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Evolution of the Rural Family Agroindustry in Brazil: An Economic Perspective

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Abstract
This paper aims to analyze the evolution of the rural family agroindustry in Brazil between 2006 and 2017, mainly from an economic point of view. The contribution to the average monetary income of rural agroindustry was calculated based on data from the 2006 and 2017 Agricultural Censuses. The results showed a large drop in rural agroindustries between the 1995/96 and 2006 censuses, followed by a small drop between the 2006 and 2017 censuses. This behavior was led by the production of cassava flour and cheese and cream cheese, whose production mainly contracted due to the drop in consumption and stricter regulations, respectively. In 2017, the average contribution to monetary income from processed products was greater than that of several agricultural activities. Public policies are fundamental for promoting rural agroindustry. In conclusion, food processing in Brazil in rural family agroindustries is an important strategy to promote increasing and stabilizing family farmers' income.
Keywords: Rural development, Family farming, Family agroindustry, Brazil.

Evolução da Agroindústria Rural Familiar no Brasil: um olhar para a dimensão econômica
Resumo
O objetivo desse artigo é analisar a evolução da agroindústria rural familiar no Brasil entre 2006 e 2017, e, principalmente, do ponto vista econômico. Foi calculado a contribuição da renda monetária média da agroindústria rural a partir dos dados Censos Agropecuários de 2006 e 2017. Os resultados mostraram grande queda do número de agroindústrias rurais entre os censos 1995/96 e 2006, seguido de pequena queda entre os censos de 2006 e 2017. Este comportamento foi liderado pela produção da farinha de mandioca e de queijo e requeijão, cuja produção em parte contraiu em razão, respectivamente, da queda no

consumo e das regulamentações mais rigorosas. Em 2017 a contribuição média da renda monetária dos produtos transformados foi maior do que várias atividades agrícolas. As políticas públicas são fundamentais para a promoção da agroindústria rural. Conclui-se o processamento de alimentos no Brasil nas agroindústrias rurais familiares é uma importante estratégia de promover o aumento e estabilização da renda do agricultor familiar.
Palavras-chave: Desenvolvimento rural. Agricultura familiar. Agroindústria familiar. Brasil**.**

Evolución de la Agroindustria Rural Familiar en Brasil: una mirada a la dimensión económica

Resumen
El objetivo de este artículo es analizar la evolución de las agroindustrias familiares rurales en Brasil entre 2006 y 2017, principalmente desde el punto de vista económico. La contribución al ingreso monetario medio del procesamiento de alimentos por la agricultura familiar se calculó a partir de los datos de los Censos Agropecuarios de 2006 y 2017. Los resultados mostraron una gran caída en el número de agroindustrias rurales entre los censos de 1995/96 y 2006, seguida de una pequeña caída entre los censos de 2006 y 2017. Este comportamiento fue liderado por la producción de harina de mandioca y de queso y requesón, cuya producción se contrajo parcialmente, respectivamente, debido a la caída del consumo y a regulaciones más estrictas. En 2017, la contribución media de los productos procesados a la renta monetaria fue mayor que la de las diversas actividades agrícolas. Las políticas públicas son importantes para promover el procesamiento de alimentos por la agricultura familiar. Se puede concluir que la transformación de alimentos por la agricultura familiar en Brasil es una estrategia importante para aumentar y estabilizar los ingresos de los agricultores familiares.
Palabras clave: Desarrollo rural. Agricultura familiar. Agroindustria familiar. Brasil.

1 Introduction

The low insertion of family farmers in the most dynamic production chains, generally associated with international trade, contributes to seeking to diversify their livelihoods towards maintaining and expanding income, as well as the occupation of family members. These farmers have adopted strategies that go beyond agricultural activities, such as the transformation of farming and livestock products, that is, they choose to install rural agroindustries on their properties (PERONDI, 2007; GAZOLLA, NIEDERLE and WAQUIL, 2012; DORIGON and RENK, 2011; FOGUESATTO and MACHADO, 2017; DAMKE et al., 2019; SPANEVELLO, 2019; CONTERATO, STRATE and DICKEL, 2019).

Family rural agroindustry is the result of a set of operations and tasks that pre-process, transform, and process agricultural and livestock production, which normally follow traditional family or community recipes and seek to add value (MIOR, 1999; GAZZOLA, NIERDERLE and WAQUIL, 2012), whose production can reach a premium price in some markets (GAZOLLA and PELEGRINI, 2011). The decision by farmers to expand production for domestic consumption on a commercial scale can make this process independent of agricultural and livestock activities through different working hours and routines (GRAZIANO da SILVA, DEL GROSSI, and CAMPANHOLA, 2002). Normally, the raw material tends to come initially from the rural property, but farmers can acquire them from other producers when economies of scale occur, which may have an impact on their rural communities GRAZIANO da SILVA, DEL GROSSI, and CAMPANHOLA, 2002; SCHNEIDER, 2007; DOS SANTOS and

GUARNIERI, 2021).

The embryo of these transformation units was normally present in the routine activities of rural families to preserve food, valuing surplus production, or as a culinary culture, that is, it has always constituted a tradition in rural areas (MIOR, 2005; DORIGON and RENK, 2011). Rural agroindustries have always been part of the daily lives of Brazilian farmers and have not disappeared with advances in the agricultural modernization process. Family agribusiness plays different roles, such as rescuing local knowledge and ethnic culture and re-establishing the link between rural and urban areas. Consumers value products with an artisanal identity, differentiated, of quality, and with attributes that bring them closer to rurality (MIOR, 2005; DORIGON and RENK, 2011; DAMKE et al., 2019).

This paper aims to analyze the evolution of the family rural agroindustry mainly from the point of view of the economic dimension between the 2006 and 2017 Agricultural Censuses. Additionally, the most significant state and national programs for encouraging and developing the rural agroindustry were surveyed, contributing to the analysis of the dynamics and dimension of this rural activity, especially the role of public policies in its promotion.

2 Family Rural Agroindustry in Brazil

The process of agricultural modernization has advanced in Brazil through several sectoral policies, which were important to increase agricultural production and productivity, mainly in the Southern, the most developed region of Brazil. In contrast, this process was less intense in poorer regions, such as the Northeast and North, as well as for small-scale producers (FREITAS, BACHA, and FOSSATTI, 2007; DE AQUINO and DO NASCIMENTO, 2020). The well-being of populations and their social and economic development should be the natural result of the introduction of new technological standards that led to increases in production and productivity, but there was no increase in income for a large portion of small-scale rural producers (DA SILVA, AMARANTE, and AMARANTE, 2022).

Transformations were identified in the Brazilian rural environment at the beginning of the 1990s, which became a space for varied activities based on social relationships between several different actors. New challenges and possibilities for its development were included in the development projects of rural areas, such as the generation of non-agricultural economic activities, including agritourism, the production of regional specialties, the direct marketing process, and handicrafts (GRAZIANO DA SILVA, DEL GROSSI, and CAMPANHOLA, 2002; DE AQUINO and DO NASCIMENTO, 2020; NASCIMENTO, AQUINO, and DELGROSSI, 2021).

The search for additional income has given rise to a myriad of options for activities that are not necessarily agricultural. The transformation and pre-processing of agricultural products make rural family agroindustry one of the many non-agricultural activities with the potential to promote rural development and, above all, to enable the sustainability of family farmers (LOBÃO and STADUTO, 2018; ANES, DEPONTI, and AREND, 2018; ESAU and DEPONTI, 2020; BESEN et al., 2021).

IBGE (2016) considers family agroindustries as one of the types of rural agroindustry. It is defined as a set of activities involving the transformation and pre-processing of products originating from agriculture (animal or vegetable origin),

regardless of the size of the agricultural establishment, its family or employer characteristics, the processed volume, and the product destination (self-consumption or commercialization). Importantly, rural producers carry out these activities in their facilities, community facilities, or third-party facilities. Raw materials can be produced in the agricultural establishment or purchased from other producers.

Family rural agroindustry is a strategy for promoting the development of family producers through the transformation of raw materials originating from agricultural production into typical or differentiated products, allowing these farmers to enter the market and making their enterprises viable using products with greater added value, also reaching a premium price (AMORIM and STADUTO, 2008; GAZOLLA and PELEGRINI, 2011; KASMIN, PASSINI, and BOICO, 2019; SPANEVELLO et al., 2019). Mior (2005, p. 191) considers rural family agroindustry to be "a form of organization in which the rural family produces, processes, and/or transforms part of its agricultural and/or livestock production, aiming, above all, at the production of exchange value that takes place in commercialization". Furthermore, according to Wesz Junior (2010) and Grisa and Schneider (2015), this activity promotes a local economy, as it allows the retention of resources in rural areas, giving scale to the added value that farmers obtain from exchanges with other local partners.

Food processing, which already took place in the kitchens of Brazilian rural families as part of their tradition and culinary and gastronomic menu, began to be valued for generating income (MIOR, 2005). The agroindustrialization of rural production is not new for family producers, much less for women farmers. They have already been processing food, and much of the knowledge came from family tradition and the farmers' culture. Food processing in the property's kitchen, a space reserved for women, reached another economic and social status when it increased in scale, that is, from reproductive activity to productive activity, contributing to agricultural families becoming engaged in multiple activities or even non-agricultural (AMORIM and STADUTO, 2008).

According to Dorigon and Renk (2011), the installation of rural agroindustries is a food and territorial cultural rescue that has brought consumers and farmers together through products associated with quality, health, and nature. Furthermore, it allowed the restoration of the emotional memory of the territory and food culture. The consumer has the feeling of purchasing part of the local tradition when purchasing a certain product.

Family rural agroindustry is a type of pluriactivity resulting from a set of operations, tasks, and procedures that involve the transformation, pre-processing, and/or processing of agricultural products obtained within an agricultural establishment or acquired, in part or in full, outside the property, whose destination is commercialization. The expansion of this type of production within the family structure can make it an independent activity, representing new working hours and different routines (GRAZIANO DA SILVA, DEL GROSSI, and CAMPANHOLA, 2002; SCHNEIDER, 2007).

The literature points to a varied range of types of agroindustries, as well as different reasons for their installation. Kiyota et al. (2014) compared the strategy of adding value in rural areas through agroindustries in family units in the South and Northeast of Brazil. The results of that research showed that farmers in the South and Northeast were looking for additional income to reduce dependence on commodity production. Producers had a similar social reproduction strategy in both regions. Foguesatto and Machado (2017) studied Rio Grande do Sul and found that the main reason for implementing agroindustries was the search to increase family income.

Adding value through agroindustries is an important rural development strategy, as control of the main links in the production chain is under the command of farmers—production of raw materials, processing, management of units, and direct marketing, among others (PERONDI, 2007). According to Perondi (2007), intermediate consumption in the activity of transforming products in family farming in diversified production systems in the southwest of Paraná was around 8%, being lower than large-scale animal production, which was around 50%, and much lower relative to monoculture grain production systems (soybean and corn), which was around 70%.

Several aspects can be listed as characteristics of family agroindustries: i) business ownership and management are carried out by the family unit or collective groups of families; ii) they are predominantly located in rural areas; iii) the food processing scale is small, using technologies suitable for this production scale; iv) they mostly use artisanal processes; v) labor is predominantly family, mainly women; vi) production of raw materials is family-owned or purchased locally, in small quantities, from neighbors and other local farmers; vii) they are often organized into networks of collective actors to overcome various obstacles, especially those related to commercialization; viii) differentiated regulations for small-scale enterprises in rural establishments; and ix) they are decentralized systems of agroindustrialization, whose enterprises were spread across different rural spaces (MIOR, 2005; AMORIM and STADUTO, 2008; PASSINI, 2020).

3 Policy and Programs for Family Rural Agroindustry

Two types of credit lines were made available at the end of the 1990s to promote the addition of value in agricultural and livestock production through agroindustrialization, in a way recognizing family farming as a development strategy. The first modality was Pronaf-Agroindústria, in 1998, with a credit line for investments to promote agroindustrialization and commercialization of production in collective family farming units. The second, in 1999, was Pronaf-Agregar (Pronaf Agregação de Renda à Atividade Rural – Pronaf Income Aggregation to Rural Activity), created by Banco do Brasil. It also presented a financing line for individual farmers (FERNANDES FILHO and CAMPOS, 2003; WESZ JUNIOR, 2012).

In 2003, two important changes were made to these credit lines: a) the unification of the two credit lines, which allowed the financing of both individual and collective units, known as Pronaf-Agroindústria; and b) the creation of the Programa de Agroindustrialização da Agricultura Familiar (Family Farming Agroindustrialization Program). The measures were combined with credit strategies, training, technological development and adaptation, market access, and adaptation of legislation (WESZ JUNIOR, 2012).

Pronaf-Agroindústria was a line of federal investment that was crucial for financing rural agroindustries for farmers, both individually (individuals) and collectively (legal entities, such as cooperatives). There were lines of credit for investments in the pre-processing, storage, processing, and commercialization of products from the family production unit, also including biodiversity products (extractive and forestry products) and non-agricultural activities such as handicrafts and support for rural tourism exploration (WESZ JUNIOR, 2010; ALVES, 2014).

The federal government's actions were followed and complemented by some Brazilian states. They created programs that encouraged the installation or improvement of family agroindustries in their states, applying a range of different purposes and strategies. Table 1 shows the seven state programs and one district program implemented in the period from 1995 to 2010, distributed in the South (RS, SC, and PR), Midwest (DF, MS, and MT), and Southeast (RJ and MG) regions. No programs of this nature were found in the North and Northeast regions.

Table 1 – State agroindustrialization programs for Brazilian family farming

Program name	Acronym	State Years of activity
Programa de Verticalização da Pequena Produção Agrícola	PROVE	DF 1995–1998
Programa de Verticalização da Pequena Produção Agropecuária	PROVE PANTANAL	MS 1999–2006
Programa da Agroindústria Familiar	PAF	RS 1999–2002
Programa de Desenvolvimento da Agricultura Familiar pela Verticalização da Produção	DESENVOLVER	SC 1998–2001
Programa da Agroindústria Familiar Fábrica do Agricultor	FÁBRICA DO AGRICULTOR	PR 1999–2010
Programa Social de Promoção de Emprego e Renda na Atividade Rural	PROSPERAR	RJ 2002–2010
Programa de Apoio à Agregação de Valor e Desenvolvimento Rural	PROVEMAIS	MT 2003–2010
Programa de Desenvolvimento da Agroindústria Artesanal de Alimentos e do Artesanato Rural	MINAS ARTESANAL	MG 2006–2010

Source: Fernandes Filho and Campos (2003); Wesz Junior (2012); Damke et al. (2019). Prepared by the authors.

State programs sought to meet their objectives and goals within the specific characteristics of each state and government. Importantly, these state initiatives had no national guidance. The results and impacts observed over time resulted from the effort, experience, and resources that each program invested. Table 2 shows a summary of the programs, with their main characteristics, differences, and results.

The offer of credit was the policy instrument present in all state programs. Some states created their complementary lines to Pronaf-Agroindústria, standing out Rio Grande do Sul and Rio de Janeiro, which managed to associate different sources of resources to generate the benefits expected from the strategies of these respective programs.

Training farmers and technicians was an instrument present in seven of the eight state programs. This shows its importance, especially because it is linked to technical advice, which allows the beneficiaries to be prepared and supported in the implementation of business strategies and proposed technologies.

Programs to support the commercialization of products and access to the market were very important in promoting the development of rural agroindustry. The main action was focused on providing spaces for the sale of products, combined with the provision of an identification seal for the goods. An innovative initiative prepared by Prosperar in the State of Rio de Janeiro provided for the creation of a 7% credit, coming from the Value-Added Tax on Sales and Services (ICMS), for commercial establishments that purchased products from the Program's beneficiaries, increasing the competitiveness of producers.

Several actions were aimed at changing legislation and monitoring farmers to obtain registration, being adopted by five of the eight programs. The Paraná program Fábrica do Agricultor stood out for creating the "agility kit," which speeded up quick access to legislation and reduced bureaucracy in the various government bodies, resulting in a reduction in the time it took to formalize agroindustries (PASSINI, 2020).

Table 2 – Summary of Brazilian state programs to promote agroindustries

Program	Objective	Goals	Strategy	Results	Highlight
PROVE	Insert small producers into the production process, add value to production, increase family income, and generate jobs.	Install 330 agroindustries, generate 2,400 jobs, and involve more than 5,000 people.	Offer of credit, adaptation to legislation, training, market access, availability of technologies, and infrastructure.	120 agroindustries financed, R$ 873 thousand invested, 178 families benefited, and 712 jobs created.	First initiative in Brazil.
PROVE PANTANAL	Insert small producers into the production process, add value to production, increase income, and generate jobs.	Set up 350 agroindustries.	Offer of credit, adaptation to legislation, training, market access, availability of technologies, and infrastructure.	175 agroindustries implemented, 230 families benefited, and 620 jobs created.	
PAF	Support farmers in value-adding activities, improve income and living conditions, and contribute to regional socioeconomic development.	Reach around 30,000 families with an expenditure of approximately R$ 120 million.	Offer of credit, adaptation to legislation, training and ATER, support to marketing tools, and market access.	800 agroindustries supported, 2,719 families served, and R$ 8.4 million executed.	Creation of the "Sabor Gaúcho" seal.
DESENVOLVER	Promote the vertical integration of rural production from family farming through the creation and consolidation of small-scale rural industries.	Create 141 and restructure 212 agroindustries, generate 760 jobs, and implement the SIM in the involved municipalities.	Offer of credit, training and ATER, commercialization, and creation of technologies.	275 agroindustries assisted, 1,000 families benefited, and 2,283 jobs created.	30 machines created and adapted.
FÁBRICA DO AGRICULTOR	Add value to agricultural products through the implementation, modernization or adaptation of agroindustries, generating employment and income, and inserting entrepreneurs into the market.	Reach more than 4 thousand family agroindustries across the State and hold 120 fairs to publicize the products.	Offer of credit, support for legalization, training of farmers, and market access.	2,500 agroindustries supported.	Agility KIT: legalization in an innovative and fast way.
PROSPERAR	Increase the supply of jobs through credit support for agroindustries and reduce the informality rate.	Legalize 720 agroindustrial units.	Offer of credit, changes in legislation, access to the market and training, and monitoring of farmers.	80 family agroindustries benefited (60 financed) and 800 farmers and technicians trained.	ICMS credit to merchants who purchase products from the Program.
PROVEMAIS	Reduce rural exodus and social inequalities through the creation of family agroindustries.		Offer of credit.	21 family agroindustries financed and R$ 600 thousand invested.	Audience: groups constituted by law
MINAS ARTESANAL	Support the generation of family income by encouraging the industrial processing of food and rural artifacts, with an artisanal characteristic.	Support 700 agro-industries, train 6,500 farmers and rural artisans, train 500 extension agents, and create 100 commercial units.	Offer of credit, training of beneficiaries, and support for the commercialization of artisanal products.		

Source: Fernandes Filho and Campos (2003); Wesz Junior (2012); Damke et al. (2019). Prepared by the authors.

Incentives for the agroindustrialization of food through processing and marketing are mostly carried out informally, mainly due to the criteria imposed in health regulations, which in turn create difficulties for farmers. In recent years there have been favorable changes in legalization for family agroindustries, but many gaps and challenges persist, contributing to the informality of the sector (OUMA, 2010; CRUZ, 2020; ETGES and KARNOPP, 2020). The training of managers of small-scale agroindustries is essential to understand the levels of uncertainty that surround the activity (RAASCH et al., 2020).

Finally, the programs also had two other instruments, but more timidly. Actions in the areas of technological development and adaptation of machinery and equipment to family agroindustries, with the National Council for Scientific and Technological Development as the financier through the Support Program for Appropriate Technologies. And infrastructure support, used by only two programs (Prove/DF and Prove/Pantanal), whose beneficiaries were very undercapitalized farmers.

Wesz Junior (2012) analyzed the choice that public managers made to define the target audience that the programs would serve. For instance, the target was the poorest population when the objective was to overcome poverty and marginality, relying on value-adding and vertical integration strategies. On the other hand, some governments understood that agroindustry was an option for farmers who were already better trained, basing program activities on offering credit and expanding the market for their products.

Several of the policies were interrupted by the change of public manager, resulting in the discontinuity of activities in many production units or even the withering away of these programs (WESZ JUNIOR, 2012). However, many states maintained actions through their official rural extension institutions, which incorporated support and development activities as company programs (except for credit), without necessarily relying on state policies or programs (DAMKE et al., 2019).

The studied programs, resulting from government public policies, represented important institutional incentives and stimuli for the development of family rural agroindustries. However, it is not possible to assess solely through the survey whether the programs could influence the growth of units or avoid their reduction. However, according to Prezotto (2002), government programs are fundamental for promoting this activity.

4 Methodology

The methodology used was quantitative based on the analysis of descriptive statistics and the calculation of the contribution of the average monetary income of the rural agroindustry (Equation 1). Three analyses were carried out: a) the evolution of the total number of agricultural establishments with agroindustries; b) the distribution of rural agroindustry activities to family producers by federation unit; and c) the economic importance of rural agroindustry for family farmers. The data sources were the 2006 and 2017 Agricultural Censuses. Secondary data available in the IBGE Automatic Recovery System were collected and analyzed from Tables 6960, 6961, and 6906, related to rural agroindustry.

We applied the procedures by Fernandes Filho and Campos (2003) to analyze

the economic importance of rural agroindustry, which excluded the following products from the analysis: green beef, coffee beans, roasted coffee, and rice grains, considering that the processing added little to the product and, therefore, they would not be representative of the monetary contribution of rural agroindustries.

Another methodological option used by Fernandes Filho and Campos (2003) was to exclude agricultural establishments larger than 100 ha to capture small properties. There was no law on family farming during the period of research by Fernandes Filho and Campos (2003), Agricultural Census 1995/96, which could better define these producers. The Family Farming Law, which describes the criteria for producers to be classified in this category, was already in force during the two analyzed periods (2006 and 2017). However, the criteria were changed between the 2006 and 2017 Agricultural Census, changing the number of family farmers (NASCIMENTO et al., 2023). Therefore, we chose to apply the same criteria as Fernandes Filho (2003), that is, producers up to 100 ha, and analyze the evolution between Agricultural Censuses.

The Agricultural Census questionnaire does not allow checking whether agricultural establishments reported the production of just one rural agroindustry product, with no records of more than one product. Fernandes Filho and Campos (2003) proposed considering that economic importance is related to the average contribution of rural agroindustry activities to the monetary revenue[1] of the agricultural establishment through the average contribution. Monetary revenue for each federation unit was analyzed based on the average difference between production values and sales values for each rural agroindustry product. Subsequently, the formula for the arithmetic mean of production (*Map*) was adopted, given by Equation (1):

$$Map = \frac{\sum x.p}{\sum p} \quad (1)$$

where x is the average contribution to the monetary income of each rural agroindustry product in establishments with up to 100 ha, and p is the total number of establishments (up to 100) per Federation Unit.

5 Evolution of Rural Agroindustries

The number of agricultural establishments between the 1995/96 and 2006 Agricultural Censuses showed a positive variation of 6.5% despite not being strictly comparable due to the methodological change, with a different data collection period. In contrast, a small negative variation of 1.97% was observed between the 2006 and 2017 Agricultural Censuses. This last period also had a methodological change, that is, the definition of agricultural establishment favored its decrease (ESTANISLAU et al., 2021).

However, a different result is found when analyzing the evolution of the number of establishments with rural family agroindustries. The proportion in the number of these establishments between the 1995/96 and 2006 Censuses had an

[1] According to Gouveia and Ross (2016), monetary income disregards non-monetary income, for example, production for consumption (which replaces the need for currency to purchase goods and food) and the execution of domestic tasks (which avoids hiring and remunerating third parties) and joint work and others. This paper was considered monetary income.

abrupt drop of almost 6 percentage points, which reflected a sharp reduction in the number of these establishments of 21.52% in this period. The proportion was practically stabilized between the 2006 and 2017 Censuses and there was a small drop in the number of these establishments (1.31%). These data show that federal and state government programs were apparently not effective or insufficient in expanding the number of transformation units.

However, the evaluation may have a different point of view because a greater reduction could have been observed without these programs. According to Prezotto (2002), the survival of family agroindustries is associated with support from government programs, mainly to promote technical assistance and improve enterprise management. Furthermore, more restrictive standards to meet quality requirements increase production costs, reducing the viability of processing (NICHELE and WAQUIL, 2011; CRUZ, 2020; SOUZA, 2019; ETGES and KARNOPP, 2020; FREITAS, CORCIOLI, and DA CRUZ, 2022). According to OUMA (2010), these requirements are partly induced by global value chains, particularly by large retail companies, which directly affect production and local markets.

Table 1 – Total number of agricultural establishments with and without family agroindustries, Brazil, 1995/96, 2006, and 2017

Census	Number of establishments		Participation (%)
	Total	With rural agroindustry	
1995/96	4,859,855	1,100,838	22.65
2006	5,175,636	863,929	16.69
2017	5,073,324	852,639	16.81

Source: 2006 and 2017 Agricultural Censuses and Fernandes Filho and Campos (2003). Prepared by the authors.

Tables 2 and 3 show that the South region recorded the largest decrease in the number of establishments with agroindustries between 2006 and 2017, a drop of 34%, followed by the Northeast region of Brazil, with a decrease of 11.12%, both with a reduction well above the Brazilian average (–1.31%). Therefore, the participation of these regions reduced in the last two Agricultural Censuses. To a certain extent, they were in the same direction as the contraction in the total number of agricultural establishments in these two regions. On the other hand, the North, Southeast, and Midwest regions showed significant growth, with 93.22, 36.53, and 74.24%, respectively. Also, there was an expansion in the number of agricultural establishments in these regions. The two regions with the largest rural population had the highest reduction in rural agroindustry and, consequently, there was a worrying reduction in economic and social spaces for diversifying its ways of life.

Table 2 – Number and variation of total agricultural establishments and agricultural establishments with rural agroindustry activities by region in Brazil

Brazil/ Region	Agricultural establishment		Variation (%)	With agroindustry		Variation (%)
	2006	2017	2006-2017	2006	2017	2006-2017
Brazil	5,175,636	5,073,324	−1.98	863,924	852,639	−1.31
North	475,778	580,613	22.03	98,168	189,677	93.22
Northeast	2,454,060	2,322,719	−5.35	358,244	318,402	−11.12
Southeast	922,097	969,415	5.13	80,162	109,442	36.53
South	1,006,203	853,314	−15.19	309,238	203,560	−34.17
Midwest	317,498	347263	9.37	18,112	31,558	74.24

Source: 2006 and 2017 Agricultural Censuses. Prepared by the authors.

Brazil had eight federative units with a negative rate and 19 with a positive rate but made significant progress in at least five states, with a growth rate above 150%, mainly in the North region (Amazonas, Roraima, Amapá, and Tocantins – North; and Rio de Janeiro – Southeast). Importantly, many federative units, such as those in the North region, had no state program to promote these agroindustries. However, they showed significant growth rates, as is the case in most states in the North region. Probably partly fueled by a growing demand for non-wood products from the Amazon rainforest. Moreover, there was a great disparity between states, for example, from a negative variation, as in Rondônia (79.01%), to a very positive variation in Roraima (3.027%), which is due to the very low number of agroindustries in 2006.

The average growth for the states of the Midwest region plus the Federal District was 72.30%. Only Santa Catarina showed growth in the South region, with a rate of 4.38%. The other states in the South region (Rio Grande Sul and Paraná) presented a strong contraction, probably associated with a reduction in the number of agricultural establishments that produced cheese, cream cheese, and cassava flour (Table 4). Particularly, as discussed in the previous section, the drop in the participation of dairy products may be partially associated with the rigidity of standards and regulations.

The strong retraction in the production of agroindustries in the Northeast region stands out, with five out of the nine states showing a negative variation similar to the South region due to a reduction in the number of agricultural establishments that produced mainly cassava flour. Data from the Family Budget Survey (POF) by IBGE showed that family purchases of cassava flour fell from 7.76 kg per capita/year in 2002 to 2.33 kg per capita/year in 2018, a sharp decline of 70%. All Brazilian regions recorded a reduction, standing out the Northeast and North regions, with reductions of 75 and 68% also between 2002 and 2018 (FELIPE, 2022).

Table 3 – Number and variation of total agricultural establishments and agricultural establishments with rural agroindustry activities by state in Brazil

Brazil/Federative Unit	Agricultural establishment		Variation (%)	With agroindustry		Variation (%)
	2006	2017	2006-2017	2006	2017	2006-2017
Brazil	5,175,636	5,073,324	-1.98	863,924	852,639	-1.31
Rondônia	87,078	91,438	5.01	13,623	2,859	-79.01
Acre	29,483	37,356	26.70	10,396	14,831	42.66
Amazonas	66,784	80,959	21.23	17,770	55,592	212.84
Roraima	10,310	16,846	63.39	229	7,161	3.027.07
Pará	222,029	281,699	26.87	51,004	91,913	80.21
Amapá	3,527	8,507	141.20	701	5,203	642.23
Tocantins	56,567	63,808	12.80	4,445	12,118	172.62
Maranhão	287,039	219,765	-23.44	93,526	102,375	9.46
Piauí	245,378	245,601	0.09	61,318	37,484	-38.87
Ceará	381,017	394,330	3.49	40,876	44,570	9.04
Rio Grande do Norte	83,053	63,452	-23.60	2,945	3,506	19.05
Paraíba	167,286	163,218	-2.43	10,031	11,223	11.88
Pernambuco	304,790	281,688	-7.58	19,019	9,531	-49.89
Alagoas	123,332	98,542	-20.10	12,717	10,156	-20.14
Sergipe	100,607	93,275	-7.29	7,528	6,817	-9.44
Bahia	761,558	762,848	0.17	110,284	92,740	-15.91
Minas Gerais	551,621	607,557	10.14	71,996	93,325	29.63
Espírito Santo	84,361	108,014	28.04	2,945	4,929	67.37
Rio de Janeiro	58,493	65,224	11.51	1,192	3,418	186.74
São Paulo	227,622	188,620	-17.13	4,029	7,770	92.85
Paraná	371,063	305,154	-17.76	37,088	24,812	-33.10
Santa Catarina	193,668	183,066	-5.47	36,681	38,286	4.38
Rio Grande do Sul	441,472	365,094	-17.30	235,469	140,462	-40.35
Mato Grosso do Sul	64,864	71,164	9.71	3,526	5,121	45.24
Mato Grosso	112,987	118,679	5.04	4,271	8,088	89.37
Goiás	135,692	152,174	12.15	9,895	17,607	77.94
Distrito Federal	3,955	5,246	32.64	420	742	76.67

Source: 2006 and 2017 Agricultural Censuses. Prepared by the authors.

The Brazilian State at the municipal, state, and federal levels has important space to implement programs for the development of rural agroindustries, contributing to the generation of employment and income and the sustainability of agricultural production units. However, even some Brazilian states that were not the target of specific policies showed growth in rural agroindustry activity, demonstrating that, combined with public policies, the benefits of this activity can be enhanced.

6 Main Products by Federation Unit

Tables 4 and 5 show the products with the highest number of family farming establishments with rural agroindustry in the 1995/96 and 2017 Agricultural Census, respectively. Cassava flour was the most frequent product in rural agroindustries in both Censuses. In 2017, approximately one of every four agroindustrial establishments produced cassava flour. That year, the largest cassava flour producers were Pará (75,275 establishments), Maranhão (68,131 establishments), and Bahia (58,131 establishments). Cassava flour is the main product in quantity produced in the states of Rondônia, Acre, Amazonas, Roraima, Pará (largest national producer), Amapá, Tocantins, Maranhão, Ceará, and Sergipe.

Cassava flour is mostly produced in Brazil by family farmers in small processing units, with production aimed at local consumption, expressing its importance in the diet and eating habits of the North and Northeast regions (COELHO, 2018). The economic aspect is also important for this product, with an estimated employment generation of 4 thousand direct jobs in 2017 in Brazil, with gross revenue close to 12 billion reais (COELHO, 2018). The percentage of production sold for this product was 73%, a much lower rate compared to other products, indicating the importance of this product for the food security and consumption of rural families. However, there has been a substantial reduction in the consumption of cassava flour in recent years (FELIPE, 2022), which may have partly contributed to the contraction in the volume and number of agricultural establishments with agroindustries that produced this product, potentially increasing food insecurity for rural families.

Table 4 – Main products of the Brazilian rural industry and average contribution to monetary revenue in establishments up to 100 hectares in 1995-96

Product (1)	Agricultural establishment		Quantity (ton)			Average contribution (R$)
	Number (2)	% (3)	Produced (4)	Sold (5)	% (5)/(4) (6)	
Cassava flour	653,739	13.45	1,478,979	1,123,292	75.95	592.99
Cheese and cream cheese	358,619	7.38	202,262	162,983	80.58	867.91
Cured meats	112,813	2.32	9,477	2,542	26.83	66.79
Cassava starch	87,910	1.81	40,749	24,399	59.88	140.58
Butter	82,568	1.70	6,516	4,126	63.32	73.39
Cornmeal	75,681	1.56	56,369	5,793	10.28	17.75
Other products	72,278	1.49	74,327	42,166	56.73	194.97
Molasses	69,412	1.43	20,682	9,513	46.00	68.07
Rapadura (panela)	56,645	1.17	79,267	67,454	85.10	491.05
Leathers and skins	48,279	0.99	1,777	1,387	78.03	28.08
Sugar	31,129	0.64	19,831	16,280	82.09	76.08
Jerked beef and others	27,438	0.56	3,622	808	22.30	67.73
Twist or rope tobacco	26,356	0.54	18,843	17,379	92.23	1,029.96
Milk cream	23,064	0.47	6,506	824	12.67	29.22
Cachaça (sugarcane spirit)	21,725	0.45	106,980	93,953	87.82	1,793.89
Grape wine	19,906	0.41	25,363	10,424	41.10	259.72
Cassava tapioca	18,421	0.38	7,297	4,964	68.02	285.48
Fruit jelly	18,243	0.38	1,217	419	34.39	28.48
Açaí syrup	16,085	0.33	17,312	208	1.20	6.73
Fruit paste	15,663	0.32	4,373	3,073	70.27	119.53
Fruit compotes	10,304	0.21	1,468	441	30.04	41.92
Dulce de leche	7,549	0.16	2,994	2,697	90.07	594.53
Cassava scraps	6,166	0.13	4,613	1,205	26.13	25.55
Grape vinegar	5,895	0.12	924	204	22.03	22.95
Clabbered milk	4,329	0.09	1,243	414	33.33	73.36
Hominy pudding	3,100	0.06	355	56	15.87	6.87
Cane juice	2,604	0.05	3,673	2,263	61.61	328.23
Cassava paste	2,601	0.05	1,618	1,116	68.99	163.78
Grape juice	1,852	0.04	360	125	34.74	68.66
Cassava grits (carimã)	1,814	0.04	1,859	899	48.38	305.38
Cassava tiquira	1,568	0.03	990	699	70.60	293.94
Palm oil	1,515	0.03	2,926	2,853	97.48	736.42
Fruit wine	1,423	0.03	906	367	40.56	143.24
Corn grits (canjiquinha)	950	0.02	687	18	2.67	4.56
Grape brandy	927	0.02	341	48	14.16	54.17
Corn fubarina	807	0.02	813	520	63.93	155.49
Candied fruits	699	0.01	336	253	75.47	573.51
Fruit liqueur	418	0.01	94	49	51.56	95.44
Sugarcane alcohol	377	0.01	4,865	4,683	96.26	906.52
Sugarcane vinegar	298	0.01	81	11	13.93	16.28
Fruit brandy	275	0.01	107	53	49.77	198.73
General						**451.58**

Source: Fernandes Filho and Campos (2003). Adapted by the authors.

The second product in number of agricultural establishments is cheese and cream cheese for the two Agricultural Censuses, representing 7.38% in 1995/96 and 11% in 2017. In this last Census, Minas Gerais (36,084 establishments), Rio Grande do Sul (31,771 establishments), and Santa Catarina (14,874 establishments) stand out among the producing states. Rio Grande do Norte, Paraíba, Pernambuco, Minas Gerais (largest national producer), Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Mato Grosso do Sul, Mato Grosso, Goiás, and Federal District are among the states in which cheese and cream cheese are the main products. The large drop in the number of properties that produce cheese and cream cheese between the Censuses may be partially associated with the growth of standards that regulate the operation of these agroindustries (NICHELE and WAQUIL, 2011).

Table 5 – Main products of the Brazilian rural industry and average contribution to monetary revenue in agricultural establishments of up to 100 hectares in 2017

Product (1)	Agricultural establishment		Quantity (ton)			Average contribution (R$)
	Number (2)	% (3)	Produced (4)	Sold (5)	% (5)/(4) (6)	
Cassava flour	340,352	23.26	706,752	517,889	73.28	3,573.48
Cheese and cream cheese	152,444	11.47	222,652	201,584	90.54	12,715.17
Pork (green)	140,600	9.66	37,494	9,961	26.57	579.03
Meat from other animals	113,749	7.97	29,320	16,842	57.44	928.63
Breads, cakes, and cookies	69,647	4.72	24,802	9,525	38.4	1,065.76
Tapioca pearls	68,599	4.67	36,613	25,346	69.23	1,174.80
Sweets and jellies	62,235	4.29	15,482	13,253	85.6	1,422.56
Charcoal	54,851	3.78	3,758,128	3,494,677	92.99	7,558.06
Fruit juices	50,553	3.46	18,646	8,539	45.8	719.66
Cured meats	43,085	2.94	7,278	4,319	59.34	1,180.94
Other products	36,922	2.55	305,396	185,099	60.61	7,592.74
Fruit pulp	23,254	1.65	37,132	33,000	88.87	6,050.70
Molasses	19,897	1.33	9,539	6,614	69.34	1,536.36
Vegetable oils	17,394	1.18	4,589	3,369	73.41	721.05
Rapadura (panela)	17,338	1.19	22,615	18,695	82.67	3,870.69
Butter	10,417	0.75	1,645	1,244	75.62	1,088.32
Cachaça (sugarcane spirit)	10,016	0.72	83,409	66,130	79.28	18,337.16
Leathers and skins	9,636	0.68	1,389	1,323	95.25	22.99
Vegetables	9,350	0.63	21,649	19,942	92.12	3,929.20
Grape wine	7,793	0.53	24,210	14,331	59.19	6,884.64
Twist or rope tobacco	7,264	0.48	6,876	2,854	41.51	2,834.39
Cornmeal	4,960	0.35	35,122	7,372	20.99	2,057.66
Processed meat	2,718	0.2	450	226	50.22	1,059.60
Wood products	2,589	0.2	5,935	4,773	80.42	18,121.67
Milk cream	2,233	0.15	736	534	72.55	1,718.32
Liqueurs	1,545	0.11	2,126	232	10.91	1,334.63
Cashew juice (cajuína)	720	0.05	1,730	1,373	79.36	6,248.61
Ginned cotton	134	0.02	554,755	498,030	89.77	2,552.24
Cottonseed	23	0	203,905	132,165	64.82	869.57
General						**4,067.26**

Source: Agricultural Census, 2017. Prepared by the authors.

Leathers and skins had the highest percentage of sales relative to the total produced according to the 2017 Census (Table 5), reaching 95% of everything that was produced. Charcoal was the second product with the highest percentage of sales (92%), in addition to being the most produced product. The 1995/96 Census presented another scenario, with two products that did not appear on the 2017 list: firstly, palm oil (97.48%), and secondly sugarcane alcohol (96.26%). Probably, large-scale commercial industries may have increased market share and family agroindustries reduced it.

7 Economic Contribution of Rural Agroindustries

The average value of the monetary revenue contribution to Brazil, based on the 2017 Agricultural Census, was R$ 4,067.43, with eight out of the 29 products showing a value higher than the average value. Sugarcane spirit (cachaça) presented the highest monetary contribution, with a value of R$ 18,337.16 (Table 5). This value is mainly due to the high sales value, as the number of agricultural establishments producing spirits in Brazil is low, that is, just over 10,000 establishments and less than 1% of the total establishments in Brazil. From the 1980s onwards, according to Calbino, De Brito, and Da Glória Brito (2022, p. 771), "the use of the discourse of a so-called quality cachaça [sugarcane spirit] for a more refined public was linked to associations with historic cities, gastronomic festivals, indicating an idea of continuity, but in a past full of disconnections." In this strategy, the cachaça production chain had technological improvements in quality control and bottle labels, as well as changes in the way the drink is consumed and presented in the media. On the other hand, there is still a past associated with negative and pejorative aspects.

The second product in terms of monetary contribution was wood, which also exceeded R$ 18,000.00 due to its high sales value. However, it is present in a very small portion of establishments, less than 0.20%. Cheese and cream cheese were the products with the highest financial volume, with a sales value of R$ 2,811,499,000.00. However, its monetary contribution is much smaller than other products because it has many establishments, but it has an important social impact in rural areas.

Fernandes Filho and Campos (2003) found a contribution from monetary revenue in the 1995/96 Agricultural Census, corrected to September 2017, of R$ 1,828.86 (Table 4). The products with the highest contributions were sugarcane spirit (R$ 1,793.89), twist or rope tobacco (R$ 1,029.96), and sugarcane alcohol (R$ 906.52). The authors concluded that the products with the highest contributions are those with the highest percentage destined for the market. This behavior was also observed in the 2017 Agricultural Census.

Table 6 shows the average monetary income of some agricultural products, milk, and products processed by family farming, according to the 1995/96 and 2017 Agricultural Censuses. The importance of the average contribution of agroindustry products to family products stands out, with higher revenue than that of the main agricultural products (beans, cassava, and corn), but lower than milk in both periods and rice in 2017.

Table 6 – Average monetary revenue from some agricultural products, milk, and products processed by family farming, according to the 1995/96 and 2017 Agricultural Census

Product	Average revenue (R$)	
	1996[1]	2017
Rice	1,448.45	5,931.21
Beans	861.99	1,317.50
Cassava	1,004.50	1,756.09
Corn	1,407.02	1,808.42
Milk	11,501.74	18,623.66
Average of agricultural products	2,200.77	4,048.88
Average of processed products	1,828.86	4,067.26

[1] Values corrected for September 2017 by INPC.
Source: 2017 Agricultural Census and Fernandes Filho and Campos (2003). Prepared by the authors.

The financial benefits are added to the social benefits, such as the creation of jobs for the family and the local community. Furthermore, the decrease in the seasonality of income on rural properties has great strategic importance for the stabilization and maintenance of rural families. The contribution of rural agroindustry can also increase the environmental sustainability levels of the properties (SCHINAIDER and TALAMINI, 2019; PASSINI, 2020; SANTOS, GUARNIERI, and FILIPPI, 2023).

8 Conclusions

This paper aimed to analyze the evolution of family and rural agroindustry in Brazil, mainly from an economic point of view, using data available from the 2006 and 2017 Agricultural Censuses. In addition, several state and national rural agroindustry development programs were surveyed and analyzed.

Rural agroindustry development programs showed an important effort in promoting initiatives to support this productive strategy and promotion of family farming both at the federal level and in the federative units. These programs had different designs focusing on various types of actions, mainly credit, technical assistance, training, changes in legislation, and marketing channels, among other mechanisms to boost the development of rural agroindustry, both aimed at new units and improving those that were in operation.

The number of agricultural establishments with rural agroindustry in Brazil reduced by 21.5% from 1996 to 2006 and showed a slight reduction between 2006 and 2017. In this last period, the proportion of rural agroindustries was around 17% relative to the total number of agricultural establishments. The contraction of agroindustries was led by the reduction in production and the number of agricultural establishments that produced cassava flour and cheese and cream cheese, respectively. These products were affected by the drop in consumption and high regulatory requirements, respectively. Furthermore, we can highlight that local and national public policies were not effective or sufficient to contain this contraction, but there could have been a major contraction in these agroindustries without them.

The average contribution of monetary revenue from processed products is a decisive contribution to the composition of family farming income. This activity has

the potential to promote cooperation between family members and between families, as well as other rural producers, through the purchase of raw materials. Therefore, the industrialization process of agricultural and livestock production is an important component of the development strategies of family farming and rural territorial development. Moreover, it can contribute to maintaining the culture and traditions of communities by valuing products historically produced by families.

The process of transforming and selling agricultural products in family rural establishments requires the development of specialized knowledge and training, as well as other aspects related to a favorable institutional environment, such as credit availability and adequacy of rules for this type of industry. The promotion of public policies aimed at rural agroindustry is important to increase diversification options and reduce the seasonality of family farmers' income, producing effective improvements in the lives of these families.

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