

Brazilian National Food and Nutritional Security System: what are the similarities in the decentralization process?

Sistema Nacional de Segurança Alimentar e Nutricional: quais são as semelhanças no processo de descentralização?

Sistema Nacional de Seguridad Alimentaria y Nutricional: ¿cuáles son las similitudes en el proceso de descentralización?

Milena Corrêa Martins ^{1,2}
Cristine Garcia Gabriel ¹
Mick Lennon Machado ¹
Patrícia Maria de Oliveira Machado ³
Claudia Soar ⁴
Giana Zarbato Longo ⁴

doi: 10.1590/0102-311XEN131022

Abstract

This study aimed to analyze the multiple characteristics of the decentralization of the Brazilian National Food and Nutritional Security System (SISAN) in a period before the institutional dismantling. Data from the 26 Brazilian states were collected in two public information systems, referring to the years 2017/2018. An exploratory and descriptive study was performed using a hierarchical cluster analysis, based on an analysis model with multiple characteristics of the system decentralization. The results indicated the formation of three clusters, showing the similarity among states with greater intersectoral and participatory character, better relationship with municipalities, and allocation of resources. On the other hand, states with less intersectoral and participatory character, linked to the low allocation of resources, execution of food security actions, and municipal support were clustered. These clusters composed mainly of North and Northeastern states, with a lower Gross Domestic Product, average Human Development Index, and a higher occurrence of food insecurity, expressed characteristics that may be related to greater obstacles in the system decentralization process. This information can help in the decision-making about the SISAN in a more equitable manner, supporting the actors involved in its maintenance and defense, at a time when the country presents an austere political and economic situation, marked by the progressive worsening of food insecurity.

Food Security; Public Policy; Cluster Analysis

Correspondence

M. C. Martins
Programa de Pós-graduação em Nutrição, Universidade Federal de Santa Catarina.
Rua Delfino Conti s/n, Florianópolis, SC 88040-370, Brasil.
milencorrearmartins@gmail.com

¹ Programa de Pós-graduação em Nutrição, Universidade Federal de Santa Catarina, Florianópolis, Brasil.

² Teia de Articulação pelo Fortalecimento da Segurança Alimentar e Nutricional, Universidade Federal de Santa Catarina, Florianópolis, Brasil.

³ Programa de Pós-graduação em Saúde Coletiva, Universidade Federal de Santa Catarina, Florianópolis, Brasil.

⁴ Departamento de Nutrição, Universidade Federal de Santa Catarina, Florianópolis, Brasil.



Introduction

Public policies regarding food security have played a leading role in the global debate in recent decades due to a persistent scenario of hunger and food insecurity, a progressive increase in non-communicable diseases, including obesity, in addition to the negative impacts of the agrifood system on the environment ^{1,2}.

Brazil has gained international notoriety for its strategies to combat food insecurity, which, from 2006 onwards, were integrated by the Brazilian National Food and Nutritional Security System (SISAN). SISAN instituted a new form of food security governance in Brazil, guided by an intersectoral, participatory, and decentralized logic to subnational levels (states, the Federal District, and municipalities) ³.

Brazil has 26 states, all of which have formally adhered to SISAN and, therefore, are responsible for implementing the system, its components (Council of Food Security, Intersectoral Chamber of Food and Nutritional Security, food security policy management bodies), and implementing and coordinating the food security policies at local level ^{4,5}. According to the Food and Agriculture Organization of the United Nations (FAO), the decentralization of food security policies is indicated for allowing a more accurate analysis of inequalities and structural and emerging issues throughout each territory, favoring the detailed monitoring of food insecurity ⁶. Therefore, the decentralization process would make public food security policies more efficient, enabling governments to direct actions and resources consistent with local demands ⁷.

However, as of 2016, a progressive weakening of public policies of social nature began in Brazil ⁸. In 2019, the Federal Government consolidated processes that led to the institutional dismantling of SISAN, with the most representative action being the exclusion of the Brazilian National Council for Food Safety (CONSEA) from the Federal Government structures, until then responsible for directly advising the president in the governance of this system ^{5,9}. These events occurred in parallel with the increase in poverty, the worsening of living conditions, and the increase in the food insecurity situation of the Brazilian population. Moreover, the COVID-19 pandemic triggered the worsening of the health, political, social, and economic crisis in Brazil. In 2022, more than half of the population had some degree of food insecurity, and 33 million Brazilians were in severe food insecurity, depicting a progressive increase in this condition in the country ¹⁰.

Although the system disruption at the federal level has drastically affected the public food security agenda in the country, many states keep their SISAN structures and related programs in operation, reinforcing their strategic role in the survival of the system ⁵. Given this situation and considering the current challenges for SISAN implementation, investigations seeking to understand the decentralization process in the states must be conducted ⁹. However, food security research focuses on assessing the status of food insecurity and analyzing programs linked to specific sectors, with few analyses about the system and public food security actions, especially with a wide scope and covering multiple dimensions and different implementation contexts ^{11,12}.

Therefore, this article aims to analyze and to discuss the multiple characteristics of the SISAN decentralization process within Brazilian states.

Materials and methods

Exploratory and descriptive study, with multivariate analysis of the interdependence of secondary data for 2017 and 2018. The units of analysis were the 26 Brazilian states. The Federal District was not analyzed, as the topic of analysis specifically addresses the relationship between the state and its municipalities ¹³.

Analysis model

The analysis model was composed of 56 categorical variables that account for the attributions of the states in relation to SISAN, under Art. 7 of *Decree n. 7,272/2010* ¹⁴. The variables were divided into three blocks of analysis: the structure of SISAN at the state level, food security actions developed at

the state level, and the State's relationship with its municipalities in the SISAN decentralization. In the block referring to food security actions, the variables were organized into four categories that summarize the activities that should be developed by the states: access to food and water, school meals, maintenance of public food security apparatus, and sustainable food systems (Box 1). The analysis model was presented, adjusted, and agreed upon in two virtual meetings conducted by the researcher responsible for the study. A total of eight specialists (professors, researchers, graduate and undergraduate students) linked to the Federal University of Santa Catarina (UFSC) and with academic and practical experience in the topic participated in these meetings. The first meeting sought to generate debates and list possible disagreements and divergences between participants regarding the analysis model. In the second meeting, the researcher responsible for the study presented a new proposal for the analysis model based on the first meeting suggestions; disagreements were aligned, and a consensus was reached to define the dimensions and variables that made up the analysis model.

Data collection

The data for the variables were collected in two public, free-to-access information systems that make available the data referring to the Survey of Basic State Information, Brazilian Institute of Geography and Statistics (ESTADIC/IBGE) and the Mapping of Food and Nutritional Security (MapaSAN), which are nationwide surveys, last conducted by the Federal Government in 2018. They collect information regarding the decentralization of SISAN and food security policies in subnational governments. ESTADIC restricts its collection to states, while MapaSAN investigates municipalities. In 2018, all 26 states answered the ESTADIC, and 41.6% of Brazilian municipalities answered the MapaSAN. The search and collection of secondary data were performed by the researcher responsible for the study. After the collection process, the data was systematized and stored in a spreadsheet previously created in the Microsoft Office Excel 2000 program (<https://products.office.com/>). The spreadsheet was organized by analysis block and consisted of the following items: state name, information source, variable, and its respective response categorization.

Data analysis

An agglomerative hierarchical cluster analysis was performed, in which the states were related by their similarities, being organized in a sequence of consecutive clusters, producing an ordered representation. Clusters were defined using a dendrogram – that is, a scaled graph –, allowing the exploratory analysis of the smallest distances between the combinations. Thus, greater homogeneity was observed between the states at each stage of the analysis for the final definition of each cluster. The hierarchical method requires a matrix containing the metric distances between clusters. In this study, the algorithm used to measure the distances was the complete linkage method, employed by the categorical nature of all analyzed variables¹⁵.

Cluster analyses were performed with the program Stata 13.0 (<https://www.stata.com>).

Results

By 2018, all Brazilian states had joined the SISAN and from 2006 to 2017, the majority (81%) had instituted the Brazilian National Policy for Food and Nutrition Security (PNSAN). State budget resources to finance the policy were provided for 92% of the states and all of them indicated that they had CONSEA, most of them (73%) implemented before the institution of SISAN. However, only 31% of the states had their own budget to guarantee the functioning of their CONSEA. Inter-Ministerial Chambers of Food and Nutritional Security (CAISAN) were also identified in all states, implemented after the creation of SISAN, and 58% of these had budgetary resources for their operation.

All states had a body responsible for managing the food security policy; however, with different structures between states. Most states had department structures together with other sectoral policies (35%); in other states, the management body referred to CAISAN (31%), and situations with sectors subordinated to another department or to the executive's office were also identified (27%).

Box 1

Analysis model to characterize the decentralization of the Brazilian National Food and Nutritional Security System (SISAN) in Brazilian states.

ANALYSIS BLOCK	VARIABLE (SOURCE)	CATEGORIZATION
Block 1 – system structure at the state level	Characterization of the system management body (1)	Intersectoral chamber of food safety (yes/no); department in conjunction with other sectoral policies (yes/no); exclusive department (yes/no); sector subordinated to another department (yes/no); sector subordinated to the head of the Executive (yes/no)
	System linking sector (1)	Social assistance (yes/no); agriculture (yes/no); planning (yes/no); health (yes/no); human rights (yes/no); other (yes/no)
	Number of sectors linked to the system (1)	1 sector; > 1 sector
	Existence of state law for the system implementation (1)	Yes/No
	Period of creation of the state food security council (1)	Created before the publication of <i>Law n. 11,346</i> (< 2006); from the year of publication of <i>Law n. 11,346</i> onwards (≥ 2006)
	Character of the state food security council (1)	Advisory; deliberative
	Training of counselors of the state food security council (1)	Yes/No
	Infrastructure of the state food security council (1)	Yes/No
	Daily allowances to work at the state food security council (1)	Yes/No
	Financial resource from the state food security council (1)	Yes/No
	Existence of an intersectoral food security chamber (1)	Yes/No
	Departments represented in the intersectoral chamber of food security (1)	Yes/No
	Linking department of the intersectoral food security chamber (1)	Finance (yes/no); planning (yes/no); agriculture (yes/no); health (yes/no); work (yes/no); education (yes/no); social assistance (yes/no); food security (yes/no); civil house (yes/no); human rights (yes/no); others (yes/no)
	Number of departments represented in the intersectoral food security chamber (1)	< 8 departments; ≥ 8 departments
	Area responsible for coordinating the intersectoral food security chamber (1)	Agriculture (yes/no); social assistance (yes/no); civil house (yes/no); food security (yes/no)
	Financial resource of the intersectoral food security chamber (1)	Yes/No
	Existence of a food security plan (1)	Yes/No
Financial resource for food security policy (1)	Yes/No	

(continues)

Box 1 (continued)

ANALYSIS BLOCK	VARIABLE (SOURCE)	CATEGORIZATION
Block 2 – food security actions developed at the state level	Category – access to food and water	
	Public activities of the Unified Registry (CadÚnico) and/or Brazilian National Transfer Program (1)	Yes/No
	Public activities of the Single Registry and/or Brazilian Income Transfer Program with state resources (1)	Yes/No
	<i>Cisternas</i> program (1)	Yes/No
	Food donation to specific groups and/or indigenous peoples, <i>quilombola</i> communities, and other traditional peoples or communities (1)	Yes/No
	Food donation to specific groups and/or indigenous peoples, <i>quilombola</i> communities, and other traditional peoples or communities with state resources (1)	Yes/No
	Category – school meals	
	Food and nutrition education activities (1)	Yes/No
	Food and nutrition education activities with state resources (1)	Yes/No
	School feeding program (1)	Yes/No
	School feeding program with state resources (1)	Yes/No
	School vegetable garden program (1)	Yes/No
	School vegetable garden program with state resources (1)	Yes/No
	Category – maintenance of public food security apparatus	
	Maintenance of food banks (1)	Yes/No
	Maintenance of food banks with state resources (1)	Yes/No
	Maintenance of community kitchens (1)	Yes/No
	Maintenance of community kitchens with state resources (1)	Yes/No
	Maintenance of public food supply apparatus (1)	Yes/No
	Maintenance of public food supply apparatus with state resources (1)	Yes/No
	Maintenance of open/popular fairs or public food markets (1)	Yes/No
	Maintenance of open/popular fairs or public food markets with state resources (1)	Yes/No
	Maintenance of popular restaurants (1)	Yes/No
Maintenance of popular restaurants with state resources (1)	Yes/No	

(continues)

Box 1 (continued)

ANALYSIS BLOCK	VARIABLE (SOURCE)	CATEGORIZATION
Block 2 – food security actions developed at the state level	Category – sustainable food systems	
	Urban agriculture activities (1)	Yes/No
	Urban agriculture activities with state resources (1)	Yes/No
	Technical assistance and rural extension for family farmers and traditional peoples and communities (1)	Yes/No
	Technical assistance and rural extension for family farmers and traditional peoples and communities with state resources (1)	Yes/No
	Public purchases from family farming (1)	Yes/No
	Public purchases from family farming with state resources (1)	Yes/No
	Training, promotion, or incentive to organic and/or agroecological production (1)	Yes/No
Block 3 – state and municipalities relationship in the system implementation	Transfer of resources to municipalities (1)	Yes/No
	Municipal adhesion to the system (2)	% of municipalities with adherence to SISAN below the median of the states; % of municipalities with adherence to SISAN equal to or greater than the median of states
	Communication between city and state council (2)	% of municipalities indicating communication with the state council lower than the median of the states; % of municipalities indicating communication with the state council equal or above the median of the states
	Communication between the municipal and state intersectoral chambers (2)	% of municipalities indicating communication with the state chamber lower than the median of the states; % of municipalities indicating communication with the state chamber equal to or greater than median of states
	Source of state funding for food and nutrition education actions carried out in the municipality (2)	% of municipalities indicating state funding for actions of food and nutrition education lower than the median of the states; % of municipalities indicating state funding for food and nutrition education actions equal to or greater than of the median of the states
	Source of state funding used to purchase food or food baskets for donations (2)	% of municipalities indicating state funding for donation of foods below the median of the states; % of municipalities indicating state funding for food donation equal or higher than the state median
	Source of state funding used to promote training activities, fostering or encouraging agroecological-based production (2)	% of municipalities indicating state funding for the promotion of agroecological production below the median of the states; % in municipalities indicating state funding to promote agroecological production equal to or greater than the median of the states
	Source of state funding for actions aimed at supporting urban agriculture practices (2)	% of municipalities indicating state funding for the promotion of urban agriculture below the median of the states; % of municipalities indicating state funding to promote urban agriculture equal to or greater than that of the median of the states
	State bodies that offer training courses on food security (2)	% of municipalities indicating receiving food security training from agencies states below the median of states; % of municipalities indicating receiving food security training from state agencies equal to or above the median of the states

Source: (1) ESTADIC 2018: Survey of Basic State Information; (2) MapaSAN 2018: Mapping of Food and Nutrition Security.

In 16 states, these bodies were associated or subordinated to only one government sector, 81% of these part of the social assistance area. In the remaining ten states, links to different sectors and areas were observed, such as social assistance, agriculture, planning, health, and human rights, among others.

Half of the states had CONSEA with an exclusively consultative character, while in the other states, CONSEA accumulated a deliberative character. In all states, CONSEA had the infrastructure to operate, and in the majority (85%), training was carried out for its members.

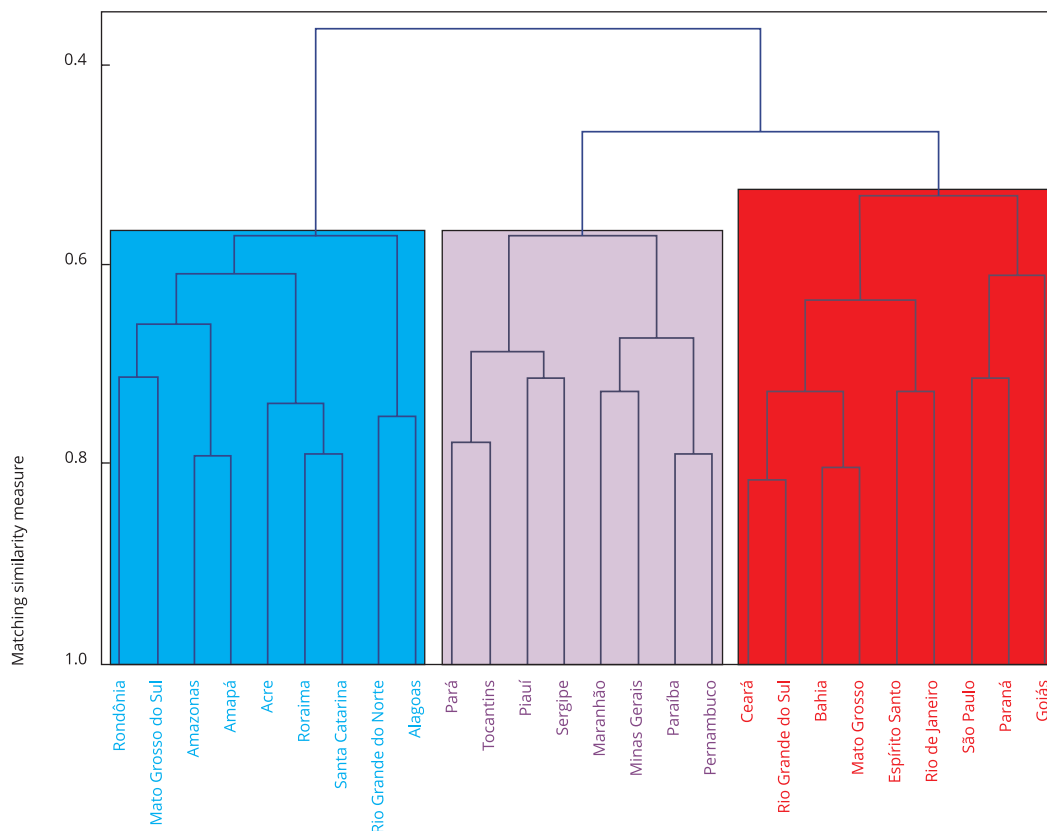
Most (58%) states had a CAISAN composed of representatives from eight or more departments, with the agriculture area being present in all states and the finance area having the lowest representation (35%). In 77% of the states, the state agency responsible for coordinating CAISAN had social assistance as its reference area. Regarding state food security plans, 54% of the states reported having them.

Most states (68%) claimed to conduct food security actions, and 77% of them relied on resources from the states themselves. In 42% of the states, resources were transferred to the municipalities to induce the decentralized implementation of SISAN and its public policy. Municipal actions for the acquisition of food or food market baskets for donations were those that received state resources (20%), while 11% transferred resources to municipalities to carry out food and nutrition education actions, 4% to carry out training courses and training on food security, 4% to support urban agriculture practices, and 3% to train, promote, or encourage agroecological production.

The classification of Brazilian states was determined by the dendrogram generated in the cluster analysis, containing the 26 Brazilian states according to the similarity of their SISAN decentralization characteristics (Figure 1).

Figure 1

Dendrogram of the hierarchical cluster analysis of Brazilian states by decentralization characteristics of the Brazilian National Food and Nutritional Security System (SISAN), Brazil, 2018.



Cluster analysis organized state similarities into a representation of consecutive clusters. Based on the analysis of the dendrogram, the relevant number of clusters was determined, considering the degree of similarity represented on the vertical line that showed the level of equality between the variables analyzed in each state. Based on the graph analysis, three clusters were formed, right after the height of 0.6 of the similarity measure. Cluster 1 (blue) added nine states, Cluster 2 (purple) eight, and Cluster 3 (red) nine. The most distinct cluster, observable when one of the vertical lines is longer, is Cluster 1, which is added to the other two clusters only at the cut height after the 0.4 similarity measure, demonstrating less similarity with the other clusters (Figure 1).

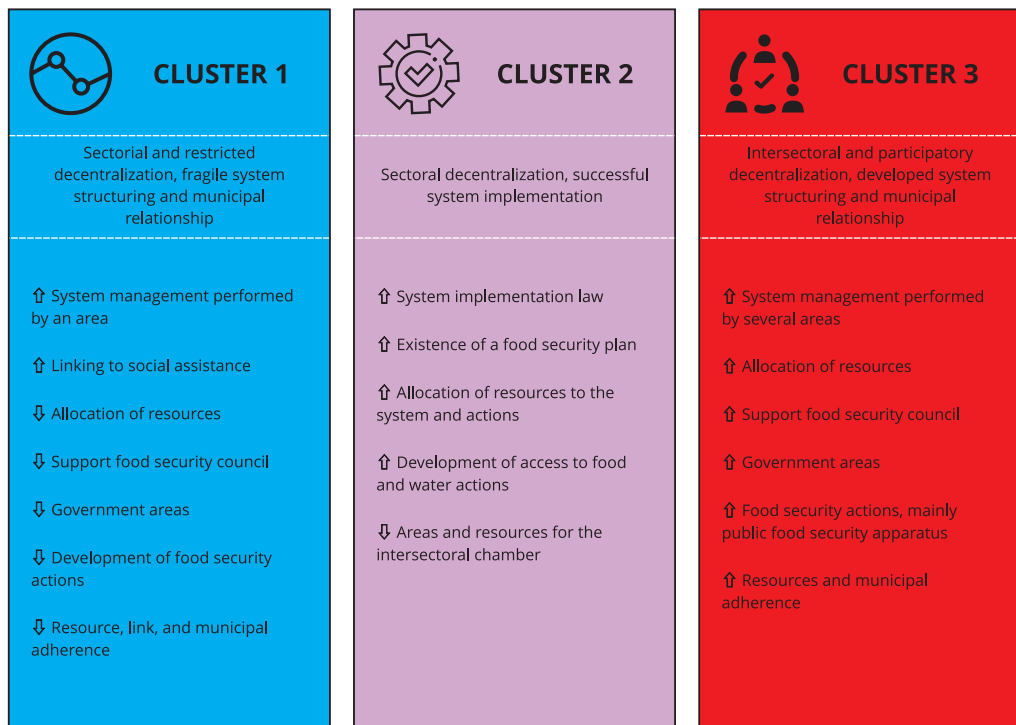
To highlight the similarities of the formed clusters, they were characterized as shown in Figure 2.

The states allocated in Cluster 1 were characterized by the management of SISAN predominantly conducted by a sector linked to social assistance. Also, this cluster contained the largest number of states that had not regulated SISAN by law, nor allocated resources to its implementation. The food security councils of these states had the lowest resources of their own, availability of daily allowances, and training of their advisers. The intersectoral chambers of the states in this cluster were characterized by being coordinated by social assistance and by having a smaller variety of linked departments. This cluster also showed the lowest number of food security actions and the lowest allocation of its own resources among the actions conducted. Furthermore, it presented the lowest values in all the variables that compose the analysis block “state and municipalities relationship in the system implementation” (Figure 2).

The most expressive characteristics among the states in Cluster 2 were the regulation of SISAN based on the state law, the existence of a food security plan, and the allocation of resources to the system. In this cluster, the characterization of the system managing body was diversified, although most of them were still linked to social assistance. Most food security councils had a deliberative character

Figure 2

Illustrative description of the clusters formed with the respective state characteristics in the decentralization of the Brazilian National Food and Nutrition Security System (SISAN), Brazil, 2018.



and a communication channel with the city councils. The intersectoral chambers were characterized by a smaller number of represented departments and a smaller budget allocation, being coordinated by social assistance and food security bodies when compared to the other clusters. The execution and allocation of state resources for food security actions were conducted by most states in this cluster, especially regarding actions guaranteeing access to food and water. Furthermore, most states financially supported the municipalities for the development of training actions in food security and agroecology and urban agriculture activities (Figure 2).

The states belonging to Cluster 3 were characterized by the management of SISAN by departments conjoined with other sectoral policies, associated with various areas such as social assistance, agriculture, health, and human rights, among others. All food security councils were created before 2006, carried out training activities for the councilors, and most of them had a consultative nature, with the availability of daily allowances. When compared with the other clusters, the intersectoral chambers of the states of this cluster had the greatest number of active departments and the greatest variety of coordinating bodies, as well as having the greatest relationship with the city councils. All states had earmarked resources for the policy, and most developed and financed food security actions, especially public food security apparatus when compared to other clusters. Regarding the link with the municipal scope, this cluster was highlighted with the highest allocation of state resources for the implementation of the system, municipal adhesion to SISAN, and allocation of financial resources for the development of food and nutrition education actions, and food donation (Figure 2).

Discussion

Our article presented an overview of the national scope of SISAN decentralization in all Brazilian states, highlighting unequal contexts and different profiles in the implementation process, which must be considered to qualify food security governance. Cluster 1 was characterized by a lower intersectoral and participatory character, with a fragile municipal relationship, as well as the lower allocation of resources to the system, instances, and state and municipal food security actions. Cluster 2 had a sectorial character, the largest SISAN implementation based on state law, and the existence of a food security plan, as well as being highlighted by the representative allocation of resources to the system and public food security actions. Cluster 3 showed a more intersectoral and participatory character, a greater relationship between states and municipalities, and a greater allocation of resources to the system, instances, and food security actions, despite the greater number of states without food security plans.

In addition to the state particularities in relation to SISAN, the influence of context characteristics in the decentralization process is recognized. In this study, we observed that from a decentralized fiscal structure, more developed states collect more and consequently are able to better face social adversities, having resources to implement the system and better social and food security indicators ^{16,17,18,19,20}. On the other hand, the North and Northeast regions of Brazil, which composed most of Clusters 1 and 2, have more unfavorable social and economic indicators, with states with a lower Gross Domestic Product (GDP), average Human Development Index (HDI), and a greater occurrence of household food insecurity, which may be related to greater obstacles in the decentralization process ^{21,22,23,24}. Studies conducted in 13 countries in Africa, Latin America, and Asia with medium and low HDI found obstacles in the process of implementing national food security policies, with a low degree of budgetary commitment, expressed by the lack of human resources and technical and financial capacity to manage the policy at all levels and sectors ^{25,26,27,28}. These results reinforce the need to consider the implementation context during the decision-making on food security policies.

Among the strategies to favor the implementation of intersectoral policies on food security, it is recommended that the system management bodies are allocated above the sectoral structures. Our findings point to a SISAN decentralization process that is still very sectorized in the states, perceived in Clusters 1 and 2, with governmental links mainly to the social assistance area, which can result in political and structural incapacity to manage all attributions and areas of action that food security policies require. Sectorial and centralized management of SISAN by the social assistance area tends

to represent a lack of government recognition of this system as a structure of social and economic development, and not restricted to welfare aspects ^{29,30}.

On the other hand, the system management characterized by the involvement of several areas of government, observed in Cluster 3, reinforces the intersectoral character, which has already established itself as a facilitator of food security promotion and with the coordinated and articulated execution of public actions of various government sectors ¹⁹. It is important to observe that countries in the European Union, Latin America, and the Africa also highlighted the essentiality of an intersectoral approach in national food security policies, usually composed of sectors such as health, education, social protection, business and foreign affairs, agriculture, and environment, among others ^{2,16,18,26}.

Overcoming the sectorial logic of management is a challenge for the implementation of complex public policies. Therefore, we highlight that the cluster with the most intersectoral state management is the one that has the smallest number of states with a food security plan. We believe that the joint planning between different government sectors can be a limitation in this process due to the history of the sectorized organization of Brazilian public management ^{29,30}. Notably, the states adhering to SISAN assume commitments and responsibilities regarding the system and the implementation of public food security programs, which must be agreed upon in the food security plans, considered the main tool for planning, management, and execution of food security public policies ³¹.

The execution and allocation of state resources for food security actions also occurred differently between clusters. States of Cluster 1, with the lowest GDP, HDI, population size, and highest food insecurity percentage, were also those that performed fewer food security actions and provided fewer resources. This adds to the fragility of the intersectoral and participatory character in the decentralization process of the cluster, reinforcing a set of existing obstacles to the consolidation of the system in subnational governments ^{4,22}.

The actions to guarantee access to food and water were mainly performed by the states of Cluster 2, mostly in the Northeast region of Brazil. The strongest context characteristics of this cluster were the average HDI, the average food insecurity percentage, and the small size and low population density of half of the comprising states. These characteristics reinforce the importance of decentralizing public food and nutritional security actions in this region, such as the *Cisternas* Program, Brazilian Income Transfer Program, and food donation ^{8,19}. We also observed a relationship between the context characteristics and the development and funding of maintenance actions for public food security apparatus. The states of Cluster 3 presented greater emphasis for these actions. This result may be related to the larger population size of the states of this cluster, as the current Brazilian regulation for implementing some types of public food security apparatus recommends the implementation in large localities, due to the complexity of these apparatuses' public management ³².

State governments are also responsible for inducing and coordinating municipalities, in order to reduce serious regional inequalities, and should support them in financial and technical matters ²². In 2020, 443 municipalities adhered to the system, that is, less than 10% of the total number of Brazilian municipalities, which demonstrates little progress in the decentralizing process of SISAN to the municipal level and indicating a fragile induction by the states and Federal Government ^{22,33}.

Cluster 3 had a better relationship with the municipalities, with greater allocation of resources for the system implementation and financial support in the development of public food security actions, which may be associated with the greater number of municipal adhesions to SISAN in the states of this cluster. This result reinforces the key role of states in mobilizing, supporting, and inducing the system decentralization to the municipal level ^{4,22}. A good implementation of the system at the state level can reflect on its consolidation at the municipal level, especially when considering the intersectoral and participatory character, added to a better investment of resources, as the most present similarities of this cluster ²².

Even in the face of the differences found in SISAN decentralization in the formed clusters, it is necessary to recognize that the advances achieved by Brazil in the first 15 years of the new millennium – expressed by the reduction of misery and hunger, the increase of food security in households, and the improvement of several social indicators ^{8,27} – were made possible by the proposition and consolidation of public policies aimed at ensuring food security, based on participatory governance ruled by legal frameworks, and with the structuring of this public system ³⁴. Ensuring the SISAN consolidation process must be the priority path both on the agenda of social movements and governments, espe-

cially in the face of the current scenario of misery, hunger, and food insecurity resurgence in Brazil. Thus, our results show that the SISAN decentralization to the states needs to be qualified, respecting and considering the different contexts, so the objectives of the system are efficiently achieved.

The use of secondary data as the main source on this research limits a more in-depth analysis of the cases, and the period analyzed expresses a scenario prior to the system dismantling process within the Federal Government. We consider that the composition of less than 50% of the municipalities in the sample may have generated a selection bias. The participation of municipalities in the MapaSAN survey is voluntary and, given the fragile institutionality of SISAN in the municipalities, the number of municipalities responding to this research is still low. This finding shows the need to consider this situation in future statistical analyses, in order to reduce this bias. But it is even more important to realize the need for strategies to be thought and put into practice to expand the participation of municipalities in MapaSAN, thus allowing results closer to reality²². However, the research that provided data for this study was the last performed in Brazil, highlighting the urgency to perform a new survey, in addition to the need to foster the viability of non-governmental research, including those based on primary data collection. Furthermore, the novelty of using cluster analysis to characterize the SISAN implementation process is highlighted.

Conclusions

The system decentralization marked certain territorial realities and delimited how much an intersectoral and participatory character can be consistent with a better implementation of the Policy in the state and in the municipal sphere.

Regarding the addressed topic, it centralized the discussion in governmental structures related to the area, making it necessary to advance in a debate that covers the breadth of food security governance, based on the principle of participation and involvement of social actors, and intersectorality and performance of government actors, with the means of articulation, decision-making, and means of promoting equity details in the prioritization of socially vulnerable populations.

In Brazil, SISAN analyses are usually conducted in a broad way, which tends to mask regional inequalities in the decentralization process. Therefore, the results of this study indicate elements and hypotheses that can be deepened by other studies, aiming at qualifying this gap. Furthermore, when performing an analysis that clustered the different states according to their characteristics in the decentralization process, we were able to identify existing patterns of similarity and, thus, indicate information that makes it possible to qualify decision-making for the implementation of SISAN in an equitable manner.

Contributors

M. C. Martins contributed to the study design, data collection, analysis and interpretation, and writing; and approved the final version. C. G. Gabriel contributed to the study design and review; and approved the final version. M. L. Machado contributed to the study design and review; and approved the final version. P. M. O. Machado contributed to the review; and approved the final version. C. Soar contributed to the review; and approved the final version. G. Z. Longo contributed to the data analysis and interpretation; and approved the final version.

Additional information

ORCID: Milena Corrêa Martins (0000-0001-5212-8661); Cristine Garcia Gabriel (0000-0002-5413-0826); Mick Lennon Machado (0000-0001-7550-1692); Patrícia Maria de Oliveira Machado (0000-0002-8630-8318); Claudia Soar (0000-0002-7079-2360); Giana Zarbato Longo (0000-0001-7666-5007).

Acknowledgments

Brazilian Coordination for the Improvement of Higher Education Personnel (CAPES).

References

1. Candel J, Daugbjerg C. Overcoming the dependent variable problem in studying food policy. *Food Secur* 2020; 12:169-78.
2. Candel JJJL. Diagnosing integrated food security strategies. *NJAS – Wageningen Journal of Life Sciences* 2018; 84:103-13.
3. Marano D, Costa MCM, Franco AS, Joia ICOS. Relato de experiência: percurso e desafios para adesão municipal ao Sistema Nacional de Segurança Alimentar e Nutricional. *Demetra (Rio J.)* 2021; 16:50901.
4. Araújo PP, Araujo MR, Salles-Costa R. Food security governance promoted by national government at the local level: a case study in Brazil. *Food Secur* 2020; 12:591-606.
5. Recine E, Fagundes A, Silva BL, Garcia GS, Ribeiro RCL, Gabriel CG. Reflections on the extinction of the National Council for Food and Nutrition Security and the confrontation of Covid-19 in Brazil. *Rev Nutr* 2020; 33:e200176.
6. Food and Agriculture Organization of the United Nations. Good food security governance: the crucial premise to the twin-track approach-background paper. http://www.fao.org/fileadmin/templates/righttofood/documents/other_documents/2011_good_food_security_gov/FoodSecurityGovernanceWorkshop_backgroundpaper.pdf (accessed on 15/Mar/2022).
7. Cistulli V, Rodríguez-Pose A, Escobar G, Schetjman A. Addressing food security and nutrition by means of a territorial approach. *Food Secur* 2014; 6:879-94.
8. Vasconcelos FAG, Machado ML, Medeiros MAT, Neves JA, Recine E, Pasquim EM. Public policies of food and nutrition in Brazil: from Lula to Temer. *Rev Nutr* 2019; 32:e180161.
9. Souza BFNJ, Bernardes MS, Vieira VCR, Francisco PMSB, Marín-León L, Camargo DFM, et al. (In)segurança alimentar no Brasil no pré e pós pandemia da COVID-19: reflexões e perspectivas. *InterAmerican Journal of Medicine and Health* 2021; 4:e202101001.
10. II Inquérito Nacional sobre Insegurança Alimentar no contexto da pandemia Covid-19 no Brasil. <https://olheparaafome.com.br/wp-content/uploads/2022/06/Relatorio-II-VI-GISAN-2022.pdf> (accessed on 12/Nov/2022).
11. Fonseca VM, Rebelo F, Marano D, Abramches AD, Amaral YNV, Xavier VM, et al. Contribution to the journal *Ciência & Saúde Coletiva* on food and nutrition in Brazil. *Ciênc Saúde Colet* 2020; 25:4863-74.
12. Rodrigues BA, Nascimento MMF, Bittencourt JVM. Mapping of the behavior of scientific publications since the decade of 1990 until the present day in the field of food and nutrition security. *Scientometrics* 2021; 126:2459-83.

13. Instituto Brasileiro de Geografia e Estatística. Perfil dos estados brasileiros: 2018. <https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2101667> (accessed on 15/Mar/2022).
14. Brasil. Decreto nº 7.272, de 25 de agosto de 2010. Regulamenta a Lei nº 11.346, de 15 de setembro de 2006, que cria o Sistema Nacional de Segurança Alimentar e Nutricional – SISAN com vistas a assegurar o direito humano à alimentação adequada, institui a Política Nacional de Segurança Alimentar e Nutricional – PNSAN, estabelece os parâmetros para a elaboração do Plano Nacional de Segurança Alimentar e Nutricional, e dá outras providências. Diário Oficial da União 2010; 26 aug.
15. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham RL. Análise multivariada de dados. Porto Alegre: Bookman Editora; 2009.
16. Candel JJ, Breeman GE, Termeer CJ. The European Commission's ability to deal with wicked problems: an in-depth case study of the governance of food security. *J Eur Public Policy* 2016; 23:789-813.
17. Haddad L, Hawkes C, Webb P, Thomas S, Beddington J, Waage J, et al. A new global research agenda for food. *Nature* 2016; 540:30-2.
18. Kepple AW, Segall-Corrêa AM. Food security monitoring in Brazil and other Latin American countries: support for governance with the participation of civil society. *Glob Food Sec* 2017; 14:79-86.
19. Bocchi CP, Magalhães ES, Rahal L, Gentil P, Gonçalves RS. A década da nutrição, a política de segurança alimentar e nutricional e as compras públicas da agricultura familiar no Brasil. *Rev Panam Salud Pública* 2019; 43:e84.
20. Escobar-Alegria JL, Frongillo EA. Terminal logic behavior and strategic defection of governmental officials during presidential transitions in Guatemala: implications for the sustainability of food and nutrition security policy. *Curr Dev Nutr* 2020; 4:nzaa161.
21. Sousa LRM, Segall-Corrêa AM, Ville AS, Melgar-Quinonez H. Food security status in times of financial and political crisis in Brazil. *Cad Saúde Pública* 2019; 35:e00084118.
22. Silva DAS, Panelli-Martins BE. O processo de adesão municipal ao Sistema Nacional de Segurança Alimentar e Nutricional. *Rev Segur Aliment Nutr* 2020; 27:e020006.
23. Pérez-Escamilla R, Gubert MB, Rogers B, Hromi-Fiedler A. Food security measurement and governance: assessment of the usefulness of diverse food insecurity indicators for policy makers. *Glob Food Sec* 2017; 14:96-104.
24. Bezerra MS, Jacob MCM, Ferreira MAF, Vale D, Mirabal IRB, Lyra CO. Insegurança alimentar e nutricional no Brasil e sua correlação com indicadores de vulnerabilidade. *Ciênc Saúde Colet* 2020; 25:3833-46.
25. Facchini LA, Nunes BP, Motta JVS, Tomasi E, Silva SM, Thumé E, et al. Food insecurity in the northeast and south of Brazil: Magnitude, associated factors, and per capita income patterns for reducing inequities. *Cad Saúde Pública* 2014; 30:161-74.
26. Lamstein S, Pomeroy-Stevens A, Webb P, Kennedy E. Optimizing the multisectoral nutrition policy cycle: a systems perspective. *Food Nutr Bull* 2016; 37(4 Suppl):S107-14.
27. Santos TG, Silveira JAC, Longo-Silva G, Ramires 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.
28. Fox AM, Balarajan Y, Cheng C, Reich MR. Measuring political commitment and opportunities to advance food and nutrition security: piloting a rapid assessment tool. *Health Policy Plan* 2015; 30:566-78.
29. Machado ML, Gabriel CG, Lacerda JT, Machado PMO. Strategic evaluation of the Food and Nutrition Security Plan of the State of Santa Catarina, Brazil. *Rev Nutr* 2018; 31:617-30.
30. Machado ML, Gabriel CG, Soar C, Neves J, Oliveira JTC. State Plan for Food and Nutrition Security: potentialities and limitations. *Rev Nutr* 2018; 31:413-22.
31. Machado ML, Gabriel CG, Soar C, Mamed GR, Machado PMO, Lacerda JT, et al. Adequação normativa dos planos estaduais de segurança alimentar e nutricional no Brasil. *Cad Saúde Pública* 2018; 34:e00206716.
32. Oliveira JT, Gabriel C, Vasconcelos F, Machado ML, Soar C, Fagundes A. Government-subsidized restaurants in Brazil: an evaluation within the framework of food and nutrition security. *Rev Nutr* 2020; 33:e200085.
33. Ministério do Desenvolvimento e Assistência Social, Família e Combate à Fome. Mais 25 municípios formalizam adesão ao Sistema Nacional de Segurança Alimentar e Nutricional. <https://www.gov.br/mds/pt-br/noticias-e-conteudos/desenvolvimento-social/noticias-desenvolvimento-social/mais-25-municipios-formalizam-adesao-ao-sistema-nacional-de-seguranca-alimentar-e-nutricional> (accessed on 02/Jun/2021).
34. Gubert MB, Santos SMC, Santos LMP, Pérez-Escamilla R. A municipal-level analysis of secular trends in severe food insecurity in Brazil between 2004 and 2013. *Glob Food Sec* 2017; 14:61-7.

Resumo

Este estudo teve como objetivo analisar as múltiplas características da descentralização do Sistema Nacional de Segurança Alimentar e Nutricional (SISAN) em um período anterior ao desmonte institucional. Dados dos 26 estados brasileiros foram coletados em dois sistemas públicos de informação, referentes aos anos de 2017/2018. Um estudo exploratório e descritivo foi realizado por meio de uma análise de cluster hierárquica baseada em um modelo de análise com múltiplas características de um sistema descentralizado. Os resultados indicaram a formação de três clusters, mostrando a semelhança entre os estados com maior caráter intersectorial e participativo, assim como melhor relação com municípios e alocação de recursos. De forma oposta, os estados com menor caráter intersectorial e participativo foram agrupados, ligados à baixa alocação de recursos, execução de ações de segurança alimentar e de apoio municipal fracas. Os clusters compostos principalmente por estados do Norte e Nordeste, com menor Produto Interno Bruto, Índice de Desenvolvimento Humano médio e maior ocorrência de insegurança alimentar, expressaram características que podem estar relacionadas a maiores obstáculos na descentralização. Essas informações podem auxiliar na tomada de decisão do SISAN de forma mais equitativa, servindo de apoio aos atores envolvidos em sua manutenção e defesa, em um momento em que o país apresenta uma situação política e econômica de austeridade, marcada pela piora progressiva da situação de insegurança alimentar.

Segurança Alimentar; Política Pública; Análise por Conglomerados

Resumen

Este estudio tuvo como objetivo analizar las múltiples características de la descentralización del Sistema Nacional de Seguridad Alimentaria y Nutricional (SISAN) en el periodo anterior al desmantelamiento institucional. Los datos de los 26 estados brasileños se recolectaron de dos sistemas de información pública referentes al periodo 2017/2018. Se realizó un estudio exploratorio y descriptivo mediante análisis de clúster jerárquico basado en un modelo de análisis con múltiples características de un sistema descentralizado. Los resultados indicaron la formación de tres clústeres, mostrando la similitud entre los estados de mayor intersectorialidad y participación, así como una mejor relación con los municipios y asignación de recursos. Por otro lado, se agruparon los estados de menor carácter intersectorial y participativo, vinculados a la baja asignación de recursos, ejecución de acciones de seguridad alimentaria y débil apoyo municipal. Los clústeres compuestos principalmente por los estados del Norte y Nordeste de Brasil, con menor Producto Interno Bruto, Índice de Desarrollo Humano medio y mayor ocurrencia de inseguridad alimentaria tuvieron características expresadas que pueden estar relacionadas con mayores obstáculos en la descentralización. Estos datos pueden ayudar al SISAN en la toma de decisiones de manera más equitativa y servir de apoyo a los actores involucrados en su mantenimiento y defensa, en momentos en que el país se enfrenta a una situación política y económica de austeridad, marcada por el progresivo empeoramiento de la inseguridad alimentaria.

Seguridad Alimentaria; Política Pública; Análisis por Conglomerados

Submitted on 18/Jul/2022

Final version resubmitted on 30/Jan/2023

Approved on 02/Feb/2023