 (17.7)	
Higher education	71 (45.2)	58 (46.8)	
Postgraduate	47 (29.9)	39 (31.5)	
Profession/Ocupation			
With income	130 (82.8)	96 (77.4)	0.291
Without income	27 (17.2)	28 (22.6)	
Minimum salary per capita			
≤1	18 (11.5)	19 (15.3)	0.445
1-3	66 (42.0)	59 (47.6)	
>3	39 (24.8)	25 (20.2)	
Do not know/Do not want to answer	34 (21.7)	21 (16.9)	

The Kruskal–Wallis test was used to analyze data from more than two groups. Fisher's exact test was applied, and the values in bold are statistically significant ($p < 0.05$).

non-Hodgkin's lymphoma, and all lymphomas, among individuals with a higher frequency of organic food consumption [41]. Cohort research showed that Norwegian women who reported frequent consumption of organically grown vegetables had a lower risk of developing preeclampsia than pregnant women who reported not consuming organic vegetables or doing so less frequently [42]. Thomas et al. [39] discussed the increasing concern about the impacts of food production and observed this in their study of French consumers of organic food.

According to Kushwah et al. [43], health is one of the main drivers of organic food consumption by consumers. According to these authors, people may be concerned about their personal health or consider their perceptions regarding the characteristics of the organic product, such as the absence of chemicals; its more natural constitution; it is healthier than conventional, processed food; and its quality [43]. These findings may explain the data obtained in the present study showing that health is the main motivational factor for people who consume organic products more often (Fig. 2).

Consumers' perceptions of the environmental benefits of organic production have motivated their consumption. Lee and Yun [44] investigated the perceptions of American consumers regarding the attributes of organic foods and concluded that the main drivers of their attitudes toward buying these foods are perceptions of nutritional content, ecological well-being, sensory aspects, and price attributes of organic foods. Research conducted with consumers of organic products from two major cities in southern India showed that consumers are more willing to buy organic food due to the perceived environmental benefits generated by this type of agricultural production [45].

Despite these benefits, people find it difficult to consume organic foods. Overall, consumers from different countries, at different times, agree that an important obstacle to the consumption of organic foods is price. However, insufficient knowledge and lack of information are also constant complaints [25,44,46]. In this sense, some aspects may contribute to their prices being higher than the conventional ones. The reason for this is that, as the organic production of food becomes more expensive, it can also add value to the environment and the possibility of providing food without chemical contamination [15].

As a strategy to resolve these barriers to consumption, there is the use of marketing tools—especially in relation to the dissemination of information—which can contribute to the growth of the organic market [46]. Consumer awareness and education can increase the likelihood that consumers are willing to pay a higher price for these products. This does not mean that knowledge about organic farming methods necessarily translates into purchasing; however, consumers who do not have knowledge about organic foods are unlikely to buy them [25].

The insufficient or limited availability and supply of organic food also decreases its accessibility and therefore decreases consumers' purchasing intentions [47]. In concurrence with this statement, more than half of all of the studies selected in the literature review carried out by Kushwah et al. [43] demonstrated the availability and supply of organic foods as obstacles to their consumption. Furthermore, the authors also identified that limited variety and availability have a significant association with the purchase intentions of organic food consumers [43]. This situation was found among respondents in the present study, while consumers who considered

the availability, supply, and variety of organic food unsatisfactory consumed these foods less frequently than did those who considered them satisfactory (Table 2).

To increase the availability and offerings of organic food, fairs are of real importance because they allow for an increase in the variety of places where these foods are sold—in addition to supermarkets. This shows the preference of the interviewed consumers to buy or acquire these foods in organic fairs or for their own cultivation. This discovery is interesting because as fairs become more accessible to consumers, they are also a source of jobs and income and consequently ensure the employment of a large number of workers [48]. These consumers may also believe that organic food prices take into account not only the final cost of the product but also the environmental and social dimensions of organic production. These people may be aware that having cheaper prices than conventional foods are often the result of negative impacts generated throughout the stages of the food system, such as damage to the environment and the health of the population and farmers [49].

Along with knowledge, for the expansion of the organic food market, the population needs to trust the origin and safety of these foods. Thus, the certification seal and the registration of production become important in this process. This is because it is not possible to visually differentiate an organic product from a conventional one. Therefore, as mentioned by most of this study's respondents, to be aware of this characteristic, people take ownership of this identification mechanism, which is determined by federal legislation in Brazil [5].

In their research, Wekeza and Sibanda [47] found that organic food consumers in South Africa were mainly single, divorced, or widowed. According to these authors, consumers without a family spend more on food than married consumers because they can pay for higher organic prices. On the other hand, married people may not buy these foods because they have more family members to feed. However, in the present study, people who have a partner—individuals who are married or in a stable relationship—consume organic foods more often than people without a partner (Table 4). This result may be linked to the fact that the majority of people are motivated to consume organic foods because of their health concerns. Therefore, individuals with a partner are concerned not only with their own well-being but also with the collective health of their family.

Regarding the age group of consumers who more regularly consume organic food, the results of this research suggest that the consumption of organic food in the surveyed region is carried out mainly by the most physically active people (Table 4). Therefore, those who are able to easily get around can reach the sales locations for these foods with no problems.

4.1. Practical implications and limitations

There is a need for government programs that seek to encourage organic agricultural practices, technical training for producers, and information for consumers. This should be emphasized to guarantee food and nutrition security, which is in line with the essential human right for all people to have adequate food.

Although this study contributes knowledge about organic foods, perceptions, motivations, and limitations to the production and consumption of these foods, it still has limitations. As in the surveyed region, some private establishments in which organic fairs are held did not allow research to be carried out in these places. Notably, the sampling, in relation to organic food producers/traders, took place in a convenient and nonprobabilistic manner. Future research with a larger sample may be needed to improve the results. In addition, although the sample size of consumers was probabilistic, there was resistance from some to answering the questionnaire. This fact demonstrates the need for public awareness to successfully collaborate with scientific research.

5. Conclusions

The organic producers/traders of Grande Vitória are generally males with less than a high school education who organically produce fruits and vegetables with certification or a declaration of production registration. The consumers of organic food are mostly female, are familiar with these products, have undergraduate or graduate degrees, and eat organically grown fruits and vegetables.

The fact that both consumers and producers/traders relate their consumption and production of organic foods to health concerns reveals an important role for these kinds of foods in promoting health and quality of life, which benefits those who produce them and those who consume them. This can be encouraged by health professionals, as the consumption of organic foods is, in practice, a way of stimulating market growth.

However, for the continued growth of the organic food market, there needs to be an integration of the efforts of political authorities and the public sector (producers and consumers). It should be noted that the present study provides knowledge about organic foods, demands from producers and consumers, and the target audience. Such information can support the most impactful future direction for market growth, which is the development of public policies that encourage organic agriculture and strategies for promoting the organic food market.

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CRedit authorship contribution statement

Jhenifer de Souza Couto Oliveira: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal

analysis, Conceptualization. **Carolina Perim de Faria**: Writing – review & editing, Writing – original draft, Project administration, Formal analysis, Conceptualization. **Jackline Freitas Brilhante de São José**: Writing – review & editing, Writing – original draft, Supervision, Project administration, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e31385>.

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