Sugarcane and Coffee in the Extreme Southern Region of Bahia, Brazil: A Spatio-Temporal Analysis and Socioeconomic Factors

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Abstract
The região extremo sul da Bahia (RESB - Extreme Southern Region of Bahia) has agricultural aptitude for several crops and has already been subjected to the expansion of sugarcane and coffee. Thus, this work analyzes the spatial and temporal dynamics of sugarcane and coffee monocultures in the RESB and their relationship with socioeconomic indices. The methodology consists of collection and analysis of data from the Instituto Brasileiro de Geografia e Estatística (IBGE), which is the main provider of geographic information and statistics in Brazil, the Companhia Nacional de Abastecimento (CONAB), which is responsible for providing technical information to support decision-making regarding the elaboration of policies aimed at agriculture and the Atlas Brasil platform. Data were collected regarding the planted area and the amount of sugarcane and coffee produced in the region between 1988 and 2019. To understand the relationship between expansion and socioeconomic factors, data related to gross domestic product (GDP) and municipal human development index (MHDI) were collected. This study identified the main sugarcane-producing municipalities (Caravelas, Mucuri, Medeiros Neto, Nova Viçosa, Lajedão, Ibirapuã and Santa Cruz Cabrália) and coffee (Prado, Itamaraju, Porto Seguro, Eunapolis, Teixeira de Freitas and Itabela). The expansion of these crops presents economic importance for the region, but presents a little contribution to the improvement of the various factors that make up the MHDI of the municipalities. This study concluded that the expansion of these crops changed the agricultural matrix of the region due to its specialization in the production of these crops to the detriment of others such as cocoa, for example.

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INTRODUCTION

The região extremo sul da Bahia (RESB - Extreme Southern Region of Bahia in English) presents favorable factors for the expansion of sugarcane and coffee, as it adjoins the mesoregion of the Vale do Mucuri, which is located in the northeast of the state of Minas Gerais, and which stands out for its production of sugarcane; and adjoins the state of Espírito Santo, which is responsible for the about 72.45% of the national production of conilon coffee (FASSIO; SILVA, 2007). This favorability can be explained by the fact that Brazilian microregions close to those that have a high concentration in the production of the same commodity have greater opportunities to maintain their high production for a long time, in addition to forming clusters of regional producers (SOUZA; PEROBELLI, 2007).

The monoculture of sugarcane was the first major economic cycle of the RESB until the middle of the sixteenth century, a fact that contributed to its settlement (DOMPIERI et al., 2020). This region is one of the main producers of sugarcane in Bahia and presents seven of the ten municipalities that had the largest harvested area of sugarcane in 2017 (IBGE, 2017).

Sugarcane production is mainly located in two areas of the region, one located further north, in the municipalities of Santa Cruz Cabrália and Eunápolis, with little representation, and another in the south, in the municipalities of Medeiros Neto, Caravelas, Lajedão and Ibirapuã, with greater representation (SEMA; LIMA, 2011).

Coffee production, on the other hand, originated from the experience of producers from Espírito Santo (SILVA et al., 2017). Initially, these farmers occupied the areas destined for livestock farming and made coffee one of the crops that presents the most demand for land in the region (MALINA, 2013). They were attracted by the low investments regarding the cost of land, a fact that promoted a satisfactory performance in the production of conilon coffee in this region (VEGRO et al., 2017). These producers benefit from the technology developed by the Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural (INCAPER) and the Cooperativa Agrária de Cafeicultores de São Gabriel (COOABRIEL) (IBGE, 2016), which are institutions aimed at supporting conilon coffee producers in Espírito Santo. Thus, the municipalities of the RESB became the main producers of conilon coffee in Bahia.

It should also be noted that the establishment and development of these crops in the RESB are also attributed to the characteristics related to climate, soil and water availability, as well as the changes promoted in agricultural production systems, the training of professionals responsible for technical assistance and the social organization involved in the production process (DOMPIERI et al., 2020).

Although the increase of sugarcane and coffee production areas in the RESB and their importance to it is notable, there is a shortage of studies on this phenomenon and its interaction with socioeconomic factors. In this sense, the justification of this work consists in verifying the dynamics of the expansion of sugarcane and coffee in the RESB and its contribution to the elaboration of public policies aimed at territorial planning in the region. The study's objective is to analyze the spatial and temporal dynamics of sugarcane and coffee monocultures in the RESB and its relationship with local socioeconomic indices.

MATERIALS AND METHODS

The study area of this work consists of the main sugarcane and coffee-producing municipalities of the RESB, located in the southern portion of the state of Bahia, bordering to the south with the north of the state of Espírito Santo, to the west with the state of Minas Gerais, to the north with the economic regions in southwestern Bahia and on the southern coast, and to the east with the shores of the Atlantic Ocean (SEI, 2019).

This study used data referring to the period from 1988 to 2019 and the choice of this period was due to the availability of data for municipal agricultural production (MAP), in the database of the Instituto Brasileiro de Geografia e Estatística (IBGE). It is important to highlight that all the variables of this study were analyzed within this period. However, it was not possible to reconcile the dates of all variables due to the absence of data in the different databases.

First, a survey of the main agricultural products of the RESB was carried out for the elaboration of its agricultural matrix, in order to present the context in which the expansion of sugarcane and coffee occurs and to elucidate the current relevance of the crops under study in the RESB. For this, the main agricultural products for the year 2019 were considered; however, the areas destined for eucalyptus production were not included in this analysis. The elaboration of

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the agricultural matrix of the region was performed based on data for the planted areas of the various crops produced in the RESB and their percentage of occupation.

Planted area (ha) and production (t) data were used to analyze the expansion of sugarcane and coffee. The data were obtained for MAP from the IBGE database.

The mapping of coffee and sugarcane expansion was developed with the support of the free software QGIS, version 3.10.14 LTR (Long-term release repository). The coordinate system in the datum SIRGAS 2000, code EPSG 31984 was adopted. Files in shapefile format were acquired from the continuous cartographic base of Brazil, at scale 1:250,000, version 2019, from IBGE. The analysis of the maps was carried out from the categorization of the data in the QGIS software to highlight the main municipalities that produce coffee and sugarcane in the region.

For socioeconomic analysis, gross domestic product (GDP) and Municipal Human Development Index (MHDI) data were used, and their growth rates were calculated starting from the 1990s.

GDP values were obtained from the Sistema de Recuperação Automática of IBGE (SIDRA) for the years 1999, 2009 and 2018, since no data were found for GDP from 1988 onwards. In addition, data were obtained on the agricultural activities that contribute to GDP by municipalities for the year 2018 on the IBGE Interactive Geographic Platform.

MHDI data were obtained from municipalities of the RESB for the years 1991, 2000 and 2010. It was not possible to obtain data for years prior to the 1990s, as the MHDI was first published in 1990. These data were obtained from the Atlas do Desenvolvimento Humano (PNUD). The MHDI is calculated from the geometric mean of the MHDI of longevity, education and income. For its analysis, the PNUD/IPEA classification (2013) was adopted, considering it as: very low MHDI (between 0.000-0.499), low MHDI (between 0.500-0.599), medium MHDI (between 0.600-0.699), high MHDI (between 0.700-0.799) and very high MHDI (between 0.800-1.000).

To analyze the population dynamics, data on the urban and rural populations between 1980 and 2010 were obtained from the IBGE database. The analysis was carried out based on the interpretation of the data related to the calculation of the percentage of urban and rural populations in this period.

RESULTS AND DISCUSSION

Agricultural matrix and expansion of sugarcane and coffee in the RESB

The main agricultural products produced in 2019 in the RESB were banana, rubber, cocoa, coffee, sugarcane, coconut, beans, orange, papaya, cassava, passion fruit, watermelon, maize, hearts of palm, black pepper and annatto.

Analyzing the agricultural matrix of the region (Figure 1), it is noted that sugarcane (33%) occupies first place in terms of planted area; coffee (27%) occupies second place, and third place is occupied by cocoa (19%) and the rest corresponds to other agricultural crops. Thus, the region stands out for its agricultural production of sugarcane and coffee, with only *Coffea canephora* being produced in the region.

Figure 1- Percentage of planted area (ha) of agricultural products in the extreme southern region of Bahia
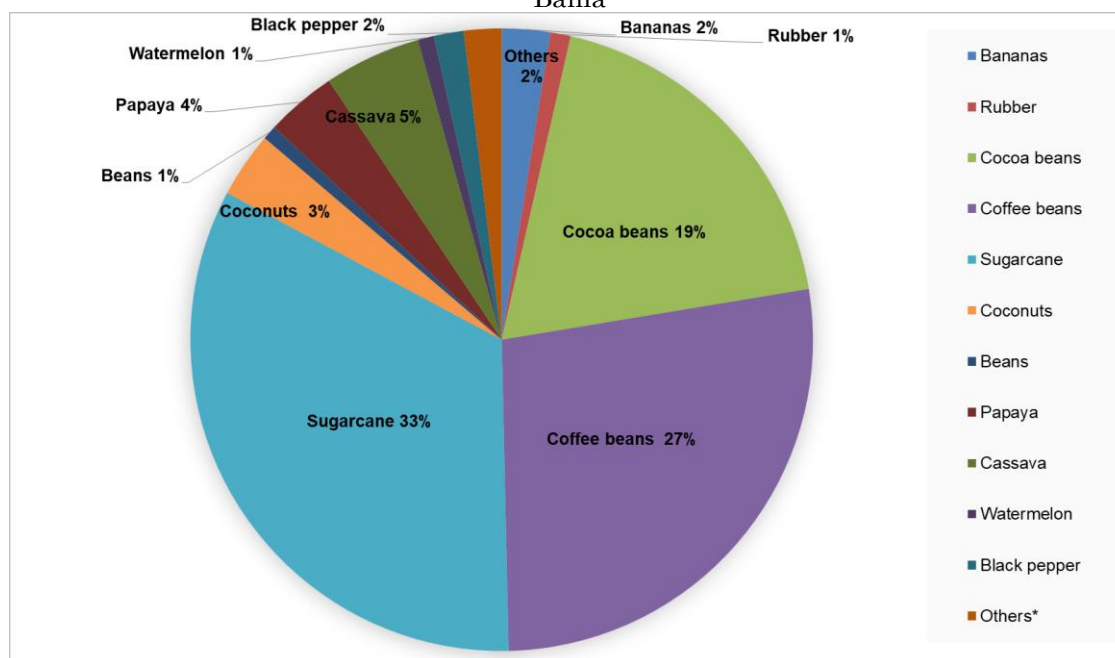
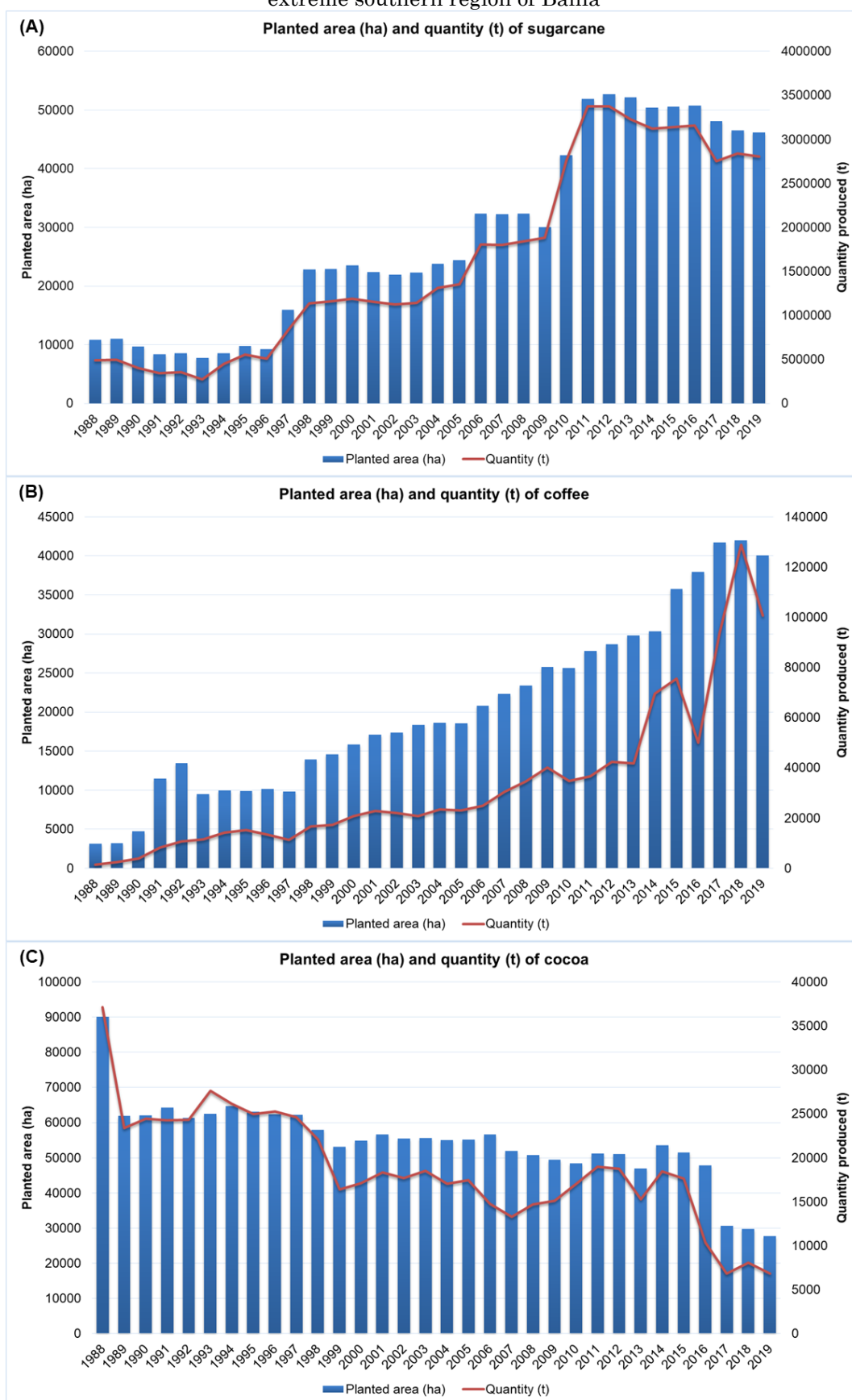Source: IBGE (2019b); Elaborated by the authors (2022).

Comparing the values of 2019 with previous years, it can be seen that sugarcane and coffee have been expanding since 1988 (Figure 2), both in terms of planted area (hectares) and production (tons). This expansion is justified due to macroeconomic policies and increased national and international demands, which have boosted the agricultural sector since the 1990s (EMBRAPA, 2018).

On the other hand, there was a reduction in the planted area and in the production of cocoa, which was previously considered the main agricultural product of the region. Although the RESB contributed to Bahia's cocoa farming, along with the Ilhéus-Itabuna production center, it lost strength due to investments by large timber companies and ranchers from Espírito Santo and Minas Gerais (CERQUEIRA NETO, 2013) and also due to by the witch's broom attacking the cocoa crop.

The data indicate that the growth of the planted area and production of sugarcane in the RESB has occurred since 1996 and 1997, respectively. The explanation for this growth is associated with the fact that Brazil became the world's largest producer of sugarcane in the 1980s, mainly due to the increase in domestic sugar consumption as a result of Brazilian industrialization and the emergence of ethanol as a new energy source (DIAS, 2021).

Figure 2- Planted area (ha) and quantity (t) of sugarcane (A), coffee (B) and cocoa (C) produced in the extreme southern region of Bahia

Source: IBGE (2019b); Elaborated by the authors (2022).

From 1988, there was growth in the area for coffee planting, with a growth rate of more than 1,000% until 2019. Despite the intense droughts that occurred in Bahia in the years prior to 2014, the RESB showed an increase in productivity, mainly due to the adherence of producers to the most productive clones, the renovation of old areas, the improvement in phytosanitary treatment, technological improvement and improvements in the spacing of growing areas (CONAB, 2014, p.12). This reveals that the structure for the production of Espírito Santo's conilon coffee is a positive factor for the advances of coffee farming in the RESB.

The reduction in planted area (ha) and coffee production in 2019 compared to the previous cycle results from the eradication of low-productive crops (BRAINER, 2019, p.6). This can be explained by the economic losses caused by the attack of pests such as the woodboring beetle and poor climatic conditions, which caused physiological stress and impaired the formation of the fruits of the coffee tree (CONAB, 2019, p. 37).

Mapping of planted area (ha) and production (t) of sugarcane and coffee by municipalities in the RESB

The mapping of the expansion of sugarcane plantations (Figure 3) indicates that, in 1988, only the municipalities of Santa Cruz Cabrália and Porto Seguro were the main producers of sugarcane, although other municipalities had a planted area of less than 2,000 ha. While, in 1998, these municipalities lost prominence, giving way to other municipalities, such as Mucuri, Medeiros Neto, Nova Viçosa and Caravelas, followed by the municipality of Eunápolis.

The displacement of sugarcane production to the municipalities of the southern portion of the RESB formed a production center for this crop that was consolidated until 2019, including the municipalities of: Caravelas, Mucuri, Ibirapuã, Nova Viçosa, Lajedão and Medeiros Neto. These six municipalities, together with Santa Cruz Cabrália, correspond to the main sugarcane-producing municipalities of the RESB.

Figure 3- Expansion of planted area (ha) and production (t) of sugarcane in the extreme southern region of Bahia (1988-2019)
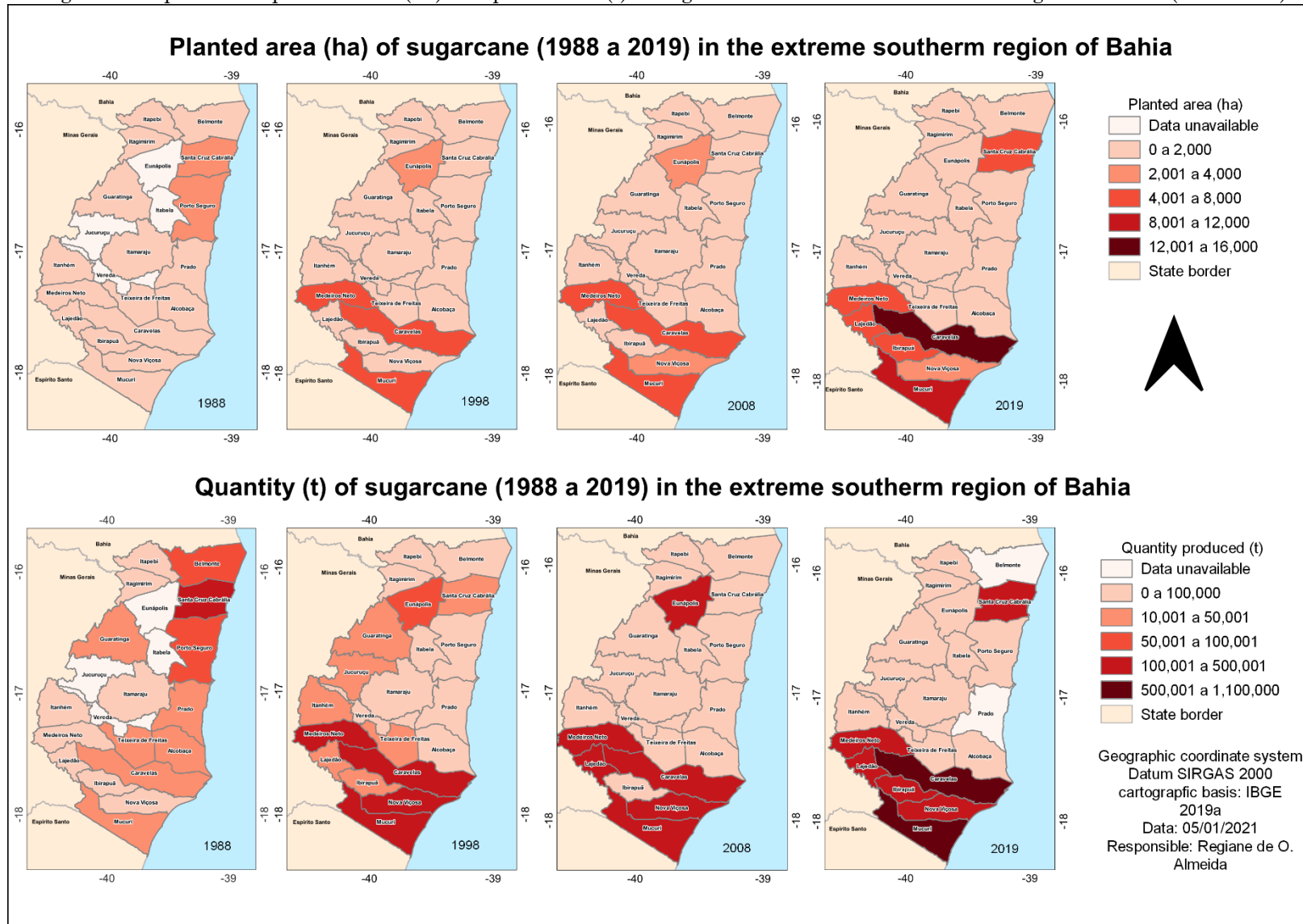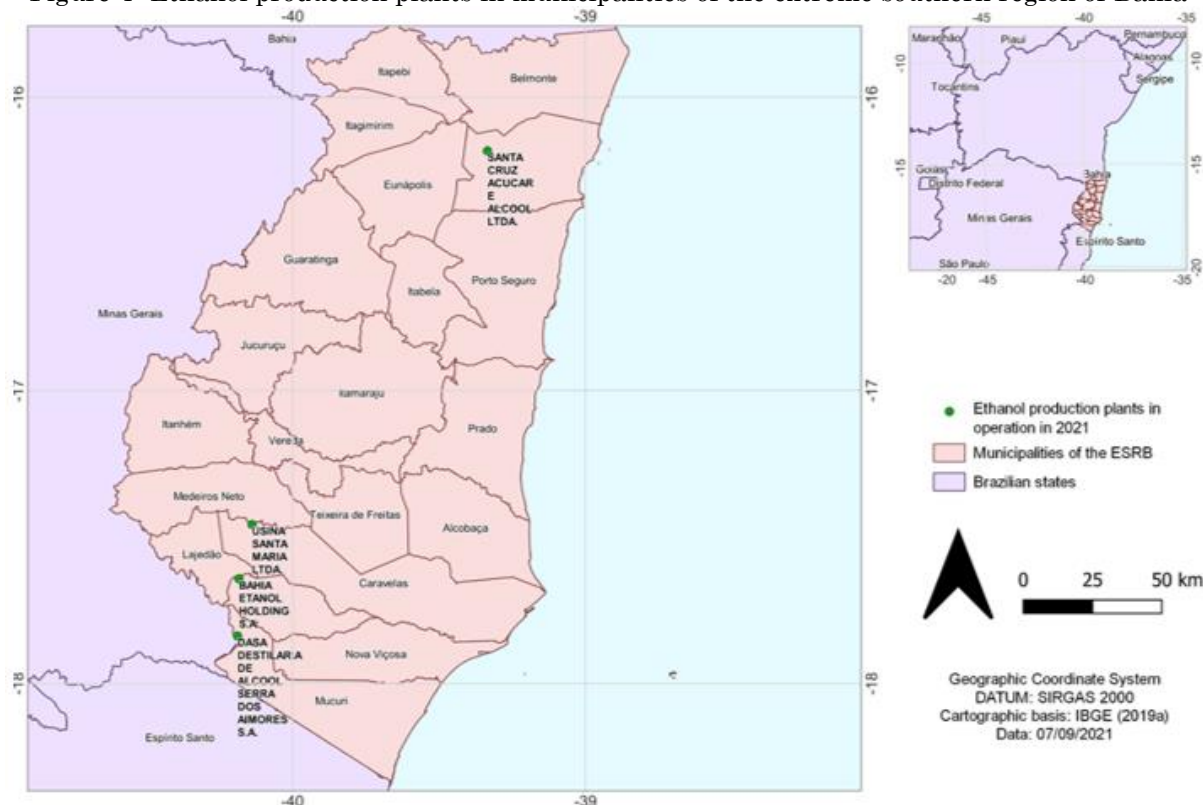

Source: IBGE (2019b); Elaborated by the authors (2022).

The RESB comprises four of the seven ethanol production plants in Bahia (Figure 4) (UNIÃO NACIONAL DA BIOENERGIA, 2020). This expansion of planted area occurred near the areas where the hydrated and anhydrous ethanol production plants were installed, since six of the seven largest sugarcane-producing municipalities in the RESB are located near these plants. Thus, the presence of ethanol production plants in the RESB (UNIÃO NACIONAL DA BIOENERGIA, 2020) contributes to this region becoming a biofuel production hub.

Figure 4- Ethanol production plants in municipalities of the extreme southern region of Bahia

Source: União Nacional da Bioenergia (2020); Elaborated by the authors (2022).

This trend can be observed in other sugarcane-producing regions, such as the mesoregion of the Triângulo Mineiro/Alto Paranaíba, where the municipalities that concentrate sugarcane production have mills either installed in their territories or located in their surroundings (MATOS; MARAFON, 2018).

The mapping of the expansion of coffee-planted areas in the RESB for the years 1988, 1998, 2008 and 2019 (Figure 5) indicates that, in 1988, only the municipalities of Guaratinga, Itamaraju and Itanhém had a planted area greater than 500 hectares, with emphasis on the municipality of Itamaraju, in terms of coffee production.

In 1998, the municipality of Itamaraju was still the main coffee producer along with the municipality of Prado, followed by the municipalities of Itabela, Guaratinga, Jucuruçu, Itanhém and Teixeira de Freitas. The two municipalities maintain a prominent position in terms of planted areas of coffee in 2008, together with the municipality of Itabela.

In 2019, Prado and Itamaraju were the municipalities with the largest planted area of coffee, followed by the municipalities of Eunápolis, Porto Seguro, Itabela and Teixeira de Freitas, totaling the six main coffee producing municipalities in the RESB.

It should be noted that, in the period under analysis, although sugarcane and coffee crops are present in most municipalities of the RESB concomitantly, the largest areas planted for each crop are concentrated in different municipalities, and there are no municipalities with emphasis on a greater number of areas planted for both monocultures. This productive specialization in some places may occur due to the imposition of rules on production relations by the international market (TOLEDO, 2017). This means that due to the worldwide demand for sugarcane and coffee, boosts their production in areas producing these crops.

Figure 5- Mapping the expansion of planted area (ha) and production (t) of coffee in the extreme southern region of Bahia (1988-2019)
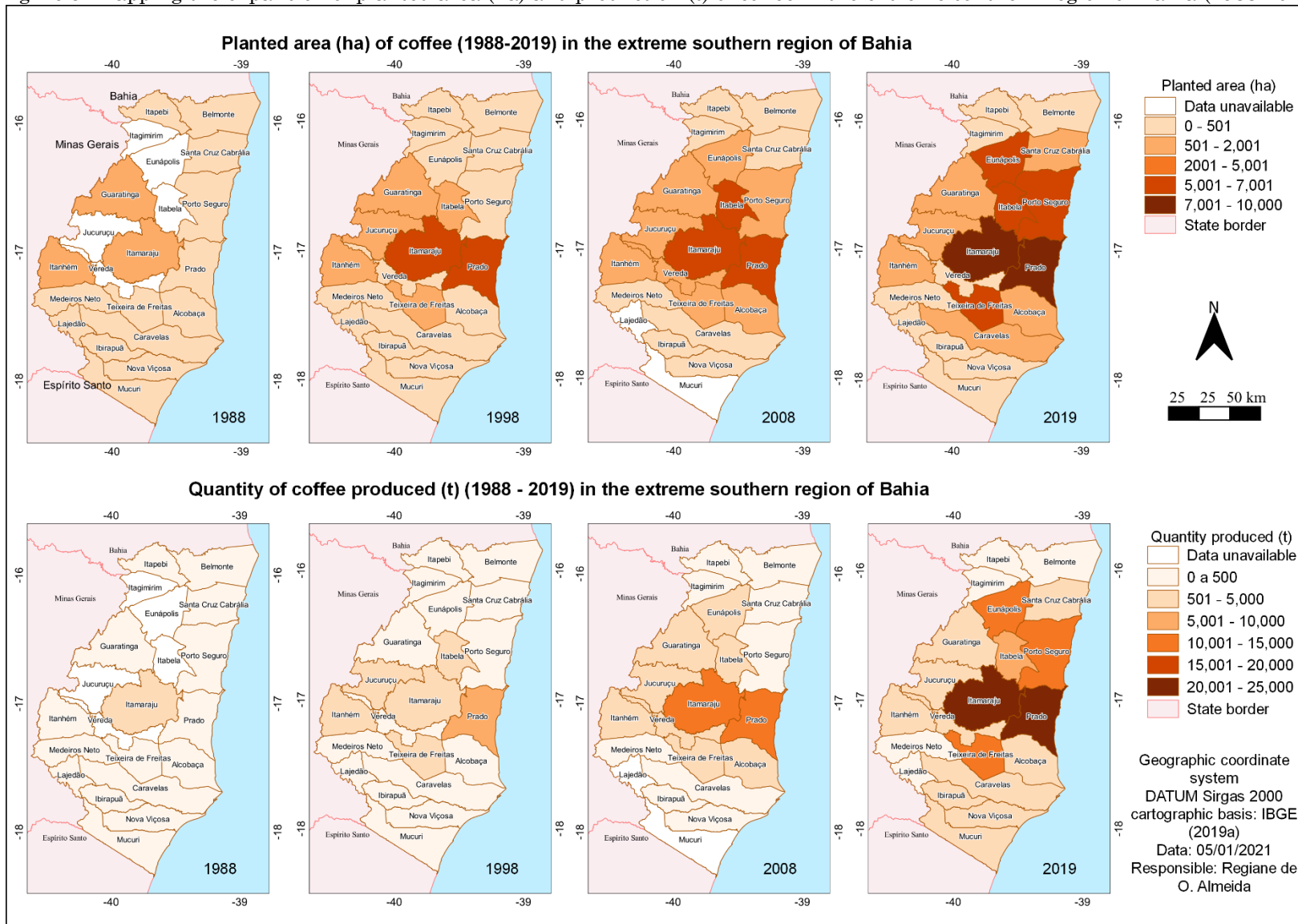
Source: IBGE (2019b); Elaborated by the authors (2022)

One fact observed in the scenario of the expansion of sugarcane and coffee is the concentration of the main producing municipalities in certain zones of the RESB. The formation of a nucleus located to the south of the region for the production of sugarcane was observed near the ethanol plants and another area where the coffee-producing municipalities are concentrated. This spatial distribution of the main producing municipalities reveals the non-competition between the production of the two crops, since a municipality that stands out in the production of sugarcane does not stand out in the production of coffee.

Gross domestic product (GDP) of sugarcane- and coffee-producing municipalities in the RESB

Analyzing the percentage contribution of the agricultural activity of the municipalities of the RESB to the municipal GDP between 1999 and 2009, it was found that most presented values higher than the percentage contribution of agriculture to the GDP of Bahia and Brazil. This

reveals the importance of the participation of agriculture in the GDP of the RESB (Table 1).

The municipalities with the highest growth rate between 1999 and 2018 for the total GDP of the region are Ibirapuã, Porto Seguro, Eunápolis, Santa Cruz Cabrália, Teixeira de Freitas and Itapebi. It is observed that Eunápolis and Teixeira de Freitas present a market for other economic activities, as they installed industrial districts, mainly focused on logging and pulp and paper production, in 1993 and 1998, respectively (DIAS, 2019).

Thus, the growth in GDP in the region between 1996 and 2010 is due to the increase in the export of pulp and paper and the contribution of the industrial sector focused on the production of alcohol (LEONEL, 2016). According to the authors, the RESB has undergone a structural transformation, ceasing to receive only the contribution of agricultural activities and also receiving the contribution of factories and companies from various economic sectors. Therefore, the contribution of sugarcane and coffee production to GDP occurs in the same context in which there is also an industrial increase aimed at the pulp and paper industry.

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Table 1- GDP in current values (in thousands of R$) of sugarcane and coffee-producing municipalities in the extreme southern region of Bahia (1999-2018)

MUNICIPALITY	1999			2009			2018			
	GDP	Agro	*AgrPart	GDP	*AgrPart	*% Agr	GDP	*AgrPart	*% Agr	* Growth (%)
Alcobaça	54390	24622	46.67	167722	81334	51.19	55,143	62,118	25.89	369
Belmonte	30265	7364	25.22	169912	68470	42	88,836	72,572	26.47	854
Caravelas	69430	36531	54.26	274173	158956	60.31	49,020	100,174	30.39	403
Eunápolis	226974	19712	9.70	1297385	89696	7.69	2,890,519	106,397	4.17	1174
Guaratinga	33491	10100	31.45	111928	45407	41.91	196,785	64,954	33.90	488
Ibirapuã	15373	6270	42.29	61511	17293	30.4	280,094	58,046	23.24	1722
Itabela	41673	10167	25.26	167730	39954	25.89	351,605	52,793	16.18	744
Itagimirim	13572	3716	28.47	45290	13369	31.15	111,647	28,497	27.24	723
Itamaraju	130671	23372	19.19	458645	96584	22.62	901,084	164,881	19.69	590
Itanhém	36932	8708	24.41	107204	33085	32.11	226,290	71,924	33.11	513
Itapebi	27089	5838	22.35	283148	24171	8.61	282,683	26,156	9.36	944
Jucuruçu	18356	7203	39.81	65415	25038	38.83	94,748	40,533	43.82	416
Lajedão	14300	7126	50.75	26252	11590	45.62	58,456	25,952	46.29	309
Medeiros Neto	61816	12701	21.47	136170	29284	22.95	329,936	61,356	19.96	434
Mucuri	407167	38351	10.53	1059667	113756	11.57	2,460,443	61,075	2.71	504
Nova Viçosa	71518	21892	32.94	271064	76278	30.54	492,650	44,204	9.98	589
Porto Seguro	194029	13497	7.58	1054485	36719	3.77	3,125,716	101,963	3.53	1511
Prado	71457	30970	44.78	241729	116164	49.62	444,042	142,325	33.45	521
Santa Cruz Cabrália	38766	9007	24.43	161964	35468	23.11	416,749	58,566	14.97	975
Teixeira de Freitas	246753	18137	8.18	1101813	51796	5.25	2,585,821	82,070	3.56	948
Vereda	18729	9057	49.10	54968	22148	41.37	71,876	27,391	39.40	284
Bahia	41883129	2695259	7.27	137942481	10605795	8.16	286239541	19095908	7.62	583
Brazil	1064999712	50782029	5.47	3333039339	149212635	5.11	286239541	309611000	5.15	-73

*AgrPart - Share of gross value added at current prices of agriculture in gross value added at current prices total GDP (%);
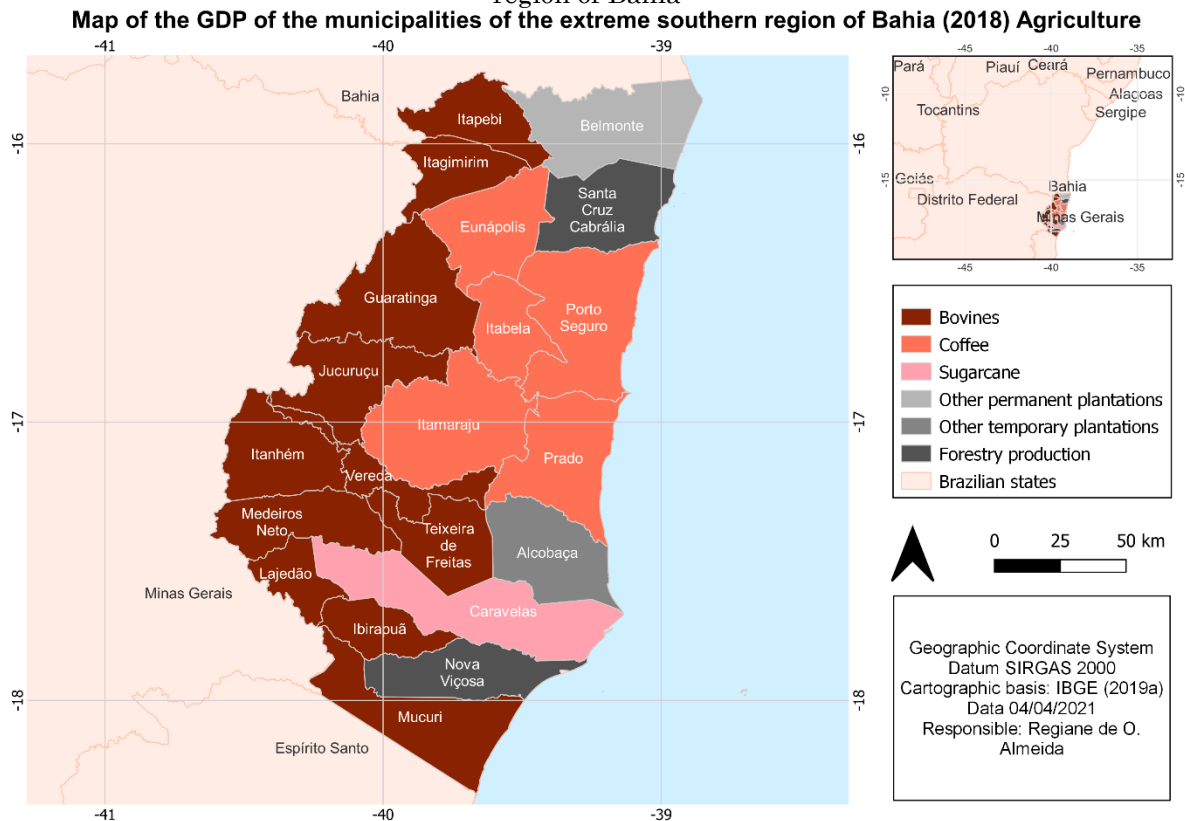Source: IBGE (2018b); Elaborated by the authors (2022).

The data referring to the contribution of agricultural activities to the municipalities of the RESB in 2018 (Figure 6) reveal that among the seven main sugarcane-producing municipalities, the municipality of Caravelas, which occupies first place in the ranking of the main sugarcane producers of the RESB, was the only one that received the highest contribution of the GDP from sugarcane. The others (Medeiros Neto, Lajedão, Mucuri, Ibirapuã and Teixeira de Freitas) received a greater contribution related to cattle production and forest products (Nova Viçosa).

It is possible that this has something to do with the fact that sugarcane is a temporary crop, and requires investments in other products. In addition, being an annual crop, sugarcane may have a lower reflection on GDP compared to eucalyptus forestry, which has a cycle of about five to seven years.

Coffee, on the other hand, presented a greater contribution to GDP in five municipalities in the region: Eunápolis, Itabela, Porto Seguro, Itamaraju and Prado. This indicates that coffee farming is a relevant activity for the local economy and that coffee-producing municipalities are specialized in coffee farming. Considering that coffee is a perennial crop, its representation in municipal GDP in the main coffee-producing municipalities can be explained.

Figure 6- Agricultural activities important to the GDP of municipalities in the extreme southern region of Bahia

Source: IBGE (2018a); Elaborated by the authors (2022)

In a similar manner, in Mato Grosso, although the production and processing of sugarcane has shown an important increase, its participation in the GDP is not significant when compared to other sectors since, even when incorporating the value of hydrated ethanol production in 2009, the impact of sugarcane on GDP remained below 2% in the state (AZEVEDO JÚNIOR et al., 2012).

In relation to the contribution of coffee farming in the state of Espírito Santo, it is observed that this was the largest agricultural activity that contributed to the gross agricultural value added by rural regions in 2018 (IBGE, 2020). Comparing this with the RESB data regarding the achievement of higher economic levels related to the contribution of coffee to the GDP of this region, it can be seen that this crop is quite effective for the local economy.

Municipal Human Development Index (MHDI) of sugarcane- and coffee-producing municipalities in the RESB

The main sugarcane and coffee-producing municipalities in the RESB (Table 2) showed growth in the MHDI between 1991 and 2010. Analyzing the growth rates of the MHDI of each of the municipalities of the RESB, with the exception of Medeiros Neto and Lajedão, it was found that they were higher than the state and national growth rates in the same period. This indicates that the region was influenced by the expansion of sugarcane and coffee to the main producing municipalities and to neighboring municipalities.

Analyzing the position occupied by the main sugarcane-producing municipalities of the RESB regarding the growth rate of the MHDI, it is noted that among the main sugarcane-producing municipalities that lead the production ranking are Mucuri and Caravelas. In contrast, the municipalities of Medeiros Neto and Lajedão are in the lowest positions. Among the main coffee producers that presented the highest growth rate of the MHDI are Prado and Itabela, and those that presented the lowest growth rate are Teixeira de Freitas and Eunápolis.

Table 2 - MHDI of the main sugarcane- and coffee-producing municipalities in the extreme southern region of Bahia (1991-2010)

MUNICIPALITY	PRINCIPAL PRODUCT	MHDI 1991	MHDI 2000	MHDI 2010	GROWTH RATE (%)
Alcobaça	-	0.272	0.453	0.608	124
Belmonte	-	0.31	0.441	0.598	93
Caravelas	Sugarcane	0.271	0.473	0.616	127
Eunápolis	Coffee	0.392	0.54	0.677	73
Guaratinga	-	0.253	0.356	0.558	121
Ibirapuã	Sugarcane	0.358	0.488	0.614	72
Itabela	Coffee	0.291	0.445	0.599	106
Itagimirim	-	0.309	0.493	0.634	105
Itamaraju	Coffee	0.334	0.462	0.627	88
Itanhém	-	0.346	0.496	0.637	84
Itapebi	-	0.218	0.394	0.572	162
Jucuruçu	-	0.202	0.354	0.541	168
Lajedão	Sugarcane	0.382	0.496	0.632	65
Medeiros Neto	Sugarcane	0.374	0.516	0.625	67
Mucuri	Sugarcane	0.275	0.525	0.665	142
Nova Viçosa	Sugarcane	0.318	0.455	0.654	106
Porto Seguro	Coffee	0.367	0.495	0.676	84
Prado	Coffee	0.298	0.471	0.621	108
Santa Cruz Cabrália	Sugarcane	0.334	0.486	0.654	96
Teixeira de Freitas	Coffee	0.378	0.539	0.685	81
Vereda	-	0.29	0.405	0.577	99
Bahia	-	0.386	0.512	0.66	71
Brazil	-	0.493	0.612	0.727	47

Source: Programa das Nações Unidas para o Desenvolvimento (2020); Elaborated by the authors (2022).

When verifying the contribution of the income, longevity and education indices to the growth of the MHDI of these municipalities, it is noticeable that all achieved growth between 1999 and 2010.

The MHDI for income and longevity in the RESB showed growth and were classified as medium and high, respectively. However, the MHDI for education is classified as very low or low. This means that despite the growth in the MHDI, some major sugarcane- and coffee-producing municipalities have not made progress in all the social spheres, thus

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demanding greater investments in public policies aimed at education.

The study of the educational profile of rural workers deserves attention since education is decisive in relation to their salaries. A study conducted on the labor market of the sugar and alcohol sector in Brazil indicates that despite the growth in the number of years of study of workers, the numbers are still low, according to the MHDI scale (MORAES, 2007).

Population in sugarcane- and coffee-producing municipalities in the RESB

The population growth in the RESB has occurred since 1980, following the trend in Brazil. In the late 1990s, the beginning of the expansion of sugarcane and coffee production in the RESB aimed to make it a hub for biofuel production and boost the production of conilon coffee from Bahia. In addition, the development of tourism and eucalyptus cultivation in this period may have exerted pressure on the region (ALMEIDA, 2008). These activities may, together, have fostered this population growth in the RESB.

In the late 1990s, the beginning of the expansion of sugarcane and coffee production in the RESB, aiming to make it a hub for biofuel production and in order to boost the production of conilon coffee from Bahia, could, together with the production of eucalyptus, have fostered this population growth.

In addition to the growth of the total population, there was also an increase in the urban population at the expense of the rural population throughout the region. This indicates that the economic activities carried out in the countryside were not sufficient to retain the population in the rural area (Table 3).

Table 3 - Urban and rural population dynamics of the main sugarcane- and coffee-producing municipalities in the extreme southern region of Bahia

Municipalities	1980				1991				2000				2010			
	Total	Urb.	Rur.	% urb	Total	Urb.	Rur.	% urb	Total	Urb.	Rur.	% urb	Total	Urb.	Rur.	% urb
Caravelas	41,170	7,105	34,065	17	19,763	8,932	10,831	45	20,103	10,332	9,771	51	21,414	11,309	10,105	53
Eunápolis	-	-	-	-	70,545	63,540	7,005	90	84,120	79,161	4,959	94	100,196	93,413	6,783	93
Ibirapuã	9,801	3,428	6,373	35	8,290	3,413	4,877	41	7,096	3,573	3,523	50	7,956	4,532	3,424	57
Itabela	-	-	-	-	20,848	13,577	7,271	65	25,746	18,837	6,909	73	28,390	21,384	7,006	75
Itamaraju	77,678	33,109	44,569	43	64,308	44,449	19,859	69	64,144	48,037	16,107	75	63,069	49,785	13,284	79
Lajedão	4,685	1,945	2,740	42	3,818	1,663	2,155	44	3,409	1,852	1,557	54	3,733	2,076	1,657	56
Medeiros Neto	27,460	14,770	12,690	54	23,059	15,704	7,355	68	21,235	16,027	5,208	75	21,560	17,064	4,496	79
Mucuri	15,144	2,827	12,317	19	17,606	4,810	12,796	27	28,062	18,685	9,377	67	36,026	27,492	8,534	76
Nova Viçosa	18,591	6,092	12,499	33	25,570	9,374	16,196	37	32,076	24,636	7,440	77	38,556	33,526	5,030	87
Porto Seguro	46,300	5,725	40,575	12	34,661	23,315	11,346	67	95,721	79,619	16,102	83	126,929	104,078	22,851	82
Prado	26,433	6,898	19,535	26	22,632	9,655	12,977	43	26,498	14,169	12,329	53	27,627	15,474	12,153	56
Santa Cruz Cabrália	49,375	1,546	47,829	3	6,535	3,197	3,338	49	23,888	13,527	10,361	57	26,264	19,002	7,262	72
Teixeira de Freitas	-	-	-	-	85,547	74,221	11,326	87	107,486	98,688	8798	92	138,341	129,263	9,078	93

Source: IBGE (2010); Elaborated by the authors (2022).

Accordingly, the expansion of agricultural commodities in Brazil (for export purposes) promotes the integration of the Brazilian economy into the international market and may represent a risk to the food security of the Brazilian population (FLEXOR et al., 2022). This situation can be explained by the fact that the development of agribusiness projects has a greater contribution to regional economic aspects, to the detriment of social issues. An example of this is seen in a study carried out on socio-environmental conflicts in the RESB, which provides data on various problems inherent in the land ownership concentration of the region (FERREIRA et al., 2019).

FINAL REMARKS

The RESB presented transformations regarding the development of agricultural activities in the studied period due to internal factors (soil and climatic conditions, availability of area for agricultural expansion) and external factors (regulation of policies to support agricultural expansion, influence of nearby regions that produce sugarcane and coffee, as well as market demands).

It was observed that sugarcane and coffee crops have grown in terms of area and production since 1988, and that 13 of the 21 municipalities of the RESB occupy the position of main producers of sugarcane (Caravelas, Mucuri, Medeiros Neto, Lajedão, Ibirapuã, Nova Viçosa and Santa Cruz Carbália) and coffee (Prado, Itamaraju, Porto Seguro, Eunápolis, Teixeira de Freitas and Itabela).

Some of the municipalities that produce sugarcane in the RESB stand out in the ranking of the main municipalities producing this crop in Bahia, and the proximity of ethanol-producing plants in Minas Gerais creates a demand for sugarcane producing areas in the RESB, such as the city of Serra dos Aimorés, which belongs to the mesoregion of the Vale do Mucuri in Minas Gerais, where the Serra dos Aimorés alcohol distillery (DASA) is located.

In the case of coffee, there is a strong influence by Espírito Santo for the search for new areas for expansion of this crop due, mainly, to the economic ease in the acquisition of land. Due to this, the RESB stands out as the only conilon coffee-producing region in Bahia.

Despite the economic importance of sugarcane and coffee for the main producing municipalities, in 2018 it was possible to conclude that there are also other significant activities for the RESB and for the increase in GDP in it. In the case of sugarcane, the consolidation of the ethanol agroindustry can boost the contribution to GDP. However, although this sector has been weakened by the COVID-19 pandemic and has to face the challenge of the global trend regarding the growth of electric vehicles, it is expected that the resumption of ethanol production will occur gradually, considering that its production is mainly aimed at supplying the domestic market (VIDAL, 2020).

On the other hand, the impacts of sugarcane and coffee production on the MHDI of producing municipalities indicate that, despite the increase, it is necessary to carry out further investigations regarding the potential impacts on society and the environment.

It is also concluded that, regarding the spatial distribution of sugarcane and coffee producers, there were changes in the main producing municipalities when compared to the area occupied by these crops in relation to the others. This fact is corroborated by the analysis carried out on the agricultural matrix of the RESB, in which it was identified that the areas occupied by sugarcane and coffee crops have grown at the expense of cocoa crops.

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AUTHORS CONTRIBUTION

Regiane de Oliveira Almeida conceived the study, collected and analyzed the data and wrote the text. Thyane Viana da Cruz conceived and outlined the research. Maria Otávia Crepaldi contributed to the collection of data for the elaboration of the maps. Leonardo Thompson da Silva contributed to the collection of data for the elaboration of the maps. Ana Cristina de Sousa contributed to the review of the research objectives. Anderson Sena contributed to data collection and processing. Everton Mateus dos Santos Cerqueira contributed to data collection and processing.