

Regional and social inequalities in food insecurity in Brazil, 2013-2018

Desigualdades regionais e sociais na insegurança alimentar no Brasil, 2013-2018

Desigualdades regionales y sociales en la inseguridad alimentaria en Brasil, 2013-2018

Camilla Christine de Souza Cherol ¹

Aline Alves Ferreira ¹

Juliana de Bem Lignani ^{1,2}

Rosana Salles-Costa ¹

doi: 10.1590/0102-311XEN083822

Abstract

This study aims to analyze the association between social indicators and the worsening of food insecurity in 2013 and 2018 in different regions of Brazil. Data from the Brazilian National Household Sample Survey (2013) and Brazilian Household Budgets Survey (2018) were analyzed, considering nationally representative samples of 110,750 and 57,920 households, respectively. Food insecurity was assessed using the Brazilian Food Insecurity Scale by estimating the percentage changes in food insecurity levels between 2013 and 2018, according to sociodemographic variables. The association between social indicators and food insecurity disaggregated by region was estimated using multinomial logistic regression models. Although North and Northeast regions had higher proportions of food insecurity, the Southeast and Central-West regions had the highest increase in food insecurity in the same periods. Income was the indicator with the highest association with food insecurity both in 2013 and 2018. We also observed the association between the presence of three or more residents aged under 18 in a household and a higher risk of food insecurity in North and South regions. Food insecurity increased unevenly among regions during the Brazilian economic crisis, which reinforced regional inequality. Moreover, food insecurity was greater among households with worse social and economic living conditions, contributing to social inequality in the country. Thus, strengthening public policies to promote food security and nutrition according to regional social inequities is necessary.

Food Insecurity; Social Indicators; Social Inequality; Poverty; Health Surveys

Correspondence

C. C. S. Cherol

Instituto de Nutrição Josué de Castro, Universidade Federal do Rio de Janeiro.

Av. Carlos Chagas Filho 373, Rio de Janeiro, RJ 21941-590, Brasil.

camillacherol@gmail.com

¹ Instituto de Nutrição Josué de Castro, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brasil.

² Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brasil.



Introduction

Since 2014, Latin America has one of the highest increases in the prevalence of moderate and severe household food insecurity in the world, as 38.7% of its population lack regular access to sufficient food for a healthy living due to the unavailability of food or resources to obtain it ¹. This condition results from social inequalities and poverty and violates the human right to adequate food and the commitment to the regularity, quality, and quantity of food consumed ^{1,2}.

Brazil was internationally recognized by the United Nations Development Programme (UNDP) for investing in social policies aimed to promote food security and nutrition and fight against hunger and extreme poverty. This recognition concerned the effect of investments to guarantee the human right to adequate food and decrease social inequalities over the last decade ³. Both *Brazilian National Household Sample Surveys* (PNAD) conducted from 2004 (34.9%) and 2013 (22.6%) by the Brazilian Institute of Geography and Statistics (IBGE) ^{4,5} and the removal of Brazil from the Hunger Map of the Food and Agriculture Organization of the United Nations (FAO) ^{4,6,7} showed this effect on the reduction in food insecurity.

However, the 2018 *Brazilian Household Budgets Survey* (POF) ² showed setbacks in these achievements due to the increase in individuals experiencing poverty and inequality. Brazil is the largest country in Latin America and is divided into five large geographically, socially, culturally, and economically different regions. These regions are important from social and geographic perspectives and have socioeconomic differences. North and Northeast regions historically have the worst social, income, and health indicators compared with other regions ^{2,8,9,10}.

Hunger increased in 2018 due to the worsening of poverty and social inequality and such increase was even higher in households in North (10.2%) and Northeast regions (7.1%) ², which reinforces the continuity of geographic inequalities in social determinants of health, as well as social inequality, hunger, and poverty in the largest regions of Brazil.

Studies based on national surveys showed social indicators associated with food insecurity in Brazil until 2013 ^{8,9}, reinforcing the use of the food insecurity indicator as a marker of inequalities in the country ^{2,11}. However, there are gaps in our understanding of the factors that could explain the worsening of food insecurity and the reduction in food security among Brazilian households after 2013, as well as whether food insecurity occurred homogeneously among regions. Thus, this study aims to analyze the association between social indicators and the worsening of food insecurity in 2013 and 2018 in different regions of Brazil.

Methods

This study was based on an analysis of data from two nationally representative surveys assessing food insecurity in the Brazilian population. Both the PNAD 2013 ⁵ and the POF 2017-2018 ² were conducted by the IBGE.

The research design and sample selection of the two surveys were based on the master sample of the Integrated System of Household Surveys, which is used in all IBGE surveys. This master sample includes primary sampling units (PSUs), that is, census sectors, which allows comparability in trend studies. The PNAD 2013 sample was obtained by sampling in three stages: municipality, census sector, and household. Municipality and census sector were selected with replacement and probability proportional to the population obtained from the 2010 demographic census data. Households were selected from each census sector. For POF 2017-2018, the sampling process included clusters in two stages: the master sample and the households selected by simple random sampling without replacement in each selected PSU ². IBGE assessed 111,073 households in 2013. By excluding those that were not permanent private households (n = 323; 0.3%), the final sample was 110,750 households (PNAD 2013). The POF 2017-2018 sample included 57,920 households.

Food insecurity was the outcome of this study and it was assessed using the *Brazilian Food Insecurity Scale* (EBIA). EBIA has been used in national surveys since PNAD 2004, as it is a psychometric scale validated for and adapted to the Brazilian population ¹². This scale includes yes/no questions about the perception of individuals responsible for the food in their household regarding access to food in

the previous 90 days. Individuals from households without residents under 18 years of age answer eight questions and those living with children and/or adolescents under 18 years of age answer 14 questions. From the sum of affirmative answers, cut-off points are applied to classify households as “food security” (score = 0), “mild food insecurity” (score = 1-5 for households with children/adolescents and 1-3 for those with adults only), “moderate food insecurity” (score = 6-9 for households with children/adolescents and 4-5 for those with adults only), or “severe food insecurity” (score = 10-14 for households with children/adolescents and 6-8 for those with adults only) ¹³.

Food security, that is, when a household has regular and permanent access to enough high-quality food without compromising access to other essential needs, was a reference category. “Mild food insecurity” includes households with concern or uncertainty about access to food in the future and inadequate food quality resulting from strategies that aim not to compromise the amount of food. “Moderate food insecurity” shows a quantitative reduction in food among adults and/or disruption in eating patterns resulting from a lack of food. “Severe food insecurity” involves a quantitative reduction in food among children and a rupture in eating patterns resulting from the lack of food among all residents, including children; in this case, hunger becomes an experience lived at home ².

Based on food insecurity-related indicators established in the literature ^{8,9,14,15}, characteristics that could explain the worsening of food security in Brazil were analyzed using the following covariates: region (North, Northeast, South, Southeast, or Central-West), monthly per capita income (≤ 1 , > 1 and ≤ 2 , or > 2 minimum wages) – considering the values in force in the reference period of each year: USD 298.68 (BRL 678.00) in 2013 and USD 297.20 (BRL 954.00) in 2018 ^{2,5} – number of residents under 18 years of age (0, 1-2, or ≥ 3), and area (urban or rural), besides variables related to the head of the household: sex (man or woman), race/skin color (white, mixed-race/black) – individuals who declared themselves indigenous or Asian were excluded due to low representation in the sample and in Brazil (2%) – and schooling level (≤ 8 or > 9 years).

For descriptive analyses, proportions and 95% confidence intervals (95%CI) were estimated. A chi-square test was performed to assess food insecurity levels and socioeconomic and demographic characteristics among households in the five regions of Brazil, considering a significance level of $p < 0.05$ for differences. In this study, households with moderate and severe food insecurity were grouped together because they represent greater severity and quantitative reduction in food among residents ¹. Multinomial logistic regression models were used to evaluate the association between study variables and food insecurity and stratified for each region. The odds ratio (OR) calculator was used.

The adjusted regression model considered variables with $p < 0.20$ in the crude multinomial analysis, which was performed using the chi-square test. Variables with $p < 0.05$ remained in the final adjusted model ¹⁶. Probabilities were predicted for the food insecurity outcome according to the monthly per capita income ≤ 1 minimum wage after the final model was adjusted for each region of Brazil in 2013 and 2018. The variance inflation factor (VIF) test was performed to evaluate multicollinearity, which was discarded because in the models, $VIF < 4$ ¹⁷. Analyses were performed using the Stata 16.0 software (<https://www.stata.com>), considering the expansion procedures for population surveys.

All IBGE data collection activities are under *Law n. 5,534* of November 14, 1968, which states that all information provided is confidential and used exclusively for statistical purposes. Researchers who use secondary data available in the public domain do not need approval by the local Research Ethics Committee, according to *Resolution n. 510* of April 7, 2016, of the Brazilian National Research Ethics Committee (CONEP). This research used IBGE data available in the public domain.

Results

In 2013, most households were in a food security situation (77.1%), with the highest prevalence in Southeast (85.3%), South (84.9%), and Central-West regions (81.6%). However, the prevalence of food insecurity levels increased in 2018 in all regions. Although North (mild food insecurity: 22% in 2013 and 32.1% in 2018; moderate/severe food insecurity: 14.7% in 2013 and 25.8% in 2018) and Northeast regions (mild food insecurity: 24% in 2013 and 29.9% in 2018; moderate/severe food insecurity: 14.6% in 2013 and 20.2% in 2018) had higher food insecurity levels in the two years, Southeast and

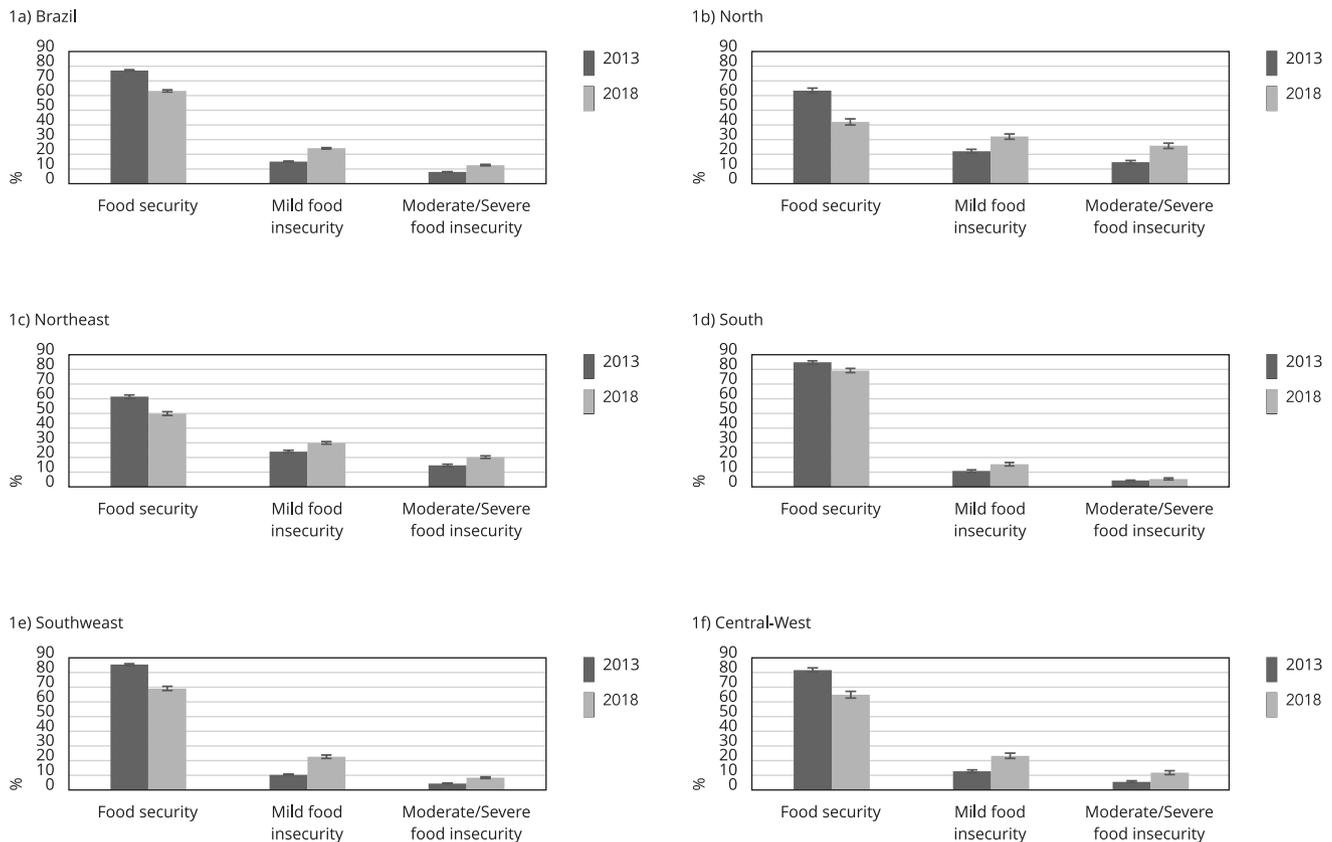
Central-West regions had the highest increase in food insecurity in the same period (Southeast: mild food insecurity: 2.2 times and moderate/severe food insecurity: 1.9 times; Central-West: mild food insecurity: 1.8 times; moderate/severe food insecurity: 2.1 times). This increase was greater than in the North (mild food insecurity: 1.5 times; moderate/severe food insecurity: 1.8 times) and Northeast regions (mild food insecurity: 1.2 times; moderate/severe food insecurity: 1.4 times) (Figure 1).

The prevalence of households with monthly per capita income > 2 minimum wage increased from 2013 (24.4%; 95%CI: 23.9-25.0) to 2018 (51.8%; 95%CI: 51.0-52.6); however, only approximately half of the population received > 2 minimum wage. The proportion of households without residents under 18 years of age increased from 2013 (47.9%; 95%CI: 47.4-48.3) to 2018 (51.6%; 95%CI: 50.9-52.3). Most heads of households were mixed-race/black in the two studied years (53.0%; 95%CI: 52.5-53.5 in 2013 and 55.1%; 95%CI: 54.3-55.9 in 2018) (Table 1).

Monthly per capita income increased in all regions from 2013 to 2018. South (30.3% in 2013 and 63.8% in 2018), Southeast (30.5% in 2013 and 60.3% in 2018), and Central-West regions (28.5% in 2013 and 59.1% in 2018) had the highest increases in the prevalence of income > 2 minimum wage. North and Northeast regions had the highest increases in the prevalence of households with per capita income > 2 minimum wage (2.3 times and 2.7 times, respectively). In the North, Northeast, South, and Southeast regions, the prevalence of women as heads of the household increased from

Figure 1

Evolution of the prevalence (%) of food security and mild and moderate/severe food insecurity in households. *Brazilian National Household Sample Survey (PNAD 2013) and Brazilian Household Budgets Survey (POF 2018).*



Note: Pearson chi-square test and $p < 0.05$.

Table 1

Socioeconomic and demographic characteristics. *Brazilian National Household Sample Survey* (PNAD 2013) and *Brazilian Household Budgets Survey* (POF 2018).

Characteristics	PNAD 2013		POF 2018	
	%	95%CI	%	95%CI
Region of Brazil				
North	7.3	7.2-7.4	7.2	6.9-7.4
Northeast	26.2	26.0-26.5	26.9	26.4-27.5
South	15.3	15.1-15.5	15.5	15.0-16.0
Southeast	43.4	43.1-43.7	42.7	42.0-43.4
Central-West	7.7	7.6-7.9	7.8	7.3-8.1
Monthly per capita income (minimum wage *)				
≤ 1	49.2	48.6-49.7	20.8	20.3-21.4
> 1 and ≤ 2	26.4	26.0-26.8	27.4	26.8-28.0
> 2	24.4	23.9-25.0	51.8	51.0-52.6
Number of residents < 18 years of age				
0	47.9	47.4-48.3	51.6	50.9-52.3
1-2	42.9	42.6-43.3	41.2	40.5-41.9
≥ 3	9.2	9.0-9.4	7.2	6.9-7.5
Area				
Urban	85.7	85.0-86.4	86.4	85.9-86.9
Rural	14.3	13.6-15.0	13.6	13.1-14.1
Sex				
Man	62.4	61.9-62.8	58.4	57.7-59.1
Woman	37.6	31.2-38.1	41.6	40.9-42.3
Race/Skin color				
White	47.0	46.5-47.5	44.9	44.1-45.7
Mixed-race/Black	53.0	52.5-53.5	55.1	54.3-55.9
Schooling level (years)				
≤ 8	47.1	46.6-47.6	42.6	41.8-43.4
> 9	52.9	52.4-53.4	57.4	56.6-58.2

95%CI: 95% confidence interval.

* Minimum wage: 2013 – USD 298.68 (BRL 678.00); 2018 – USD 297.20 (BRL 954.00).

2013 to 2018; however, man's responsibility was higher in all regions. The number of mixed-race/black individuals increased in Northeast (73.5% in 2013 and 75.4% in 2018) and Central-West regions (59.8% in 2013 and 63.8% in 2018). North Region had the highest prevalence of mixed-race/black individuals (81.1%) (Table 2).

Considering the analyses of the final model (Table 3), North Region had a significantly increased risk of moderate/severe food insecurity for households with ≥ 3 residents under 18 years of age, Northeast Region had a significantly increased risk of moderate/severe food insecurity for monthly per capita income > 1 and ≤ 2 minimum wage, and South Region had a significantly increased risk of both mild food insecurity and moderate/severe food insecurity for households with ≥ 3 children and/or adolescents. Rural households in Central-West Region were directly associated with food security in 2018 (Table 3).

From the final model adjusted for each region, we predicted probabilities of food insecurity. For all regions, the predicted probability of food security for households with monthly per capita income ≤ 1 minimum wage was higher in 2013 than in 2018. For mild and moderate/severe food insecurity, the probabilities of receiving ≤ 1 minimum wage and experiencing food insecurity were higher in 2018 than in 2013. In North and Northeast regions, the lines were almost straight, which shows a higher probability of food insecurity in both years compared with other regions (Figure 2).

Table 2

Prevalence of household food insecurity and socioeconomic and demographic characteristics according to regions of Brazil. *Brazilian National Household Sample Survey (PNAD 2013) and Brazilian Household Budgets Survey (POF 2018).*

Characteristics	North		Northeast		South		Southeast		Central-West	
	PNAD 2013	POF 2018								
	% (95%CI)									
Food insecurity *										
Food security	63.3 (61.6-65.0)	42.2 (40.0-44.3)	61.4 (60.2-62.6)	49.9 (48.7-51.0)	84.9 (84.0-85.7)	79.2 (77.8-80.6)	85.3 (84.6-86.0)	69.1 (67.6-70.5)	81.6 (80.1-83.0)	64.9 (62.6-67.2)
Mild	22.0 (20.7-23.3)	32.1 (30.3-34.0)	24.0 (23.1-24.9)	29.9 (29.0-30.8)	10.8 (10.1-11.5)	15.4 (14.3-16.5)	10.3 (9.8-10.8)	22.6 (21.5-23.7)	12.8 (11.8-13.9)	23.3 (21.5-25.2)
Moderate/ Severe	14.7 (13.7-15.7)	25.7 (24.0-27.5)	14.6 (13.9-15.3)	20.3 (19.3-21.2)	4.4 (4.0-4.8)	5.4 (4.7-6.2)	4.4 (4.1-4.7)	8.3 (7.7-9.1)	5.6 (4.9-6.2)	11.8 (10.5-13.2)
Monthly per capita income (minimum wage **) *										
≤ 1	65.3 (64.1-66.5)	38.0 (36.2-39.9)	70.5 (69.6-71.4)	35.1 (34.1-36.1)	35.4 (34.1-36.6)	11.6 (10.5-12.8)	39.4 (38.6-40.3)	13.5 (12.6-14.5)	43.3 (41.8-44.8)	14.0 (12.6-15.4)
> 1 and ≤ 2	20.0 (19.1-20.8)	28.4 (26.7-30.2)	16.9 (16.3-17.5)	30.8 (29.9-31.7)	34.3 (33.4-35.2)	24.6 (23.3-26.0)	30.1 (29.4-30.8)	26.2 (25.1-27.3)	28.2 (27.2-29.2)	26.9 (25.2-28.6)
> 2	14.7 (13.8-15.7)	33.5 (31.6-35.5)	12.6 (11.9-13.3)	34.1 (33.1-35.2)	30.3 (29.2-31.5)	63.8 (62.0-65.5)	30.5 (29.5-31.5)	60.3 (58.7-61.8)	28.5 (27.0-30.0)	59.1 (56.9-61.4)
Number of residents < 18 years of age *										
0	36.3 (35.3-37.3)	35.6 (33.9-37.4)	41.8 (41.1-42.5)	46.8 (45.8-47.7)	51.7 (50.7-52.7)	55.2 (53.6-56.7)	52.0 (51.2-52.7)	56.0 (54.6-57.4)	48.7 (47.5-49.9)	51.9 (49.4-54.3)
1-2	45.6 (44.7-46.5)	49.2 (47.6-44.9)	46.4 (45.7-47.0)	44.0 (43.1-44.9)	42.1 (41.3-43.0)	40.3 (38.9-41.8)	40.7 (40.1-41.3)	38.4 (37.1-39.8)	42.9 (41.9-44.0)	40.8 (38.7-42.9)
≥ 3	18.1 (17.3-18.9)	15.2 (13.9-16.5)	11.8 (11.3-12.3)	9.2 (8.7-9.8)	6.2 (5.7-6.7)	4.5 (4.0-5.1)	7.3 (7.0-7.7)	5.6 (5.0-6.2)	8.4 (7.9-9.0)	7.3 (6.5-8.3)
Area *										
Urban	75.6 (73.4-77.6)	77.7 (76.1-79.3)	74.8 (73.2-76.4)	74.9 (73.6-76.2)	85.8 (83.7-87.7)	87.5 (86.6-88.3)	93.4 (92.3-94.2)	93.8 (93.3-94.3)	89.3 (87.6-90.8)	90.6 (89.6-91.4)
Rural	24.4 (22.4-26.6)	22.3 (20.7-23.9)	25.2 (23.6-26.8)	25.1 (23.8-26.4)	14.2 (12.3-16.3)	12.5 (11.7-13.4)	6.6 (5.8-7.6)	6.2 (5.7-6.7)	10.7 (9.2-12.4)	9.4 (8.6-10.4)
Sex *										
Man	63.1 (62.1-64.2)	57.8 (55.9-59.7)	61.3 (60.5-62.1)	54.9 (53.8-56.0)	63.4 (62.4-64.4)	57.7 (56.1-59.3)	62.5 (61.7-63.3)	60.3 (59.0-61.6)	62.4 (61.2-63.6)	61.6 (59.6-63.6)
Woman	36.9 (35.8-37.9)	42.2 (40.3-44.1)	38.7 (37.9-39.5)	45.1 (44.0-46.2)	36.6 (35.6-37.6)	42.3 (40.7-43.9)	37.5 (36.7-38.2)	39.7 (38.4-41.0)	37.6 (36.4-38.8)	38.4 (36.3-40.4)
Race/Skin color *										
White	21.1 (20.2-22.0)	18.9 (17.5-20.3)	26.5 (25.8-27.3)	24.6 (23.6-25.6)	76.5 (75.3-77.7)	75.4 (73.8-76.9)	54.5 (53.6-55.4)	52.6 (51.0-54.2)	40.2 (38.9-41.5)	36.2 (34.2-38.3)
Mixed-race/Black	78.9 (78.0-79.8)	81.1 (79.7-82.5)	73.5 (72.7-74.2)	75.4 (74.4-76.4)	23.5 (22.3-24.7)	24.6 (23.1-26.2)	45.5 (44.6-46.4)	47.4 (45.8-49.0)	59.8 (58.5-61.1)	63.8 (61.7-65.8)

(continues)

Table 2 (continued)

Characteristics	North		Northeast		South		Southeast		Central-West	
	PNAD 2013	POF 2018								
	% (95%CI)									
Schooling level (years) *										
≤ 8	51.3 (50.1-52.5)	44.9 (42.9-46.9)	58.5 (57.4-59.5)	53.9 (52.8-55.0)	44.6 (43.4-45.8)	39.7 (38.1-41.3)	41.0 (40.1-41.8)	36.5 (35.2-38.0)	43.5 (42.2-44.8)	40.4 (38.0-42.9)
> 9	48.7 (47.5-49.9)	55.1 (53.1-57.1)	41.5 (40.5-42.6)	46.1 (45.0-47.2)	55.4 (54.2-56.6)	60.3 (58.7-61.8)	59.0 (58.2-59.9)	63.5 (62.0-64.8)	56.5 (55.2-57.8)	59.6 (57.1-62.0)

95%CI: 95% confidence interval.

* $p < 0.05$ (Pearson chi-square test);

** Minimum wage: 2013 – USD 298.68 (BRL 678.00); 2018 – USD 297.20 (BRL 954.00).

Table 3

Odds ratio (OR) and 95% confidence intervals (95%CI) adjusted for regions of Brazil by socioeconomic and demographic variables according to levels of food insecurity. *Brazilian National Household Sample Survey* (PNAD 2013) and *Brazilian Household Budgets Survey* (POF 2018).

Characteristics	Mild food insecurity		Moderate/Severe food insecurity	
	PNAD 2013 Adjusted OR * (95%CI)	POF 2018 Adjusted OR * (95%CI)	PNAD 2013 Adjusted OR * (95%CI)	POF 2018 Adjusted OR * (95%CI)
North				
Monthly per capita income (minimum wage **)				
≤ 1	2.5 (2.1-3.0) ***	2.0 (1.6-2.5) ***	4.3 (3.3-5.6) ***	4.1 (3.2-5.3) ***
> 1 and ≤ 2	1.4 (1.2-1.8) ***	1.4 (1.2-1.8) ***	1.3 (0.9-1.8)	2.0 (1.6-2.6) ***
> 2	1.0	1.0	1.0	1.0
Number of residents < 18 years of age				
0	1.0	1.0	1.0	1.0
1-2	1.7 (1.5-1.9) ***	2.1 (1.8-2.5) ***	0.9 (0.8-0.9) ***	1.1 (0.9-1.4)
≥ 3	2.3 (2.1-2.7) ***	3.0 (2.2-4.0) ***	1.9 (1.6-2.2) ***	3.3 (2.5-4.2) ***
Area				
Urban	1.0	1.0	1.0	1.0
Rural	1.0 (0.8-1.2)	2.1 (0.7-1.2)	1.0 (0.8-1.3)	1.1 (0.8-1.4)
Sex				
Man	1.0	1.0	1.0	1.0
Woman	1.2 (1.1-1.3) ***	-	1.5 (1.3-1.7) ***	-
Race/Skin color				
White	1.0	1.0	1.0	1.0
Mixed-race/Black	1.2 (1.1-1.4) ***	1.2 (1.0-1.6)	1.6 (1.4-1.8) ***	1.4 (1.1-1.8) ***
Schooling level (years)				
≤ 8	1.2 (1.1-1.4) ***	1.3 (1.1-1.7) ***	2.1 (1.8-2.4) ***	1.8 (1.5-2.2) ***
> 9	1.0	1.0	1.0	1.0

(continues)

Table 3 (continued)

Characteristics	Mild food insecurity		Moderate/Severe food insecurity	
	PNAD 2013 Adjusted OR * (95%CI)	POF 2018 Adjusted OR * (95%CI)	PNAD 2013 Adjusted OR * (95%CI)	POF 2018 Adjusted OR * (95%CI)
Northeast				
Monthly per capita income (minimum wage **)				
≤ 1	2.7 (2.3-3.0) ***	2.3 (2.1-2.7) ***	4.6 (3.8-5.5) ***	5.2 (4.5-6.0) ***
> 1 and ≤ 2	1.5 (1.3-1.8) ***	1.6 (1.4-1.8) ***	1.4 (1.1-1.8) ***	2.3 (2.0-2.6) ***
> 2	1.0	1.0	1.0	1.0
Number of residents < 18 years of age				
0	1.0	1.0	1.0	1.0
1-2	2.0 (1.9-2.2) ***	1.9 (1.7-2.1) ***	0.8 (0.8-0.9) ***	1.0 (0.9-1.1)
≥ 3	2.9 (2.6-3.2) ***	2.5 (2.1-3.0) ***	2.0 (1.7-2.2) ***	2.2 (1.8-2.6) ***
Area				
Urban	1.0	1.0	1.0	1.0
Rural	1.4 (1.3-1.6) ***	1.0 (0.9-1.2)	1.4 (1.3-1.6) ***	1.1 (0.9-1.3)
Sex				
Man	1.0	1.0	1.0	1.0
Woman	1.1 (1.0-1.4) ***	1.2 (1.1-1.4) ***	1.4 (1.3-1.5) ***	1.5 (1.3-1.6) ***
Race/Skin color				
White	1.0	1.0	1.0	1.0
Mixed-race/Black	1.3 (1.2-1.4) ***	1.2 (1.1-1.3) ***	1.7 (1.6-1.9) ***	1.5 (1.3-1.7) ***
Schooling level (years)				
≤ 8	1.3 (1.2-1.4) ***	1.3 (1.2-1.4) ***	2.3 (2.1-2.5) ***	1.9 (1.7-2.1) ***
> 9	1.0	1.0	1.0	1.0
South				
Monthly per capita income (minimum wage **)				
≤ 1	3.2 (2.7-3.8) ***	2.6 (2.0-3.4) ***	7.2 (5.2-9.9) ***	4.7 (3.2-6.8) ***
> 1 and ≤ 2	1.7 (1.4-2.1) ***	1.9 (1.6-2.3) ***	1.9 (1.3-2.7) ***	2.2 (1.7-3.0) ***
> 2	1.0	1.0	1.0	1.0
Number of residents < 18 years of age				
0	1.0	1.0	1.0	1.0
1-2	1.6 (1.4-1.8) ***	2.0 (1.7-2.5) ***	0.6 (0.5-0.7) ***	0.8 (0.6-1.1)
≥ 3	2.2 (1.8-2.7) ***	4.7 (3.4-6.6) ***	1.1 (0.8-1.4)	2.8 (1.8-4.4) ***
Area				
Urban	1.0	1.0	1.0	1.0
Rural	-	-	-	-
Sex				
Man	1.0	1.0	1.0	1.0
Woman	1.6 (1.5-1.8) ***	1.7 (1.4-2.0) ***	1.8 (1.5-2.1) ***	2.1 (1.6-2.7) ***
Race/Skin color				
White	1.0	1.0	1.0	1.0
Mixed-race/Black	1.7 (1.5-1.9) ***	1.7 (1.4-2.0) ***	2.1 (1.8-2.5) ***	2.0 (1.5-2.7) ***
Schooling level (years)				
≤ 8	1.6 (1.4-1.8) ***	1.4 (1.2-1.7) ***	2.0 (1.7-2.4) ***	1.5 (1.1-2.0) ***
> 9	1.0	1.0	1.0	1.0

(continues)

Table 3 (continued)

Characteristics	Mild food insecurity		Moderate/Severe food insecurity	
	PNAD 2013 Adjusted OR * (95%CI)	POF 2018 Adjusted OR * (95%CI)	PNAD 2013 Adjusted OR * (95%CI)	POF 2018 Adjusted OR * (95%CI)
Southeast				
Monthly per capita income (minimum wage **)				
≤ 1	3.3 (2.9-3.8) ***	2.6 (2.1-3.1) ***	6.7 (5.3-8.3) ***	5.9 (4.6-7.4) ***
> 1 and ≤ 2	1.7 (1.5-1.9) ***	1.8 (1.6-2.1) ***	1.8 (1.4-2.3) ***	2.5 (2.1-3.1) ***
> 2	1.0	1.0	1.0	1.0
Number of residents < 18 years of age				
0	1.0	1.0	1.0	1.0
1-2	1.5 (1.4-1.7) ***	1.7 (1.5-2.0) ***	0.7 (0.6-0.8) ***	0.8 (0.6-0.9) ***
≥ 3	2.1 (1.9-2.4) ***	2.7 (2.1-3.4) ***	1.3 (1.1-1.6) ***	1.6 (1.2-2.2) ***
Area				
Urban	1.0	1.0	1.0	1.0
Rural	0.8 (0.7-0.9) ***	0.9 (0.7-1.0)	0.8 (0.6-1.0)	0.8 (0.6-1.1)
Sex				
Man	1.0	1.0	1.0	1.0
Woman	1.3 (1.2-1.4) ***	1.3 (1.1-1.4) ***	1.6 (1.4-1.8) ***	1.7 (1.4-2.0) ***
Race/Skin color				
White	1.0	1.0	1.0	1.0
Mixed-race/Black	1.4 (1.3-1.6) ***	1.6 (1.4-1.8) ***	1.8 (1.6-2.0) ***	1.9 (1.6-2.2) ***
Schooling level (years)				
≤ 8	1.3 (1.2-1.4) ***	1.2 (1.1-1.4) ***	1.8 (1.6-2.1) ***	1.5 (1.2-1.8) ***
> 9	1.0	1.0	1.0	1.0
Central-West				
Monthly per capita income (minimum wage **)				
≤ 1	3.3 (2.6-4.2) ***	2.9 (2.3-3.6) ***	7.0 (4.9-10.2) ***	5.2 (3.9-7.0) ***
> 1 and ≤ 2	2.0 (1.6-2.5) ***	1.9 (1.5-2.3) ***	1.8 (1.3-2.5) ***	2.3 (1.8-3.0) ***
> 2	1.0	1.0	1.0	1.0
Number of residents < 18 years of age				
0	1.0	1.0	1.0	1.0
1-2	1.6 (1.4-1.8) ***	1.8 (1.5-2.1) ***	0.5 (0.4-0.6) ***	0.6 (0.5-0.8) ***
≥ 3	2.5 (2.0-3.1) ***	2.2 (1.6-2.9) ***	0.9 (0.7-1.2)	1.2 (0.7-2.0)
Area				
Urban	1.0	1.0	1.0	1.0
Rural	-	0.8 (0.6-0.9) ***	-	0.6 (0.4-0.7) ***
Sex				
Man	1.0	1.0	1.0	1.0
Woman	1.2 (1.1-1.4) ***	1.3 (1.1-1.6) ***	1.5 (1.2-1.7) ***	1.5 (1.2-1.8) ***
Race/Skin color				
White	1.0	1.0	1.0	1.0
Mixed-race/Black	1.2 (1.1-1.4) ***	1.2 (0.9-1.4)	2.0 (1.6-2.4) ***	1.9 (1.4-2.5) ***
Schooling level (years)				
≤ 8	1.5 (1.3-1.7) ***	1.4 (1.2-1.7) ***	2.1 (1.7-2.6) ***	2.5 (2.0-3.3) ***
> 9	1.0	1.0	1.0	1.0

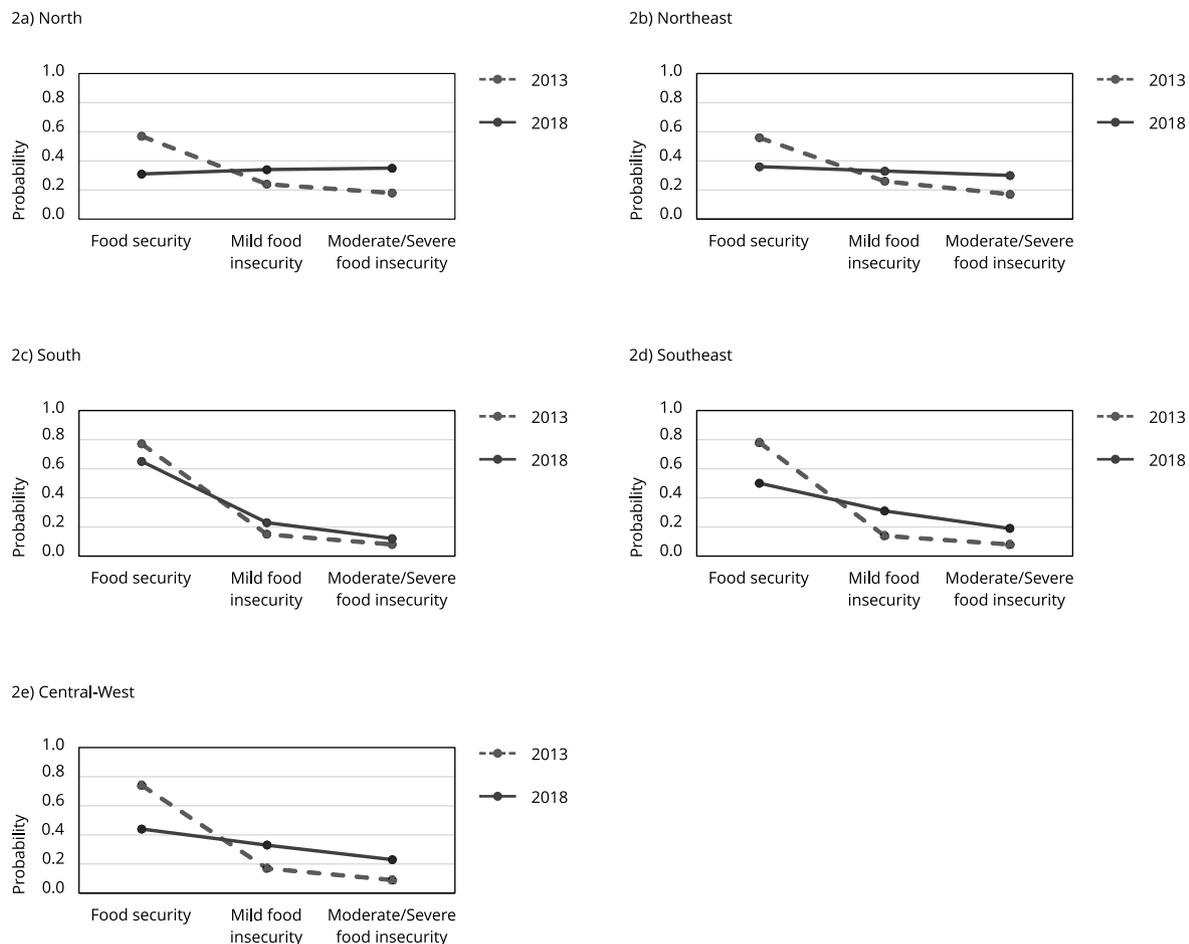
* Multinomial logistic regression with all adjustment variables: monthly per capita income, number of residents < 18 years of age, area, sex, race/skin color, and schooling level for all regions of Brazil, except area for South and Central-West regions in 2013 and sex for North and South regions in 2018 ($p > 0.20$);

** Minimum wage: 2013 – USD 298.68 (BRL 678.00); 2018 – USD 297.20 (BRL 954.00);

*** $p < 0.05$.

Figure 2

Distribution of predicted probabilities for food security and food insecurity according to monthly per capita income ≤ 1 minimum wage * in each region of Brazil. *Brazilian National Household Sample Survey (PNAD 2013)* and *Brazilian Household Budgets Survey (POF 2018)*.



Note: probabilities estimated by multinomial logistic regression models for each region.

* Minimum wage: 2013 - USD 298.68 (BRL 678.00); 2018 - USD 297.20 (BRL 954.00).

Discussion

Results showed that food insecurity increased in Brazil from 2013 to 2018. Food insecurity worsened in different proportions among regions and the associations between social indicators and moderate/severe food insecurity pointed to regional and social inequalities. International comparisons with other measurement scales show that the prevalence of food insecurity in Brazil from 2017 to 2018 was lower than in Mexico from 2018 to 2019¹⁸ and higher than in Canada from 2017 to 2018¹⁹.

Our findings can be analyzed in the light of the permanence of growing inequality in several countries, especially the emerging ones²⁰. Among them, Brazil continues to have one of the worst levels of social inequality²¹.

Inequality can be expressed in social dimensions, such as sex, race/skin color, geographic location, and income²¹. Income is one of the most expressive food insecurity factors⁸. Since the 2000s, wage inequality has been decreasing in Brazil and millions of individuals have left poverty, mostly due to

government programs, such as increased minimum wage and cash transfers as the Brazilian Income Transfer Program (PBF) ²⁰.

However, the political and economic crisis that started in 2015 changed the economic scenario and resulted in reduced purchasing power and increased unemployment and food prices due to inflation, which influenced food security in Brazilian households ¹⁵ and consequently increased hunger ^{7,10,15}. The assessment of food insecurity shows a violation of the basic right to food and, therefore, is a proxy measure of social inequality.

In this study, household income was the variable with the highest risk of food insecurity, with different results among regions. Although South, Southeast, and Central-West regions had the highest increases in monthly per capita income, there were also regions where low-income households were at high risk of moderate/severe food insecurity in 2018. Low-income households were more susceptible to moderate/severe food insecurity, which shows the existing inequality among more developed regions and reinforces that income is an important marker of inequality.

North and Northeast regions had the highest prevalence of food insecurity probably because they have the lowest income distribution and the highest concentrations of families living in poverty and extreme poverty ²², which reinforces the importance of cash transfers in the budgetary composition of households, especially when in poverty.

Palmeira et al. ²³ studied the effect of government programs on overcoming food insecurity in a municipality in Northeast Region and found that policies aimed at health protection, food security, poverty reduction, and rural development were associated with maintaining food security over time and overcoming food insecurity. However, from 2013 to 2018, this region was affected by budget cuts in social policy investments due to the crisis ^{7,24,25}, which strengthened income and regional inequalities.

A IBGE survey presents data that reinforce this debate on regional inequality ²⁶. Based on the Watts index, which is sensitive to inequality and poverty concentration, this survey shows that Northeast Region represents almost half of national poverty (47.9%), followed by North Region (26.1%). These two regions had the highest percentages of poverty, however, the situation of Northeast Region regarding inequality and poverty concentration is worse probably because its states have a higher population density compared with the Northern Region, besides long periods of drought.

Low-income families can apply for benefits from Federal Government cash transfer programs, such as the PBF. This program considered monthly per capita income and family composition (number of residents under 18 years of age). Until November 2021, it transferred funds to families in poverty or extreme poverty. Studies show the strong relationship between the PBF and reduced food insecurity, which is important to reduce social inequalities and increase access to food ²⁷. Northeast Brazil had a high rate of poverty and a higher proportion of families benefiting from the PBF ²³.

However, the reduction in the budget of the PBF and other social programs promoting food security and nutrition, as well as reduced household income and increased unemployment, affected the increase in food insecurity in Brazil ²⁵. Middle-class families in Northeast Region were at increased risk of moderate/severe food insecurity from 2013 to 2018, showing the effect of the economic crisis on this region, including budget cuts to these programs and increased food prices. Moreover, moderate/severe food insecurity among households with income ≤ 1 minimum wage had a high OR. These data corroborate the expansion and worsening of social inequalities in Brazil, especially among the most vulnerable population.

The period analyzed in this study presented important economic changes, which affected household income and consumption, besides increasing food prices ²⁵. Santana & Sarti ²⁸ evaluated the evolution of the cost of basic food baskets and its relationship with minimum wage in a municipality in Southeast Region. According to the authors ²⁸, the price of items included in basic food baskets increased from 1959 to 2018 and the minimum wage was insufficient to purchase them. This increased price, besides unemployment, worsened food insecurity in Brazilian households, especially those with lower income. These factors may have contributed to worsen food insecurity in the studied periods. Moreover, basic food baskets include foods such as meat, milk, beans, rice, flour, coffee, sugar, and oil, which offers an extended energy supply, but a low supply of *in natura* foods, such as fruits and vegetables.

The discontinuation of public policies may also have affected large households. In 2018, differently from 2013, households with three or more residents under 18 years of age were at higher risk of moderate/severe food insecurity in North Region and mild and moderate/severe food insecurity in South Region, which reinforces the consequences of the economic crisis. Studies analyzed the relationship between severity food insecurity, poverty, and well-being in households with children and adolescents ^{2,29,30}.

Pereira et al. ³¹ analyzed food insecurity in households with children and/or adolescents under 15 years of age using nationally representative data in 147 countries and four territories from a 2014-2015 survey and observed a high prevalence of moderate/severe food insecurity (41%). According to the authors ³¹, households with children and adolescents have structural features that make them more vulnerable to experience food insecurity, such as heads of household with lower education, lower per capita income, and more residents in the household.

The discontinuation of public social policies in Brazil, such as budget cuts for investments in rural development programs, technical assistance, and the strengthening of family farming, also affected rural regions ³². Almeida et al. ³³ assessed food insecurity in rural families and found that food security may occur because these families produce food for their own consumption and when production exceeds, it can be sold, which would generate income and minimize food insecurity. Although other studies ^{9,33} showed lower food insecurity in rural areas, in this study, we found a direct relationship between living in rural areas and food security only in Central-West Region.

This study also found that in South, Southeast, and Central-West regions, despite families with higher wages and food security, woman's responsibility at home was associated with risk of food insecurity. This finding may contribute to the debate on gender inequality among more developed regions. Moreover, in both studied years, households with mixed-race/black individuals were directly associated with food insecurity, which corroborates previous studies ^{34,35,36,37} and shows that although more than half of the Brazilian population is mixed-race/black ², social policies to advance racial equity and eradicate structural injustices that have historically relegated this population to the margins of society still have much to develop.

Our findings showed the reduction of food security in Brazilian households before the COVID-19 pandemic. This health crisis, besides the already existing political, economic, and social crises, worsened access to adequate food on a regular and a permanent basis. The Brazilian Research Network on Food and Nutrition Sovereignty and Security (Rede PENSSAN) conducted two surveys on food insecurity in the context of the COVID-19 pandemic in Brazil, in 2020 and from 2021 to 2022 ^{11,38}. Data showed that the prevalence of residents in a severe food insecurity situation, who faced food deprivation and hunger, increased from 9% in 2020 to 15.5% in the 2021-2022 period.

This study had limitations. Although it was not longitudinal, IBGE used a common and representative sample in both surveys, which allowed the comparison of findings between the two years, updating the literature on food security and food insecurity trends in Brazil. Our findings enables the understanding of the association between social indicators and the worsening of food insecurity, poverty, and hunger in the five regions of Brazil in two different economic scenarios. Moreover, it reinforces the debate on socioeconomic inequality in the country and the importance of policies to promote food security and nutrition, especially in the current context of discontinued social policies.

Conclusion

The analysis of food security/food insecurity data from two Brazilian surveys showed that from 2013 to 2018, the prevalence of food insecurity significantly increased. This increase occurred unevenly among regions, since North and Northeast, which have greater social, economic, and demographic vulnerability, had higher food insecurity, especially at moderate/severe levels. However, food insecurity also increased in South, Southeast, and Central-West, the most developed regions of the country. We observed a different risk pattern for food insecurity among households with residents under 18 years of age depending on household density, especially in the South and Northeast regions, which provides further evidence for the debate on income and social and regional inequality in Brazil.

These findings reinforce the effect of the economic crisis on the income of Brazilian households and the reduction in the budget of public policies to promote food security and nutrition, thus contributing to the debate on the increase in food insecurity in Brazil. Therefore, food insecurity and hunger in the population should continue to be monitored, especially considering the current political and social context.

Contributors

C. C. S. Cherol contributed to the study conception and development, data analysis and interpretation, and writing of the article, and approved the final version of the manuscript. A. A. Ferreira contributed to the study conception and development and writing of the article, and approved the final version of the manuscript. J. B. Lignani contributed to the study conception and development, data interpretation, and writing of the article, and approved the final version of the manuscript. R. Salles-Costa contributed to the study conception and development and writing of the article, and approved the final version of the manuscript.

Additional information

ORCID: Camilla Christine de Souza Cherol (0000-0001-5865-5905); Aline Alves Ferreira (0000-0001-5081-3462); Juliana de Bem Lignani (0000-0001-9321-7417); Rosana Salles-Costa (0000-0002-2307-4083).

Acknowledgments

The authors thank the Brazilian National Research Council (CNPq), the Rio de Janeiro State Research Foundation (FAPERJ), and the Brazilian Coordination for the Improvement of Higher Education Personnel (CAPES) for their financial support.

References

1. Food and Agriculture Organization of the United Nations; International Fund for Agricultural Development; United Nations Children's Fund; World Food Programme; World Health Organization. The state of food security and nutrition in the world 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome: Food and Agriculture Organization of the United Nations; 2021.
2. Instituto Brasileiro de Geografia e Estatística. Pesquisa de Orçamentos Familiares 2017-2018: análise da segurança alimentar no Brasil. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2020.
3. Programa das Nações Unidas para o Desenvolvimento. Indicadores de desenvolvimento brasileiro. Brasília: Programa das Nações Unidas para o Desenvolvimento; 2013.
4. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional por Amostra de Domicílios (PNAD): segurança alimentar. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2004.
5. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional por Amostra de Domicílios (PNAD): segurança alimentar. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2014.
6. Organização das Nações Unidas para a Alimentação e a Agricultura. O estado da segurança alimentar no Brasil: um retrato multidimensional. Relatório 2014. Brasília: Organização das Nações Unidas para a Alimentação e a Agricultura; 2014.
7. Vasconcelos FAG, Machado ML, Medeiros MAT, Neves JA, Recine E, et al. Public policies of food and nutrition in Brazil: from Lula to Temer. *Rev Nutr* 2019; 32:e180161.
8. Lignani JB, Palmeira PA, Antunes MML, Salles-Costa R. Relationship between social indicators and food insecurity: a systematic review. *Rev Bras Epidemiol* 2020; 23:e200068.

9. Santos TG, Silveira JAC, Longo-Silva G, Rami- res EKNM, Menezes RCE. Tendência e fatores associados à insegurança alimentar no Brasil: Pesquisa Nacional por Amostra de Domicílios 2004, 2009 e 2013. *Cad Saúde Pública* 2018; 34:e00066917.
10. Salles-Costa R, Ferreira AA, Mattos RA, Reichenheim ME, Pérez-Escamilla R, Segall-Corrêa AM. Food insecurity increases in Brazil from 2004 to 2018: analysis of national surveys. *medRxiv* 2020; 26 oct. <https://www.medrxiv.org/content/10.1101/2020.10.22.20217224v1>.
11. Rede Brasileira de Pesquisa em Soberania e Segurança Alimentar e Nutricional. Food insecurity and Covid-19 in Brazil. VIGISAN: National Survey of Food Insecurity in the Context the Covid-19 Pandemic in Brazil. https://olheparaafome.com.br/VIGISAN_AF_National_Survey_of_Food_Insecurity.pdf (accessed on 27/Apr/2022).
12. Reichenheim ME, Interlenghi GS, Moraes CL, Segall-Corrêa AM, Pérez-Escamilla R, Salles-Costa R. A model-based approach to identify classes and respective cutoffs of the Brazilian household food Insecurity Measurement Scale. *J Nutr* 2016; 146:1356-64.
13. Segall-Corrêa AM, Marin-León L, Melgar-Quiñonez H, Pérez-Escamilla R. Refinement of the Brazilian household food insecurity measurement scale: recommendation for a 14-item EBIA. *Rev Nutr* 2014; 27:241-51.
14. Bezerra TA, Olinda RA, Pedraza DF. Food insecurity in Brazil in accordance with different socio-demographic scenarios. *Ciênc Saúde Colet* 2017; 22:637-52.
15. Sousa LRM, Segall-Corrêa AM, Ville AS, Melgar-Quiñonez H. Food security status in times of financial and political crisis in Brazil. *Cad Saúde Pública* 2019; 35:e00084118.
16. Hosmer Jr. DW, Lemeshow S. *Applied logistic regression*. New York: John Wiley & Sons; 2000.
17. Hair JF. *Análise multivariada de dados*. Porto Alegre: Bookman; 2009.
18. Shamah-Levy T, Vielma-Orozco E, Heredia-Hernández O, Romero-Martínez M, Mojica-Cuevas J, Cuevas-Nasu L, et al., editors. *Encuesta Nacional de Salud y Nutrición 2018-19: resultados nacionales*. Cuernavaca: Instituto Nacional de Salud Pública; 2020.
19. Tarasuk V, Mitchell A. *Household food insecurity in Canada, 2017-18*. Toronto: Research to Identify Policy Options to Reduce Food Insecurity; 2020.
20. Chancel L, Piketty T, Saez E, Zucman G, editors. *World inequality report 2022*. https://wir2022.wid.world/www-site/uploads/2022/03/0098-21_WIL_RIM_RAP_PORT_A4.pdf (accessed on 03/May/2022).
21. United Nations Development Programme. *Trapped? Inequality and economic growth in Latin America and the Caribbean*. https://www.undp.org/sites/g/files/zskgke326/files/migration/latinamerica/undp-rblac-RHDR-UNDP_C01-EN.pdf (accessed on 03/May/2022).
22. Instituto Brasileiro de Geografia e Estatística. *Síntese de indicadores sociais: uma análise das condições de vida da população brasileira, 2018*. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2018. (Estudos e Pesquisas. Informação Demográfica e Socioeconômica, 39).
23. Palmeira PA, Mattos RA, Pérez-Escamilla R, Salles-Costa R. Multisectoral government programs and household food insecurity: evidence from a longitudinal study in the semiarid area of northeast, Brazil. *Food Secur* 2021; 13:525-38.
24. Souza LEPF, Barros RD, Barreto ML, Kattikireddi SV, Hone TV, Sousa RP, et al. The potential impact of austerity on attainment of the Sustainable Development Goals in Brazil. *BMJ Glob Health* 2019; 4:e001661.
25. Bocchi CP, Del Porto EB, Perini JHN, Rahal LS, Gonçalves RS, Moneta STG. A segurança alimentar e nutricional no Brasil diante da pandemia do novo coronavírus. In: Prudente L, Muchagata M, Pontual P, editors. *Políticas públicas: análises e respostas para a pandemia*. Brasília: Associação Nacional dos Especialistas em Políticas Públicas e Gestão Governamental; 2020. p. 18-24.
26. Instituto Brasileiro de Geografia e Estatística. *Pesquisa de Orçamentos Familiares 2017-2018. Perfil das despesas no Brasil. Indicadores selecionados*. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2020.
27. Pameira PA, Bem-Lignani J, Maresi VA, Mattos RA, Interlenghi GS, Salles-Costa R. Temporal changes in the association between food insecurity and socioeconomic status in two population based surveys in Rio de Janeiro, Brazil. *Soc Indic Res* 2019; 144:1349-65.
28. Santana ABC, Sarti FM. Assessment of the indicators of purchasing, availability, and nutritional adequacy of the Brazilian basic food basket. *Ciênc Saúde Colet* 2020; 25:4001-12.
29. Ke J, Ford-Jones EL. Food insecurity and hunger: a review of the effects on children's health and behaviour. *Paediatr Child Health* 2015; 20:89-91.
30. Howard LL. Does food insecurity at home affect non-cognitive performance at school? A longitudinal analysis of elementary student classroom behavior. *Econ Educ Rev* 2011; 30:157-76.
31. Pereira A, Handa S, Holmqvist G. Estimating the prevalence of food insecurity of households with children under 15 years, across the globe. *Glob Food Sec* 2021; 28:100482.
32. Organização pelo Direito Humano à Alimentação e à Nutrição Adequadas. *Informe DHANA 2019: autoritarismo, negação de direitos e fome*. Brasília: FIAN Brasil; 2019.
33. Almeida JA, Santos AS, Nascimento MAO, Oliveira JVC, Silva DG, Mendes-Netto RS. Factors associated with food insecurity risk and nutrition in rural settlements of families. *Ciênc Saúde Colet* 2017; 22:479-88.

34. Facchini LA, Nunes BP, Motta JVS, Tomasi E, Silva SM, Thumé E, et al. Insegurança alimentar no nordeste e sul do Brasil: magnitude, fatores associados e padrões de renda *per capita* para redução das iniquidades. *Cad Saúde Pública* 2014; 30:161-74.
35. Paixão M, Rossetto I, Montovanele F, Corvano L. Assistência social e segurança alimentar e nutricional. In: Becker BK, Mendes C, Buarque C, Sachs I, Costa JF, Dowbor L, et al., editors. *Relatório anual das desigualdades raciais no Brasil; 2009-2010*. Rio de Janeiro: Garamond; 2010. p. 125-9.
36. Cherol CCS, Ferreira AA, Salles-Costa R. Governmental programmes associated with food insecurity among communities of descendants of enslaved blacks in Brazil. *Public Health Nutr* 2020; 24:3136-46.
37. Cherol CCS, Ferreira AA, Salles-Costa R. Social inequalities and household food insecurity in quilombola communities in Brazil. *Rev Nutr* 2021; 34:e200173.
38. Rede Brasileira de Pesquisa em Soberania e Segurança Alimentar e Nutricional. Food insecurity and Covid-19 in Brazil. II VIGISAN: National Survey on Food Insecurity in the Context of the Covid-19 Pandemic in Brazil. <https://olheparaafome.com.br/wp-content/uploads/2022/09/OLHESumExecutivoINGLES-Diagramacao-v2-R01-02-09-20224212.pdf> (accessed on 25/Oct/2022).

Resumo

Este artigo tem como objetivo analisar a associação entre indicadores sociais e o agravamento da insegurança alimentar entre 2013 e 2018 em diferentes regiões do Brasil. Foram analisados dados da Pesquisa Nacional por Amostra de Domicílios (2013) e da Pesquisa de Orçamentos Familiares (2018). Foram investigadas amostras nacionalmente representativas de 110.750 e 57.920 domicílios, respectivamente. A insegurança alimentar foi avaliada pela Escala Brasileira de Insegurança Alimentar, estimando as variações percentuais nos níveis de insegurança alimentar entre dois períodos (2013 e 2018), segundo variáveis sociodemográficas. A associação entre indicadores sociais e insegurança alimentar desagregada por região foi estimada através de modelos de regressão logística multinomial. Apesar de o Norte e o Nordeste terem as maiores proporções de insegurança alimentar, o Sudeste e o Centro-oeste foram as regiões com maior aumento da insegurança alimentar durante os mesmos períodos. A renda foi o indicador com maior associação com insegurança alimentar, tanto nas pesquisas de 2013 quanto em 2018. Observou-se também a associação da presença de três ou mais moradores menores de 18 anos com maior risco de insegurança alimentar no Norte e no Sul. O aumento da insegurança alimentar durante a crise econômica brasileira ocorreu de forma desigual entre as regiões, além de ter sido maior entre as famílias com piores condições de vida econômica e social, o que reforçou a desigualdade regional, contribuindo para a desigualdade social no país. Reforça-se a necessidade de fortalecer políticas públicas de promoção da segurança alimentar e nutricional, de acordo com as iniquidades sociais regionais.

Insegurança Alimentar; Indicadores Sociais; Inequidade Social; Pobreza; Inquéritos Epidemiológicos

Resumen

Este artículo tiene como objetivo analizar la asociación de los indicadores sociales con el empeoramiento de la inseguridad alimentaria entre 2013 y 2018 en diferentes regiones de Brasil. Se analizaron datos de corte transversal de la Encuesta Nacional por Muestra de Domicilios (2013) y de la Encuesta de Presupuestos Familiares (2018). Se investigaron muestras representativas a nivel nacional de 110.750 y 57.920 hogares, respectivamente. La inseguridad alimentaria se evaluó mediante la Escala Brasileña de Inseguridad Alimentaria, estimando los cambios porcentuales en los niveles de inseguridad alimentaria entre dos períodos (2013 y 2018), según las variables sociodemográficas. La asociación de los indicadores sociales con la inseguridad alimentaria desagregada por regiones se estimó mediante modelos de regresión logística multinomial. A pesar de que el Norte y el Nordeste tenían las proporciones más altas de inseguridad alimentaria, el Sudeste y el Centro-oeste fueron las regiones con el mayor aumento de la inseguridad alimentaria en los mismos períodos. Los ingresos fueron el indicador con mayor asociación con la inseguridad alimentaria, tanto en las encuestas de 2013 como en las de 2018. También se observó la asociación de la presencia de tres o más residentes menores de 18 años con el mayor riesgo de inseguridad alimentaria en el Norte y en el Sur. El aumento de la inseguridad alimentaria durante la crisis económica brasileña se produjo de forma desigual entre las regiones y reforzó la desigualdad regional, además de haber sido mayor entre las familias con peores condiciones de vida social y económica, contribuyendo a la desigualdad social en el país. Se refuerza la necesidad de fortalecer las políticas públicas para promover la seguridad alimentaria y la nutrición, según las iniquidades sociales regionales.

Inseguridad Alimentaria; Indicadores Sociales; Inequidad Social; Pobreza; Encuestas Epidemiológicas

Submitted on 06/May/2022

Final version resubmitted on 01/Nov/2022

Approved on 07/Nov/2022