

Farming and Food Resilience During the COVID-19 Pandemic: Economic and Health Perspectives

Agricultura e resiliência alimentar durante a pandemia de COVID-19: perspectivas econômicas e de saúde

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ABSTRACT

Objective: To understand how family farmers faced the challenges imposed by the COVID-19 pandemic, as well as the resilience and adaptation strategies adopted for rural sustainability, considering the economic and health dimensions.

Methods: An exploratory, qualitative, and integrative literature review was conducted, with content analysis based on Bardin, encompassing publications between 2019 and 2022 in the Google Scholar, SciELO, CAPES, Science.gov, and Scopus databases, in addition to official documents on public policies aimed at family farming. **Results:** It was observed that the pandemic caused a significant reduction in income, disruption of traditional marketing channels, and increased social vulnerability among farmers. On the other hand, programs such as Programa Nacional de Fortalecimento da Agricultura Familiar (PRONAF) and Programa Nacional de Alimentação Escolar (PNAE) acted as mitigation mechanisms, guaranteeing emergency credit and maintaining institutional markets. The adoption of digital marketing strategies and the intensification of sanitary protocols, as well as impacts on mental health resulting from economic insecurity and social isolation, are also highlighted. **Conclusions:** It is concluded that, despite structural limitations, family farming has demonstrated adaptive capacity, being fundamental for food security and for reducing inequalities in crisis contexts, reinforcing the importance of integrated public policies between economy and health.

KEYWORDS: Family farming. Public policies. Food security. Rural sustainability.

RESUMO

Objetivo: Compreender como agricultores familiares enfrentaram os desafios impostos pela pandemia de COVID-19, bem como as estratégias de resiliência e adaptação adotadas para a sustentabilidade rural, considerando as dimensões econômica e de saúde. **Método:** Realizou-se pesquisa exploratória, qualitativa e de revisão integrativa da literatura, com análise de conteúdo baseada em Bardin, abrangendo publicações entre 2019 e 2022 nas bases Google Scholar, SciELO, CAPES, Science.gov e Scopus, além de documentos oficiais sobre políticas públicas voltadas à agricultura familiar. **Resultado:** Observou-se que a pandemia provocou redução significativa de renda, desestruturação de canais tradicionais de comercialização e ampliação da vulnerabilidade social dos agricultores. Por outro lado, programas como Programa Nacional de Fortalecimento da Agricultura Familiar (PRONAF) e Programa Nacional de Alimentação Escolar (PNAE) atuaram como mecanismos de mitigação, garantindo crédito emergencial e manutenção de mercados institucionais. Destacam-se ainda a adoção de estratégias digitais de comercialização e a intensificação de protocolos sanitários, bem como impactos na saúde mental decorrentes da insegurança econômica e do isolamento social. **Conclusões:** Conclui-se que, apesar das limitações estruturais, a agricultura familiar demonstrou capacidade adaptativa, sendo fundamental para a segurança alimentar e para a redução das desigualdades em contextos de crise, reforçando a importância de políticas públicas integradas entre economia e saúde.

PALAVRAS-CHAVE: Agricultura familiar. Políticas públicas. Segurança alimentar. Sustentabilidade rural.

Classificação JEL: Q12; Q18; I18

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1 INTRODUCTION

The COVID-19 pandemic has led to significant changes across various sectors, including family farming, highlighting the need to understand its resilience in the face of economic and public health challenges. Although there are multiple analyses of the pandemic's impacts on agriculture, a gap remains in the literature regarding an integrated approach that considers both economic and health aspects of the sustainability of family farming.

In Brazil, family farming is the primary source of food production, relying on small rural properties where family members are the main workforce (Brasil, 2023). The Brazilian political structure prioritizes family farming, which is crucial for national and global food security (Berchin et al., 2019).

Conceptually, family farmers are those who engage in rural activities while simultaneously meeting specific criteria established by Law 11.326 (Brasil, 2006). Historically, family farming in Brazil predates Portuguese colonization, since indigenous agricultural practices already exhibited, and continue to exhibit, characteristics of this agricultural model (Brasil, 2016).

The arrival of immigrants from different parts of the world contributed to an extensive production system that diversified agricultural production, combining subsistence farming with market-oriented activities (Goulart; Vieira; Bittencourt, 2021). Initially, the concept of family farming was unclear, with terms like "small farmer" used to describe those with limited land who produced primarily for local consumption (Barbosa da Cruz et al., 2020).

In contemporary Brazil, public policies have focused on strengthening family farming as an essential component of food security. Programs such as Fome Zero and the Programa de Aquisição de Alimentos (PAA) have created stable markets for family farmers, promoting food security and sustainable rural development (Berchin et al., 2019).

Family farming plays a fundamental role in the resilience of food systems due to its proximity to local consumers, diversification of crops, and reduced vulnerability to global crises. Small farmers typically produce for nearby markets, facilitating food supply during disruptions in global supply chains (Altieri; Nicholls, 2020).

Additionally, agroecology positively impacts both production and dietary diversity, significantly improving nutrition in small-scale farming contexts and contributing to achieving Sustainable Development Goal (SDG) 2 (Kansanga et al., 2021). The adoption of agroforestry practices can enhance the sustainability of organic farming by diversifying

production components and promoting positive ecological relationships (Rosati; Borek; Canali, 2021).

During global crises such as the COVID-19 pandemic, local production can be sustained through financial and technical support from local programs, including subsidies for inputs, targeted credit lines for family farmers, and the creation of direct markets such as farmers' markets and government procurement programs that directly connect producers with local consumers (Altieri; Nicholls, 2020). This reduces dependence on international supply chains by prioritizing local distribution over food imports, encouraging domestic production of fertilizers, seeds, and agricultural equipment to prevent bottlenecks in supply, and diversifying food production rather than focusing exclusively on export commodities (Rosati; Borek; Canali, 2021). This diversified food production approach also enhances local food security (Altieri; Nicholls, 2020).

On the other hand, the COVID-19 pandemic exposed vulnerabilities in the infrastructure and policies supporting family farming. Key challenges include inadequate storage and transportation infrastructure, lack of alternative marketing channels, and limited and fragmented government support. Many family farmers lack proper storage facilities (such as refrigerated silos or warehouses), leading to food loss during crises (Reardon; Bellemare; Zilberman, 2020). Furthermore, the reliance on local markets or farmers' markets for direct sales highlighted the absence of digital platforms or alternative distribution channels during lockdown periods (Adeel Zafar et al., 2021). Public policies also struggled to expand their reach and adequately support small farmers during the crisis (Reardon; Bellemare; Zilberman, 2020).

Logistical and distribution challenges arose due to the closure of markets and regional fairs. This disrupted farmers' primary sales outlets, directly impacting their income and reducing local food availability (Reardon; Bellemare; Zilberman, 2020). The COVID-19 pandemic has negatively affected agricultural production in China, with restrictions impacting supply and production capacity, serving as a warning for other developing countries (Pu; Zhong, 2020). Additionally, the difficulty in distributing products and reaching final consumers forced many farmers to sell at lower prices to intermediaries, damaging the sector's economic sustainability.

Currently, family farming accounts for 80% of the global food supply; in Brazil, approximately 70% of food consumed originates from family farms, representing 77% of the country's agricultural establishments, according to the latest agricultural census (IBGE, 2017). Following the enactment of Law 11.326 (2006), the agricultural census highlighted

the sector's contribution to Brazil's staple food production. The census indicated that 77% of agricultural establishments fall under the family farming category, employing over 10 million people, equivalent to 67% of rural workers (Brasil, 2017). The United Nations also recognizes that family farming is responsible for 80% of the world's food supply.

Considering this context, this study aims to understand how family farmers have navigated the challenges imposed by the pandemic, as well as the resilience and adaptation strategies adopted for rural sustainability. This is a comprehensive and interdisciplinary content analysis that highlights the role of public policies in mitigating the pandemic's effects. The study examines economic impacts (commercialization, logistics, and sustainability) and health effects (both physical and mental) on farmers-factors often overlooked in crisis-related research.

2 MATERIALS AND METHODS

This study was conducted through exploratory, qualitative, and integrative review research. The research process began with a literature review as part of a master's dissertation. This review was carried out in June 2022 using the databases Google Scholar, Science.gov, SciELO, CAPES Journals, and Scopus, in both Portuguese and English. Boolean operators were used to combine the following keywords: “family farming”; “COVID-19” AND “family farming”; “agriculture”; “agriculture” AND “COVID-19.” Additionally, a time filter was applied for the period between 2019 and 2022, corresponding to the post-pandemic context.

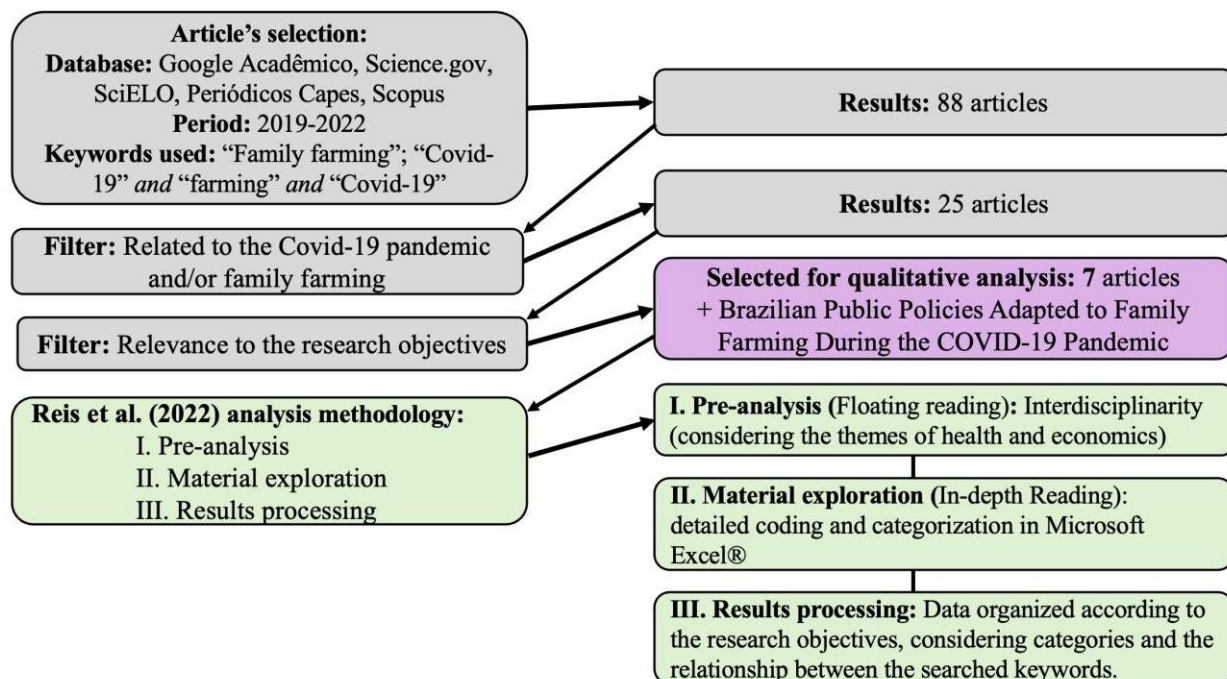
The search initially resulted in 88 documents, which were organized in an Excel spreadsheet and filtered based on the following criteria: relevance to the COVID-19 pandemic and/or family farming. The first selection narrowed the results to 25 articles, which formed the initial library. Additional relevant articles from the databases were accessed during the pre-analysis phase and selected for qualitative analysis based on their relevance to the research objectives. Furthermore, Brazilian public policies aimed at family farming during the COVID-19 pandemic were analyzed, along with other relevant documents included in the research.

The applied review method was content analysis, as proposed by Bardin (Bardin, 1977), and adapted for use with Mendeley® software tools (Reis et al., 2022). In the academic context, computational competence and cross-disciplinary skills are essential for

researchers to effectively use digital tools and spaces in qualitative research, leading to higher-quality projects (Pope; Costa, 2023).

Bardin (Bardin, 1977) defines content analysis as a category-based method that enables systematic classification of content for extracting and interpreting data. The content analysis process is structured into three main phases (Figure 1): I. Pre-analysis; II. Exploration of the material; III. Processing of results.

Figure 1 - Summary of the methodology used.



Source: authors.

All stages of content analysis were conducted with the support of Mendeley® software, following the methodology adapted from Reis et al. (Reis et al., 2022). This methodology consists of three phases: I. Pre-analysis; II. Exploration of the material; III. Processing of results.

In the first phase, pre-analysis, the documents were organized into a library in Mendeley®. After an initial skimming of the collected articles, key articles were highlighted as favorites. The primary criterion for analysis was interdisciplinarity, considering the categories of health and economy, which are directly connected to the impacts of the COVID-19 pandemic on family farming. This phase enabled the identification of mutual interaction between these categories, demonstrating how family farming was affected both

economically and in terms of health during the pandemic, with an emphasis on excerpts addressing these impacts.

The second phase, exploration of the material, involved detailed coding and categorization using Microsoft Excel®, with an in-depth reading and selection of articles that fit the study's theme. The articles were numbered based on predefined criteria. The spreadsheet contained information such as article details (title, journal, year, authors), analysis categories (such as economy and health), and their connections to family farming. All documents classified as favorites in the previous stage were further analyzed, and the most relevant findings for each category were highlighted and properly referenced.

In the third and final phase, processing of results, the collected data were grouped and organized according to the research objectives, considering classifications by categories and their relationship with the keywords. This phase aimed to ensure internal coherence among all stages, culminating in a systematization that allowed the achievement of the proposed objectives.

3 FAMILY FARMING IN BRAZIL

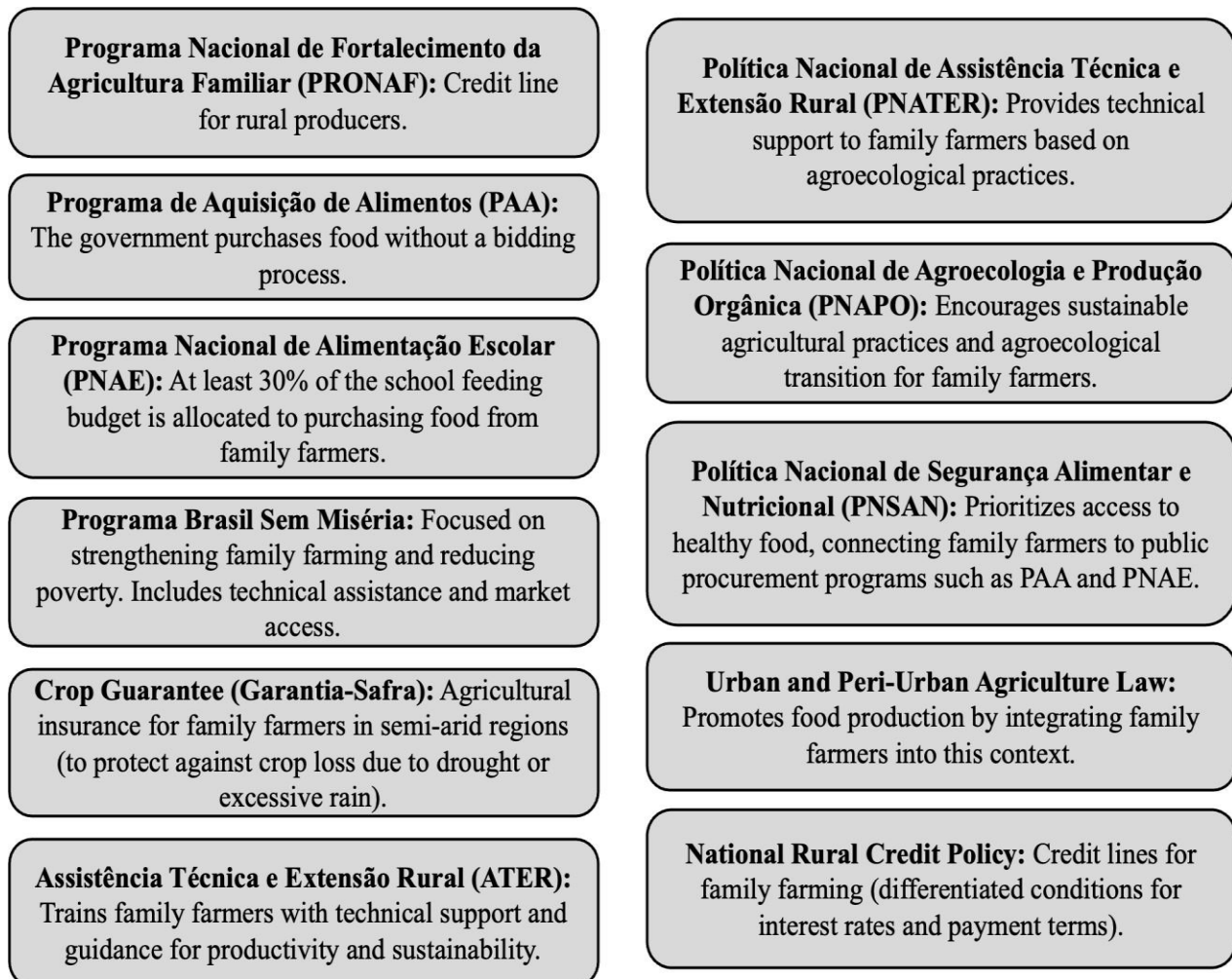
The adoption of sustainable practices, whether through crop diversification or the conscious use of soil and other natural resources, contributes to preserving local culture as well as protecting rural heritage. Similarly, organic farming allows consumers access to locally produced food, which is fresher and enhances overall quality of life (Medeiros et al., 2020).

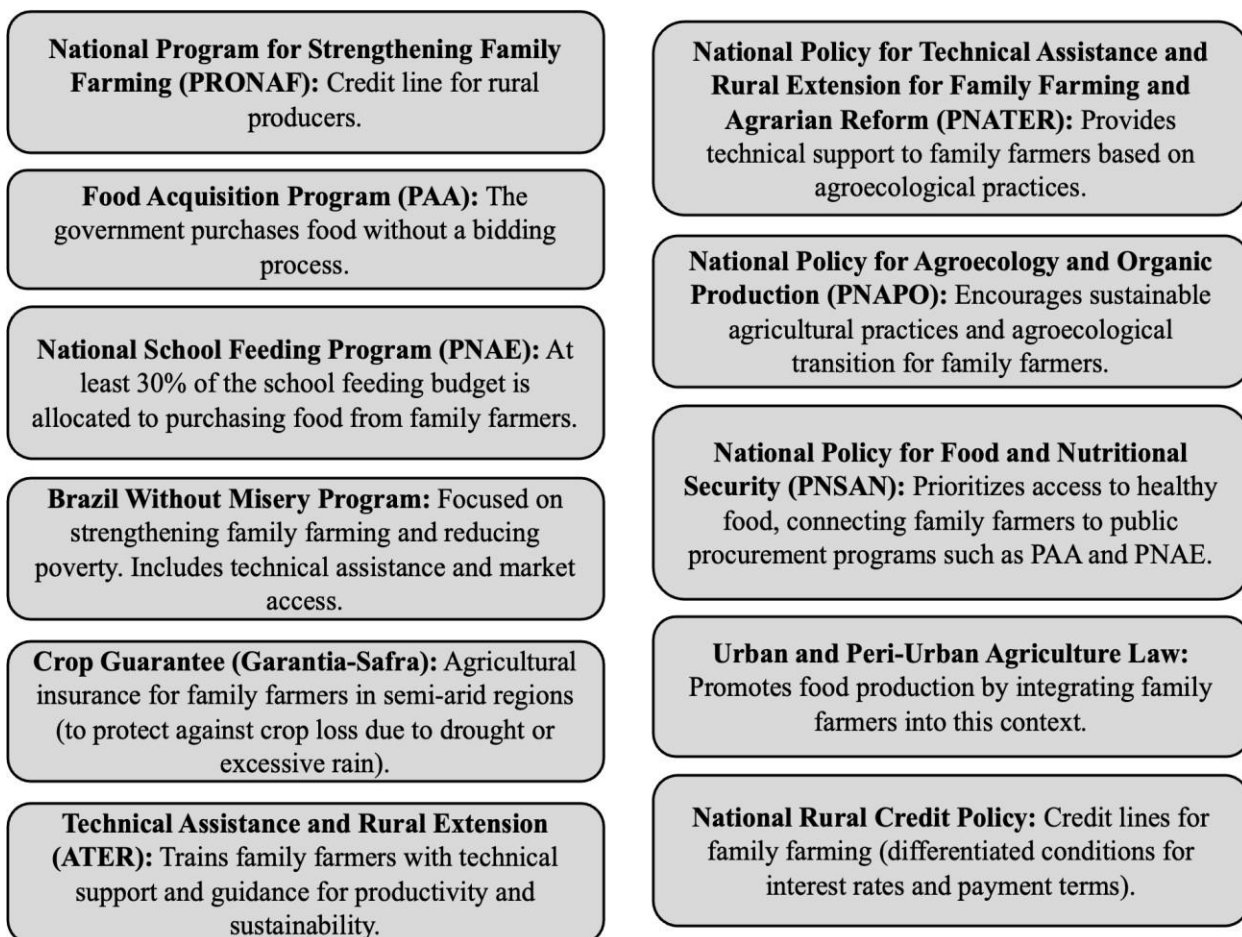
Local development and quality of life were boosted in 1995 with the creation of the *PRONAF*. Its objective was to support families and strengthen the activities carried out by rural producers. Additionally, it served as an initiative to modernize the production system and add value to agricultural production. Within this program, besides other incentives, specific credit lines with tailored regulations for producers were introduced. The resulting increase in farmers' purchasing power enabled investments and the integration of new production factors, contributing to higher production and employment generation (Rodrigues, 2019).

From that point onward, the recognition and appreciation of the sector grew, driven not only by financial incentives but also by government policies and programs aimed at encouraging production and commercialization (Figure 2). These include: *PRONAF*, which

provides credit lines specifically for family farmers; *PAA*, which allows government food purchases without requiring public bidding, fostering cooperation and production diversification; *Programa Nacional de Alimentação Escolar (PNAE)*, which ensures that food for schools is purchased from family farmers; *Brasil sem Miséria (BSM)*, aimed at food security; *Programa de Assistência Técnica e Extensão Rural (ATER)*, which offers technical training for family farmers, among others.

Figure 2 - Brazilian Programs and Policies for Family Farming





Source: authors.

With these programs and policies, the sector gains strength and recognition. To further develop family farming, Brazil established specific legislation in 2016 through Law 11.326, dated July 24, (2006). This law defined guidelines and criteria for formulating the National Policy for Family Farming and Rural Family Enterprises, aiming to determine who qualifies as a family farmer. It also promotes the creation of public policies for market access, product commercialization, rural technical assistance, and farmer education, while encouraging sustainable agricultural practices that respect regional biomes and biodiversity. Additionally, the law seeks to integrate historically marginalized populations into rural development policies and supports the coordination of programs and policies to develop an ecosystem that sustains family farming.

By law, a family farmer is defined as someone engaged in rural activities, owning land equivalent to up to four fiscal modules, using family labor, and deriving household income primarily from rural work (Brasil, 2006). Thus, the goal of public policies for family farmers is to provide support and consolidate producer groups to maintain their activities in rural areas and diversify production (Zahaikevitch et al., 2022).

In this context, a notable initiative is the PAA, which integrates public policies for food and nutritional security to strengthen family farming. This program was established through Federal Law No. 10.696, dated June 2, 2003 (Brasil, 2003). Through this program, family farmers can sell their produce to government agencies. Additionally, the program fosters rural development, combats poverty, and reduces social inequalities by generating income for farmers (Salgado; Souza; Ferreira, 2022).

Thus, the PAA contributes to maintaining public food stocks, strengthens local and regional supply chains by valuing biodiversity and organic production, and promotes healthy eating habits. It also encourages cooperativism and associations among farmers (Brasil, 2003). Moreover, it enables farming families to sell directly to public institutions without the need for a bidding process. Another benefit is the fair pricing of products, aligned with market valuation. As a result, the products serve various sectors, including universities, hospitals, and correctional facilities (Salgado; Souza; Ferreira, 2022).

Another important incentive program for family farming is Law No. 11.947, dated June 16, 2009 (2009), which regulates school feeding services and allocates funds from the *Fundo Nacional de Desenvolvimento da Educação* (FNDE) to states, municipalities, and the federal district under the PNAE. According to this law, 30% of these funds must be used for direct purchases from family farmers or organizations directly linked to the sector. Another provision prioritizes agrarian reform settlements, traditional indigenous communities, and quilombola communities. Like the PAA, the PNAE does not require a bidding process but can be implemented through a public call mechanism.

The PNAE aims to encourage food production and local sustainability by increasing the availability of fresh and healthy food in schools (Dias et al., 2020). Furthermore, the program helps diversify students' diets while respecting local culture, traditions, and healthy eating habits. Consequently, it also ensures seasonal food diversity sourced from local production (Feitosa et al., 2022).

Family farming plays a crucial role in promoting several Sustainable Development Goals (SDGs) established in the UN 2030 Agenda, such as those related to food security (SDG 2), combating climate change (SDG 13), and conserving biodiversity (SDG 15) (Gómez-Pellón, 2024). Given the importance of Brazilian family farming, national programs and policies offer protection and prioritize domestic markets to consolidate groups of farmers. In addition, they support local activities and generate income with a social focus on reducing inequalities and eradicating poverty.

The COVID-19 pandemic created a scenario of individualism, socio-environmental degradation, and economic shifts, underscoring the need for effective public policies for family farming in Brazil. As a result (Table 1), different activities had to be redesigned and adapted to this new reality, which imposed social distancing and altered consumption and production patterns across various contexts and spaces (Nepomoceno et al., 2021). Decisions regarding new project launches and securing financing were impacted by market uncertainty during the pandemic. However, this period also encouraged investment and financing decisions (Amorim; Sales; Grecco, 2022).

Table 1 - Analysis Results by Article for the Economics and Health Categories

Citation	Study Objective	Category	Main Result/Contribution
Nepomoceno et al. (2021)	To provide a synthesis of the impacts of the COVID-19 pandemic on economic processes, family farming, and the environment in Brazil.	Economy	Identified reduced income and serious difficulties in marketing agricultural production, increasing rural vulnerability.
		Health	Warned of potential collapse in the healthcare system and risks to food security due to changes in consumption patterns.
Futemma et al. (2021)	To identify and understand the impact of this health crisis on small-scale rural producers, one of the vulnerable groups in Brazilian society.	Economy	Found that 84% of small producers experienced income losses, and 68% reported negative impacts on sales.
		Health	Reported that 86% of producers had close contacts infected with COVID-19, and 11% of severe cases did not receive medical care.
Breitenbach (2020)	To discuss the effects of the pandemic on agriculture and food security and to identify strategies to minimize impacts on family farming.	Economy	Highlighted the suspension of farmers' markets, forcing producers to adopt delivery services and social media-based sales.
		Health	Emphasized maintaining food security for low-income consumers and implementing new sanitation protocols.
Sousa, Jesus & Beraldo (2021)	To analyze the impacts of COVID-19 on the productive inclusion of family farmers through a case study of the Cooprato cooperative.	Economy	Revealed that sales dropped by more than half, and the suspension of the National School Feeding Program (PNAE) affected 80% of the cooperative's revenue.
		Health	Observed that cooperative members belonging to high-risk groups were unable to commercialize their products and had to comply with stricter sanitation requirements.
Amorim, Sales & Grecco (2022)	To analyze how COVID-19 affected corporate financing and investment policies from a behavioral finance perspective.	Economy	Examined how managerial overconfidence influenced aggressive financing decisions aimed at reversing financial losses.
		Health	Investigated mental health impacts, showing that fear, anxiety, and uncertainty affected corporate decision-making processes.
Cavalli et al. (2020)	To discuss the implications of COVID-19 containment measures on food production and distribution, as well as strategies to strengthen the sector.	Economy	Discussed the disruption of short food supply chains and the need to ensure minimum income levels to maintain economic sustainability.
		Health	Highlighted contamination risks and the importance of distributing food baskets containing locally produced foods to mitigate hunger.

Source: authors.

The analytical framework structured in Table 1 reveals that food resilience during macroeconomic shocks is deeply interdependent with public health and economic stability. Regarding weaknesses, the literature exposes the financial vulnerability of smallholders due to the abrupt closure of physical markets, which directly triggered nutritional and psychological distress, alongside an initial operational rigidity within institutional programs that struggled to adapt to emergency demands. Conversely, significant opportunities emerged through social innovation and digital transformation, where the rapid adoption of e-commerce, WhatsApp networks, and collective solidarity safety nets demonstrated the high adaptive capacity of family farmers to secure urban supply chains. Consequently, to serve as true socioeconomic buffers in future crises, public policies like PRONAF, PNAE, and PAA must transition into more flexible instruments, integrating emergency credit lines with rural digital inclusion strategies and decentralized sanitary protocols.

During the COVID-19 phase, family farming suffered from declining sales and profit losses. Rural producers were affected in terms of production, commercialization, income, human health, and communication methods (Futemma et al., 2021). Coping strategies were classified into two categories: a) Government actions and emergency public policies; b) Actions by civil society (farmers, their representative organizations, and other social actors). Thus, different sectors were involved, either reactively or proactively, in minimizing the social and economic consequences of the pandemic on family farming (Oliveira; Abranches; Lana, 2020).

In this context, it is essential to analyze the relationship between the impacts of the COVID-19 pandemic on family farming, considering economic and health dimensions. The observed effects on production, commercialization, income, and human health—as well as the strategies adopted to mitigate these challenges—reflect a complex interaction between the difficulties faced and the emergency actions implemented. While emergency public policies aimed to minimize economic and social effects, civil society initiatives demonstrated the resilience and adaptability of farmers and their representative organizations.

4 RESULTS AND DISCUSSION ON THE ECONOMY

The COVID-19 pandemic exposed structural vulnerabilities in family farming, generating severe economic impacts on production distribution and farmers' income. Studies indicate that 60% of Brazilian family farmers experienced income losses exceeding 40% during the first year of the pandemic (Brasil, 2022). The disruption of traditional distribution channels, such as open-air markets and institutional procurement programs,

deepened social vulnerability, particularly among small producers without access to alternative markets (Cavalli et al., 2020).

In Brazil, public policies such as the PNAE and the PRONAF acted as critical buffers; however, their implementation revealed persistent gaps. The lack of digital infrastructure left 72% of family farmers unable to access online sales platforms during lockdowns (Berchin et al., 2019). This technological limitation, combined with inadequate storage infrastructure (Reardon; Bellemare; Zilberman, 2020), transformed logistical challenges into subsistence crises for many rural households.

Moreover, production, commercialization, and farmers' income were affected in a multidimensional manner, with a considerable negative impact on sales for 6% of producers. Many had to adopt new commercialization strategies, abandoning their usual sales locations (Futemma et al., 2021). The pandemic led to immediate increases in the prices of staple foods such as chickpeas, beans, and tomatoes (Cariappa et al., 2020). It also triggered significant shifts in both farmgate and consumer prices for various vegetables, with more pronounced changes at the farmgate level. These disparities resulted in both gains and losses for local vegetable producers (Hirvonen et al., 2021).

Social isolation measures and the closure of institutional markets, such as farmers' markets, had a significant impact on the main sales channels used by family farmers, including the PNAE. In this context, the vulnerabilities exposed by the crisis may represent opportunities to transition toward more socially just and environmentally sustainable production models, such as small-scale and organic farming (Cavalli et al., 2020). To adapt, many family farmers turned to alternative markets, including delivery systems, and began organizing new commercialization strategies (Sousa; Jesus; Beraldo, 2021).

In Brazil, public policies such as the *PNAE* and the *PRONAF* provided economic support to family farmers during the pandemic. Reports from the *FNDE* indicate that schools adapted by purchasing food directly from family farmers and distributing it as food baskets (Brasil, 2022). This measure ensured a source of income for many farmers who relied on institutional purchases. *FNDE* reports indicate that, in 2021, 30% of the resources allocated to school feeding were used for direct purchases from family farmers. This percentage aligns with current legislation and helps mitigate the economic impact of the pandemic on small producers.

Additionally, emergency credit was granted. Data from the *Banco do Nordeste* on *PRONAF* show that access to emergency credit expanded during the pandemic. Before the crisis, the program already offered credit lines for family farmers with specific conditions for each group, such as *PRONAF Grupo A*, *PRONAF Mais Alimentos*, and *PRONAF Produtivo Orientado*. Interest rates varied according to the credit line and the farmer's profile, and financing limits were established based on the purpose of the loan (Cruz et al., 2021).

The *PRONAF* is divided into target groups. *PRONAF Grupo A* is intended for farmers settled under the *Programa Nacional de Reforma Agrária (PNRA)* and beneficiaries of land credit programs. It provides credit for the initial structuring of productive activities, focusing on sustainability and the development of production units. *PRONAF Mais Alimentos* aims to modernize and increase productivity in agricultural activities. It finances investments such as the purchase of machinery, agricultural implements, irrigation systems, and improvements in farm infrastructure. *PRONAF Produtivo Orientado* supports small farmers in developing specific productive projects with continuous technical assistance. This program provides credit for planned productive activities, usually linked to local or regional production chains (Banco Nacional do Nordeste, 2021).

During this period, Banco Nacional do Nordeste (2021) adopted measures to facilitate credit access, aiming to mitigate the economic impacts on the agricultural sector. A specific credit line was created to support the productive sector affected by natural disasters, such as the floods at the end of 2021 and early 2022. This line offered special financing conditions for rural producers and family farmers.

Additionally, *PRONAF Grupo A* was expanded to include Indigenous and *Quilombola* communities. This allowed these groups to access financing with reduced interest rates, as low as 0.5% per year, with extended repayment terms of up to 10 years. Furthermore, access to rural microcredit was facilitated, with effective interest rates of 0.5% per year and compliance bonuses of up to 40% in semi-arid regions. This initiative supported small producers in maintaining and expanding their activities (Banco Nacional do Nordeste, 2022).

Product commercialization through farmers' markets was impacted due to movement restrictions. However, the encouragement of digital platforms and delivery systems helped sustain sales. Reports from Banco Nacional do Nordeste (2021, 2022) indicate that while traditional market sales declined, there was an increase in the use of local marketplaces.

5 RESULTS AND DISCUSSION ON HEALTH

The impacts of the pandemic on health, particularly among family farmers, were also evident. Hygiene and sanitation practices were intensified both in the fields and in harvesting, packaging, and transportation processes (Futemma et al., 2021). Farmers had to incorporate strict hygiene measures for products and packaging, using water, soap, sanitizing agents, or 70% alcohol gel.

However, limited access to basic sanitation and treated water compromised the sanitary security of some agricultural communities, exposing them to additional health risks during food production and commercialization. Moreover, the reorganization of farmers' markets and the implementation of social distancing measures posed logistical challenges and increased the risk of contamination in sales processes (Cavalli et al., 2020).

Mental health was also affected. Amorim, Sales, and Grecco (2022) indicated that social isolation and uncertainty about the future led to psychological effects such as fear, anxiety, and frustration among farmers. These factors contributed to increased emotional instability in rural communities. Furthermore, many cooperative members in family farming were in high-risk groups for COVID-19, preventing them from participating in essential activities such as selling at markets (Sousa; Jesus; Beraldo, 2021).

Public policies influenced health-related aspects, both in terms of food security and public health, for farmers and consumers. The continuation of the *FNDE* during the pandemic ensured the supply of nutritious, fresh food to students in vulnerable situations. The distribution of food baskets mitigated food insecurity risks for many rural families. The diversification of products supplied by family farmers allowed these baskets to include healthier foods, contributing to improved eating habits (Brasil, 2022).

According to the Banco Nacional do Nordeste (2021, 2022), family farmers adopted rigorous sanitary measures in their production and commercialization processes, such as using personal protective equipment and sanitizing packaging. These practices helped reduce the risk of COVID-19 contamination for both producers and consumers.

In summary, supporting and strengthening the family farming sector during the COVID-19 pandemic is crucial not only to ensure food supply and maintain food sovereignty and security (Cavalli et al., 2020) but also to promote the health and well-being of rural communities. Improved market access and the maintenance of family income are essential for the economic sustainability of these producers. Additionally, sustainable agricultural

investments, including the rapid recovery of affected soil, irrigation water, and livestock, can enhance the resilience of small-scale farming systems (Goswami et al., 2021). This resilience, in turn, contributes to economic stability and the health of rural families, especially in times of crisis like the pandemic.

6 FINAL CONSIDERATIONS

By investigating economic and health dynamics, this study identified that public policies, despite their limitations, played a significant role in the adaptation and resilience of family farmers. The adoption of digital commercialization strategies and sanitary measures contributed to the continuity of production and consumer protection.

This study adds to the debate on the interaction between health, economy, and sustainability in family farming, particularly during crisis periods such as the COVID-19 pandemic. Furthermore, it integrates the analysis of public policies with the strategies adopted by farmers during the pandemic. Practically, it provides valuable insights for public policymakers to develop more effective strategies for future crises by emphasizing the importance of policies targeted at family farming and the strengthening of short supply chains.

From a societal perspective, this study highlights the relevance of family farming for food security and reducing social inequalities, particularly in crisis contexts.

The research was limited to a bibliographic analysis in specific languages, restricting the breadth of available information. Additionally, the study did not include direct interviews with family farmers, which could have provided more detailed perspectives. Therefore, future studies involving direct engagement with family farmers are recommended to deepen the understanding of the challenges faced and the resilience strategies adopted.

Another avenue for future research could be analyzing the impact of public policies in different regions of Brazil, allowing for a better understanding of the effectiveness of localized actions. Additionally, it would be interesting to explore how digital technologies can be more broadly integrated into agricultural commercialization.

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