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## Commuting in the Rural Environment: The Field-City Interrelations in Small Municipalities of The Zona Da Mata Mineira, Minas Gerais, Brazil

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# **Commuting in the Rural Environment: The Field-City Interrelations in Small Municipalities of The Zona Da Mata Mineira, Minas Gerais, Brazil**

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## **Abstract**

The objective of this study was to analyze the demographic dynamics regarding the rural–urban and male–female population in the municipalities of the “predominantly rural”, ‘intermediate’ and ‘urban’ regions of the Zona da Mata Mineira (ZMM), in the state of Minas Gerais, Brazil. The ZMM is a coffee-producing region with 142 municipalities, 90% of them with less than 20,000 inhabitants, and it is marked by the predominance of small rural properties with less than 50ha. Despite being an impoverished and poorly industrialized region, the municipalities of this microregion have maintained and even increased their urban population when compared to municipalities with a higher Human Development Index (HDI), located in southern Brazil. In this region of the ZMM, the dual residency of mainly small rural producers has grown above the average in Brazil and the state of Minas Gerais. To analyze the demographic peculiarities and agrarian structure of the municipalities of the ZMM, the population data provided by the Instituto Brasileiro de Geografia e Estatística (IBGE) between the 1970s and 2020 was used, in addition to the classification criteria of the regions of the Organization for Economic Co-Operation and Development (OECD). The results of our study showed the largest growth in one microregion with a ‘predominantly rural’ when compared to “predominantly urban” profile. These data revealed the peculiar characteristics of the demographic dynamics of the ZMM in relation to other Brazilian mesoregions, which would justify new studies. However, the Brazilian and global trends of masculinization and aging of the rural population was also observed in the ZMM.

**Keywords:** regional economy, agrarian structure, regional development, agricultural production, Zona da Mata Mineira

# **Navettage dans l'environnement rural: Les interrelations terrain-ville dans les petites municipalités de la Zona Da Mata Mineira, au Minas Gerais, au Brésil**

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## **Résumé**

L'objectif de cette étude était d'analyser les dynamiques démographiques concernant la population rurale-urbaine et masculine féminine dans les municipalités des régions «principalement rurales», «intermédiaires» et «urbaines» de la Zona da Mata Mineira (ZMM), dans l'état de Minas Gerais, au Brésil. La ZMM est une région productrice de café avec 142 municipalités, dont 90% de moins de 20 000 habitants et elle est marquée par la prédominance de petites propriétés rurales de moins de 50 ha. Bien qu'il s'agisse d'une région pauvre et peu industrialisée, les municipalités de cette microrégion ont maintenu et même augmenté leur population urbaine par rapport aux municipalités ayant un indice de développement humain (IDH) plus élevé, situées dans le sud du Brésil. Dans cette région de la ZMM, la double résidence de la plupart des petits producteurs ruraux de petite taille a dépassé la moyenne au Brésil et dans l'état du Minas Gerais. Pour analyser les particularités démographiques et la structure agraire des municipalités de la ZMM, les données démographiques fournies par l'Institut Brasileiro de Geografia e Estatística (IBGE) entre les années 1970 et 2020 ont été utilisées, en plus des critères de classification des régions de l'Organisation de coopération et de développement économiques (OCDE). Les résultats de notre étude ont montré la plus forte croissance dans une microrégion avec un profil «principalement rural» par rapport au profil «principalement urbain». Ces données ont révélé les caractéristiques particulières de la dynamique démographique de la ZMM par rapport à d'autres méso régions brésiliennes, ce qui justifierait de nouvelles études. Cependant, les tendances brésiliennes et mondiales de la masculinisation et du vieillissement de la population rurale ont également été observées dans la ZMM.

**Mots-clés:** économie régionale, structure agraire, développement régional, production agricole, Zona da Mata Mineira

## **1.0 Introduction**

The Zona da Mata Mineira (ZMM) is one of the 12 mesoregions of the state of Minas Gerais. It is formed by 142 municipalities with less than 20,000 inhabitants and a density of less than 50 inhabitants/km<sup>2</sup>, as is the case in more than 80% of the 5,570 Brazilian municipalities. The Human Development Index (HDI) of its 142 municipalities characterizes it as being predominantly intermediate, as is also the case in most Brazilian municipalities. The service sector stands out, amidst the few industrialized areas and the abundance of coffee ‘fields’, which feed a seasonal economy. This fact is indeed a specific, regional aspect. On face value, however, it should be a very common mesoregion, among so many others existing in the Brazilian territory. But research conducted in the municipalities of the Zona da Mata Mineira have started to reveal a daily, customary commuting dynamic of its population between countryside and city, which has drawn attention to this mesoregion.

Commuting between the countryside and the city has been a very common phenomenon in Brazilian agriculture. A study conducted by Hoffmann and Jesus (2020) showed that 49% of the total employed population living in rural areas did not do agricultural work, while a third of those who exercised agricultural activities lived in urban areas. That is, the displacement between countryside and city is a phenomenon of great relevance in Brazil. In states like São Paulo, which is the most highly developed in Brazil, 65% of the population living in rural areas does not work in agriculture and 58% of the ‘employed population’ in agriculture resides in the urban area.

Both the OECD (Organization for Economic Co-Operation and Development) and the IBGE (Brazilian Institute of Geography and Statistics) have started recognizing the impact of urban centers with more than 50,000 inhabitants on the commuting of the rural and urban population. In the case of the OECD, a methodology was adopted that classified the regions as ‘predominantly urban’, ‘intermediate—close to the city or remote’, and ‘predominantly rural—close to the city or remote’. The Brazilian Institute of Geography and Statistics (IBGE) followed the same OECD criteria. However, instead of classifying the ‘regions’, it classified the ‘municipalities’ according to the size of the Brazilian municipalities. According to Fiúza, Carvalho, and Lima (2020), this commuting between countryside and city is present even in less industrialized regions, pointing to different population growth rates in regions that are near or far from an urban center with more than 50 inhabitants/km<sup>2</sup>.

Most municipalities in the ZMM region have an HDI between 0.6 and 0.7, or much lower than those observed in the municipalities in the south of the country. Curiously, however, and unlike these municipalities of the south, the municipalities of the ZMM have managed not to lose population from 1970 to 2020, despite a stagnant economy in most of its 142 municipalities, as pointed out by Netto and Diniz (2010). Although an emptying trend of the countryside has been observed, this has not manifested at the level of the municipality or the microregion. In the south of the country, Silveira and Jardim (2017) analyzed the population dynamics in Rio Grande do Sul and concluded that, “in the smaller municipalities, with up to 20 thousand inhabitants, many showed negative rates, followed by municipalities in the population range of 20 to 50 thousand inhabitants” (Silveira & Jardim, 2017, p. 15). Similarly, Endlich and Rocha (2009), describing the loss of space of small coffee-producing properties in northern Paraná State after the 1970s, also point to the outflow of the countryside. However, data from the IBGE (2021) show that this outflow in the state of Paraná is not restricted only to the countryside but to the total population

of entire municipalities. Given the above, the objective of this study was to analyze what seems to be an exception: the demographic dynamics of the Zona da Mata Mineira. This paper presents the socio-demographic and economic characteristics of these 142 municipalities of the Zona da Mata Mineira in order to understand the reasons that explain the population retention capacity of these municipalities, most of them with less than 20,000 inhabitants and a barely dynamic economy.

This paper is subdivided into four parts: after this introduction, the methodological procedures are described. The third section presents the results and discussions, describing the demographic and economic characteristics of the municipalities of the ZMM over the last 50 years. This section also presents the agrarian structure of the agricultural establishments of the Zona da Mata Mineira (ZMM). Finally, the concluding remarks are presented, in which we seek to summarize the main conclusions that resulted from this study.

## 2.0 Methodological Procedures

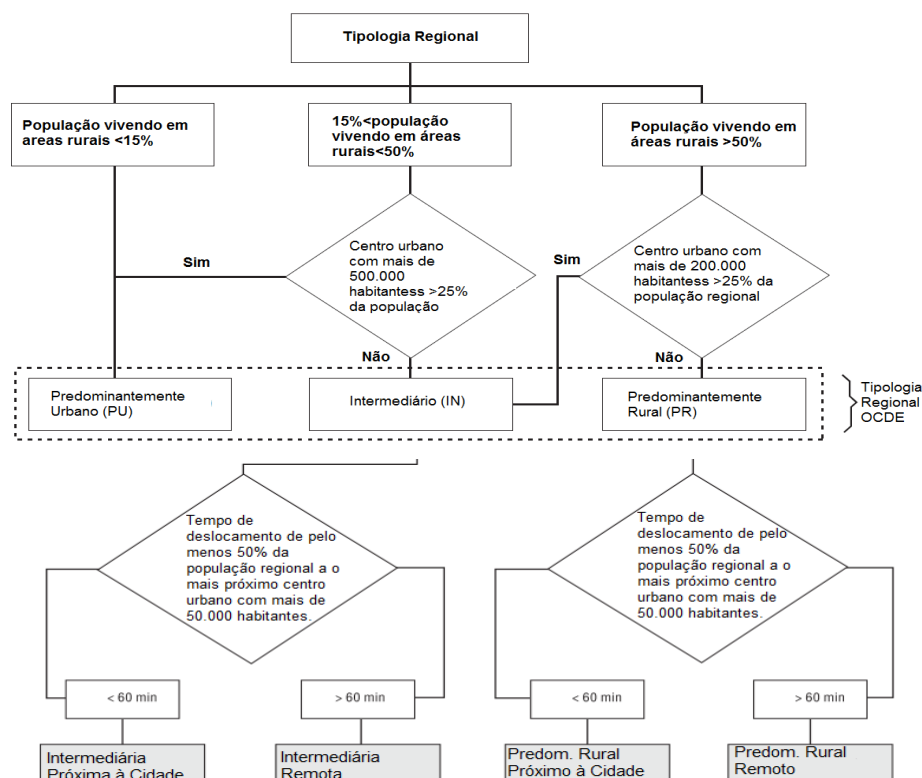
In order to better understand the socio-demographic characteristics of the 142 municipalities that make up the Zona da Mata Mineira, this study adopted the OECD methodology, applying it to the reality of the Zona da Mata Mineira mesoregion. The rural–urban typology adopted by the IBGE is based on two indicators: ‘demographic density’ combined with the ‘accessibility of urban centers’ with more than 50,000 inhabitants. These are the same indicators as the OECD’s and European Union’s typology (IBGE, 2017). In this work, we adopted the OECD methodology both because of its applicability to Brazilian reality and because it makes it easy to make Brazilian results compatible with those of other countries. Although the IBGE adopts the same principles as the OECD methodology, there is greater detail in the IBGE methodology regarding the size of human clusters. The really significant difference between the methodologies is the fact that the OECD uses a regional scale while the IBGE uses a municipal one. This is due to the fact that Brazilian municipalities are larger than European ones, which influences the calculation of travel time between municipalities in the same region. However, because this is not the case of the Zona da Mata Mineira mesoregion, with the vast majority of municipalities being less than 60 minutes away from an urban center with more than 50 inhabitants/Km<sup>2</sup>, this variable was not considered relevant. The OECD methodology was therefore applied in the present work, which considers the region and not the municipalities for the classifications of ‘rural’ and ‘urban’.

As such, a survey of the population size and population density of each of the 142 municipalities of the mesoregion was carried out. Those with a demographic density of less than 150 inhabitants/km<sup>2</sup> were classified as rural. In the second stage, the sum of the population of the municipalities classified as rural was used to classify the microregions as: predominantly rural; intermediate, and predominantly urban. *Predominantly rural microregions* were those in which more than 50% of the population of the microregion lived in rural municipalities, that is, those which had a demographic density below 150 inhabitants/km<sup>2</sup>. *Intermediate microregions* were those in which between 15% and 50% of the population lived in rural municipalities. *Predominantly urban microregions* were those in which less than 15% of the population lived in regions with less than 150 inhabitants/km<sup>2</sup> (OECD, 1994).

However, in 2010, the OECD created a new version of the methodology, adding the accessibility time of the region's population to an urban center with more than 50,000 inhabitants to its classification criteria. This new typology acknowledged the expansive force of urban culture emanating from urban

centers over localities that were no more than 60 minutes away. In this research conducted in the Zona da Mata Mineira, this OECD (2010) typology was adapted, applying it to the level of its seven microregions. In our study, therefore, these microregions were classified according to the OECD (2010) criteria. If a microregion classified in the first stage as *intermediate* or *predominantly rural* had more than 50% of its total population living more than 60 minutes away from an urban center with more than 50,000 inhabitants, then this particular microregion would be classified as ‘intermediate remote’ or as ‘rural predominantly remote’. But if more than 50% of the total population of the microregion was less than 60 minutes away from an urban center with more than 50,000 inhabitants, then this microregion would be classified as ‘intermediate near city’ or ‘predominantly rural near city’, as can be seen in Figure 1 (OECD 2010).

Figure 1: Adaptation of the classification typology (OECD, 2010) for the microregions of the Zona da Mata Mineira.



Source: OECD (2010).

In addition to the microregion's classification, the current study also sought to characterize the municipalities, considering the size of their population. This typology—‘Small I’, ‘Small II’, ‘Medium’, ‘Large and ‘Metropolis’—established by the IBGE in 2010, allows for a better description of the demographic characteristics of the municipalities located in each of the seven microregions presented here.

In order to better understand the demographic and socioeconomic dynamics of these municipalities, an analysis was also conducted of the historical series of some indicators for these municipalities in the decades after 1970, a period marked by major demographic transformations in Brazil. The following data were collected: (a) rural, urban male and female population as well as rural, urban, male and female economically active population for the years 1970, 1980, 1991, 2000, 2010; (b) municipal and agricultural GDP, per capita income, average per capita income for the same years; (c) total number of farming

establishments, total area of farming establishments for the years 1970, 1980, 1995, 2006, 2017; and (d) total number of farming establishments by property size (1995, 2006, 2017).

Table 1. *Typology to Classify Municipalities According to IBGE's Taxonomy*

<b>Classification</b>	
Up to 20,000 inhabitants	Small I
Up to 50,000 inhabitants	Small II
Up to 100,000 inhabitants	Medium
Up to 900,000 inhabitants	Large
More than 900,000 inhabitants	Metropolis

Source: Census (IBGE, 2010 as cited in Koga, 2020).

These secondary data were obtained by searching the IBGE using the IBGE's automatic recovery system—SIDRA—as a source of research, as well as by searching the Institute of Applied Economic Research through IPEADATA, and also by using the Prêmio Atlas do Desenvolvimento Humano no Brasil (2015) which includes the Municipal Human Development Index. The data from the Agricultural Census of the Zona da Mata Mineira for the years 1970, 1980, 1995, 2006, and 2017 were also used in order to verify whether there was a decrease or increase in the number of agricultural establishments. This analysis also considered data related to the productive dynamics and the specificities of agricultural establishments located in the ZMM.

The concept of an agricultural establishment adopted in this study was proposed by the IBGE in accordance with Guimarães and Baccarin (2017), who considered an 'agricultural establishment' to be any land of continuous area regardless of size or situation—urban or rural—consisting of one or more plots subordinated to a single producer where an agricultural operation takes place, for example (a) the cultivation of soil with permanent and temporary crops including vegetables and flowers; (b) the breeding, rearing, or fattening of large and medium-sized animals; (c) the raising of small animals; (d) forestry or reforestation; and (e) the extraction of vegetable products.

The distribution of land tenure was analyzed by comparing the participation of each group of establishments, as defined above, in the number and area of the total agricultural establishments in the Zona da Mata Mineira. The 2006 and 2017 Agricultural Censuses were used because they opened up new possibilities for research regarding the socioeconomic characteristics of agricultural establishments, as they included questions that enabled investigation of the existence of nonagricultural activities or the exercise of activities outside the establishment by the heads and/or members of the family (Escher et al., 2014). Secondary data sources have as advantages the scope of their population coverage, their low information collection costs, and their accessibility. Their disadvantages include the lack of standardization of data over time.

### 3.0 Results and Discussion

#### 3.1 Sociodemographic Characterization of the Zona da Mata Mineira (ZMM)

Minas Gerais is composed of 12 mesoregions: (a) Triângulo Mineiro/Alto Paranaíba, (b) Northwest Minas, (c) North Minas, (d) Jequitinhonha, (e) Vale do Mucuri, (f) Vale do Rio Doce, (g) Metropolitan Belo Horizonte, (h) Central Mineira, (i) West Minas, (j) South/Southwest Minas, (k) Campo das Vertentes, and (l) Zona da Mata Mineira. The Zona da Mata Mineira meso-region is composed of seven microregions (see Table 2), namely: (a) Ponte Nova, (b) de Manhuaçu, (c) Viçosa, (d) Muriaé, (e) de Ubá, (f) Juiz de Fora, and (g) Cataguases. The Juiz de Fora microregion has the largest number of municipalities among the others, having almost double the municipalities in relation to the Cataguases and Ubá microregions.

Table 2: *Absolute and Relative Distribution of Municipalities that Make up the Microregions of the Zona da Mata, MG*

Microregion	Number of municipalities	Percentage in relation to the ZMM
Muriaé Microregion	20	14.0
Ubá Microregion	17	11.9
Juiz de Fora Microregion	33	23.1
Cataguases Microregion	14	9.8
Ponte Nova Microregion	18	12.6
Manhuaçu Microregion	20	14.0
Viçosa Microregion	20	14.0
Total	142	100

Sources: IBGE (2006); Agricultural Census (2019).

According to the IBGE, in 2021 the ZMM had a population of approximately 2,321,594 people, representing 11% of the population of the state of Minas Gerais. The vast majority of its municipalities had no more than 20,000 inhabitants, and there were less than 6% with more than 100,000 inhabitants, as can be seen in Table 3. That is, it really is a mesoregion composed of very small municipalities, which have their economic and social base still very much tied to rural activities. In the case of the southern region, Silveira and Jardim (2017) state that, “the cities with the largest percentage increase in the annual population growth rate were those with populations between 20 thousand and 50 thousand inhabitants, which also reveals the urbanization process in small municipalities” (p. 15).



Table 3: *Absolute and Relative Distribution of the Municipalities of the ZMM by Population Size of the Municipalities in 2010*

<b>Number of inhabitants</b>	<b>Classification</b>	<b>Number of municipalities</b>	<b>Percentage in relation to the ZMM</b>
Up to 20,000 inhabitants	Small I	125	88.0
Up to 50,000 inhabitants	Small II	9	6.3
Up to 100,000 inhabitants	Medium	6	4.2
Up to 900,000 inhabitants	Large	2	1.4
More than 900,000 inhabitants	Metropolis	0	0.0
<b>Total</b>		<b>142</b>	<b>100</b>

Source: Census (IBGE, 2010 as cited in Koga, 2020).

When looking at the rural population of the ZMM from 1970 to 2010 (see Table 4), a decreasing trend can be seen throughout the five decades under analysis. This reduction was a little more intense in the female population. But the reductions were not homogeneous throughout the period, when the percentages between men and women are observed. The outflow of men was lower than that of women in all decades. This trend of greater departure of women from the countryside, verified in the ZMM, followed the same trend found in other studies conducted in different Brazilian regions (Faria, et al., 2019; Stropasolas 2004). These studies point to the masculinization of the countryside. In the 1980–1991 decade the exit of women from the countryside was more pronounced, perhaps as a result of the crisis in coffee prices. Women represent the dominant labor force in coffee harvesting.

However, although there has been a decrease in the rural population of the small municipalities with an agricultural economy of the ZMM, this does not mean that this population has migrated to large and distant urban centers. On the contrary, the data allow us to infer that this rural-city migration may have taken place within the municipalities themselves or at the micro and mesoregional level, as found by Castro (n.d.).

When examining the demographic data for the Zona da Mata Mineira, Matos et al. (2004) observed that the provision of services, trade, and industry are increasingly responding to the new population dynamics of the rural environment, which is no longer characterized as exclusively agricultural. Non-agrarian services are expanding through rural areas. Paiva and Toma (2005) state that there was a greater diversification of economic activities in the Zona da Mata Mineira region (ZMM) from 1990 onwards. Agricultural activities were strengthened, especially coffee, fruit, poultry and swine farming. The furniture center in Ubá and the food processing center in Visconde do Rio Branco were strengthened. Automotive factories were installed in Juiz de Fora and educational and service centers were expanded in the city of Viçosa. This regional economic dynamics may explain the process of retaining economically active labor in the ZMM during this period. However, according to a study by

Reis et al. (2013), the economy of these small ZMM municipalities depends substantially on government transfers, such as the Municipal Participation Fund (*Fundo de Participação Municipal*, MMF). The capacity of these small municipalities to generate their own revenue from the local economy is small.

Table 4: *Absolute Distribution of the Rural Population—Total, Female and Male—in the ZMM and the Relative Change between the 1970s and 2010s*

Decade and variation (%)	Rural Population		
	Female	Male	Total
1970	383988	410491	794479
Variation 70/80	-9.8	+6.1	-1.6
1980	346392	335.649	782041
Variation 80/91	-22.2	-10.8	-27.3
1991	269547	299200	568747
Variation 91/00	-16.4	-15.8	-16.1
2000	225307	252005	477312
Variation 00/10	-12.8	-12.4	-12.6
2010	196468	220700	417168
Variation 70/10 (%)	-48.8	-46.2	-47.5

Sources: IBGE (1960/2010); Demographic Census (2010).

Table 5 presents the evolution of the population in the municipalities belonging to the seven microregions of the ZMM, and it shows an expressive growth in six of the seven microregions, with a population decrease being observed only in the Ponte Nova microregion. The population of the Zona da Mata Mineira grew 47.5% over the last 50 years. On average, the ZMM grew 8.1% per decade. In fact, the 1980s, which was the decade with the most pronounced rural exodus, was also the one that, contradictorily, presented the greatest growth (12.5%) possibly due to the growth of the population in the urban areas. This reinforces the thesis that the absorption of the rural population may have occurred largely at the level of the municipalities themselves. Most of them, with less than 10,000 inhabitants and located in microregions where only one or at most two municipalities had more than 50,000 inhabitants. The data show that five of the seven microregions had a population growth higher than 30% over the last 50 years: (a) Juiz de Fora (83%), (b) Manhuaçu (69%), (c) Ubá (46%), (d) Muriaé (46%), and (e) Viçosa (31%). Indeed, the Manhuaçu microregion, strongly marked by the coffee economy, showed a growth of almost 70% over the last five decades, revealing a strong capacity to retain its population and boost its regional economic dynamics.

Table 5. *Evolution of the Population and Relative Change over the Decades in the Microregions of the Zona da Mata of Minas Gerais, 1970-2020*

Decade	1970	1980	1991	2000	2010	2020	Variation 1970/2020
Juiz de Fora	433059	494286	583117	664344	728602	792397	83.0
Manhuaçu	175685	189262	222289	242554	274929	297164	69.1
Ubá	202412	195599	211140	242042	269650	296805	46.6
Muriaé	199850	208724	242848	261596	275986	291697	46.0
Viçosa	175004	180227	199267	215915	221585	229637	31.2
Cataguases	177163	177621	193586	207589	216590	227094	28.2
Ponte Nova	210511	193697	192708	189791	187147	186800	-11.3
<b>ZMM</b>	<b>1573684</b>	<b>1639416</b>	<b>1844955</b>	<b>2023831</b>	<b>2174489</b>	<b>2321594</b>	<b>47.5</b>

Sources: IBGE (2010); Demographic Census and IBGE (2021).

Whether this capacity for population growth presented by six of the seven microregions of the Zona da Mata was established in a dispersed manner, among most municipalities in each of the microregions, or in a concentrated manner, with few municipalities presenting a capacity for population retention, remains to be analyzed, however. In addition to analyzing the demographic dynamics of the seven microregions in the last 50 years it is also important to better characterize them demographically. The analysis of the dynamics of population growth of a region has been studied by various government agencies throughout the world as a result of the inflection in the trend toward the dominance of the urban population over the rural one after World War II. The OECD is one of the institutions that has been most prominent in developing classificatory taxonomies that express the transformation in the rural–urban relationship in the regions of the European Union, serving as a reference for other agencies and scholars around the world.

When applying the extended methodology of the OECD (2010) to the seven micro-regions of the ZMM, five were classified as ‘Predominantly rural near city’ (Manhuaçu, Cataguases, Muriaé, Viçosa, and Ponte Nova), one as ‘Predominantly Urban’ (Juiz de Fora), and one as ‘Intermediate near city’, Ubá (see Table 6). As can be seen from this classification, the five micro-regions that presented growth rates above 30% over the last 5 decades were regions with three different types of classification. In other words, five microregions presented a population growth above 30%, but didn't fall within the same classificatory framework. This reveals that population growth occurred in regions with different demographic and economic characteristics: Juiz de Fora

(Predominantly Urban); Ubá (Intermediate Near City); and Manhuaçu, Muriáe and Viçosa (Predominantly Rural Near City). Even among the two microregions with a population growth above 40% over the last half century, one was ‘Predominantly Urban’ (Juiz de Fora) and the other ‘Predominantly Rural Near City’ (Manhuaçu). This extended OECD classification draws attention, therefore, to the importance of looking at the strength of urban centers with more than 50,000 inhabitants as drivers of opportunities for the inhabitants and the economy of the small municipalities that are around them, provided that these are not too far away, that is, more than 60 minutes away.

Table 6. *Classification of the microregions according to OECD criteria, 2010*

Category	Microregion
Predominantly Urban	Juiz de Fora
Intermediate Near City	Ubá
Intermediate Remote	None
Predominantly Rural Near City	Manhuaçu, Cataguases, Muriáe Viçosa and Ponte Nova
Predominantly Rural Remote	None

Source: Adapted from IBGE (2017).

When looking more closely at the population dynamics of the 142 municipalities belonging to the mesoregion of the ZMM, one can see that among the 33 municipalities that made up the microregion of Juiz de Fora, the most industrialized of the seven micro-regions, 79% increased their population between 2010 and 2020. In the Manhuaçu microregion, a population growth of close to 70% could be observed over the last 5 decades, very similar to the Juiz de Fora microregion, clearly the most urbanized one. The economy of the Manhuaçu microregion is based on coffee. Of its 20 municipalities, only one lost population. That is, 95% of the municipalities in the Manhuaçu microregion had the capacity to retain and even increase their population over the last 50 years. Although the Juiz de Fora microregion had the highest population growth rate, it lagged behind the Cataguases microregion regarding the percentage of municipalities that increased their population. Although the population of the Cataguases microregion increased in general—21% versus the 45% of the Juiz de Fora region—this increase was more homogeneous, with a larger number of municipalities growing in population.

Table 7 shows that the Ubá microregion, a furniture center with a more industrialized economy than Manhuaçu, had a much less expressive percentage of municipalities with a capacity for population growth: 76.5% in comparison with the 95% of the Manhuaçu microregion, whose economy is sustained by coffee. That is, although the Ubá microregion has had a population growth above 30% over the past five decades, four of its 17 municipalities lost population between 2010 and 2020. Similarly, in the Viçosa microregion, which also had a population growth above 30% over the past five decades, this growth occurred in a much more concentrated way than in the Ubá microregion: of the 20 municipalities that make up the Viçosa microregion, 45% lost population between 2010 and 2020. That is, the growth occurred in a more concentrated

way in some of its municipalities. On the other hand, the Cataguases microregion, the only one with two urban centers with more than 50,000 inhabitants, revealed a good capacity to retain its population: only two of its 14 municipalities lost population, while 86% of its municipalities gained population. The Muriaé microregion showed a much worse population retention trend. Among its 20 municipalities, 30% lost population, despite the fact that the microregion has grown above 30% over the last 50 years. This shows a tendency toward the concentration of the population in a smaller number of municipalities in the microregion. All these six microregions (Manhuaçu, Cataguases, Juiz de fora, Ubá, Muriaé and Viçosa) have in common that they presented population growth over the last 5 decades, despite having different percentages in terms of the municipalities that managed to retain population. Ponte Nova was the only one among the seven microregions to lose population over the last 50 years. The population of the 18 municipalities in the microregion decreased 0.18%, showing a clear stagnation: 66.6% of the municipalities lost population.

Table 7. *Percentage of Population Growth, Percentage of Municipalities with Population Increase or Decrease, and OECD Typology According to Zona da Mata Microregions*

Microregion	% Population Growth	Category	% Municipalities with Population Growth	% Municipalities with Population Decrease
Manhuaçu	41%	Predominantly Rural Near City	95%	5%
Cataguases	21%	Predominantly Rural Near City	86%	14%
Juiz de Fora	45%	Predominantly Urban	79%	21%
Ubá	32%	Intermediate Near City	76.50%	23.50%
Muriaé	31.50%	Predominantly Rural Near City	70%	30%
Viçosa	31%	Predominantly Rural Near City	55%	45%
Ponte Nova	-11%	Predominantly Rural Near City	33.40%	66.6%

Source: Adapted from IBGE (2017).

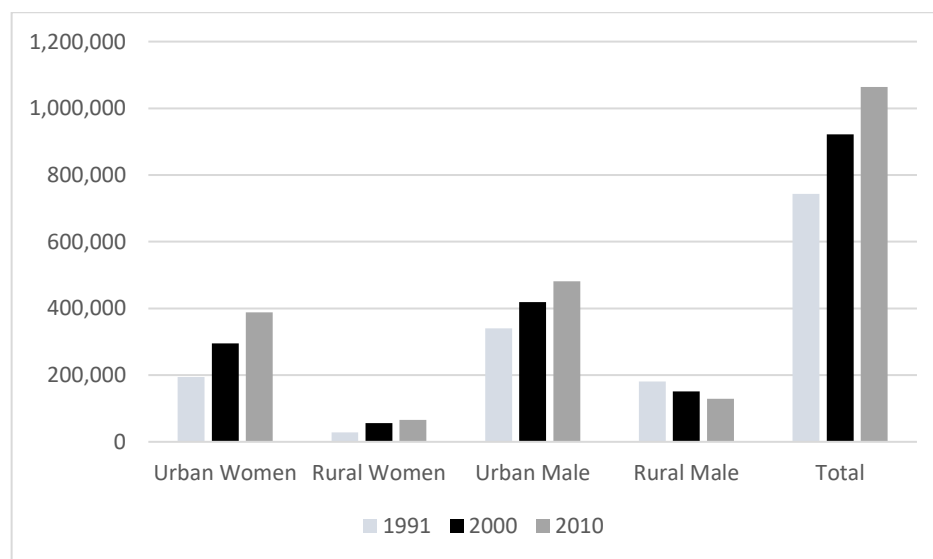
Another interesting aspect is that the two microregions with the highest percentage of municipalities with population increase were classified as ‘Predominantly Rural Near City’. Both the Manhuaçu and Cataguases microregions had a higher percentage of municipalities with population growth

than the microregions of Juiz de Fora, which is classified as ‘Predominantly Urban’, or Ubá, which is classified as ‘Intermediate Near City’. The typology of the microregion, therefore, does not seem to be determinant for the population growth presented by the municipalities. A population growth above 40% occurred both in a microregion classified as ‘Predominantly Rural Near City’ and in a microregion classified as ‘Predominantly Urban’. And, despite the fact that three microregions classified as ‘Predominantly Rural Near City’ could be found among those with a population growth above 30%, the only microregion to see a decrease in its population also fell into this same classification. That is, the economic dynamics of these microregions must be better understood before getting a better understanding of their demographic dynamics.

### 3.2 Economic Dynamics of the Zona da Mata Mineira (ZMM)

When observing the numbers referring to the economically active population from 1991 to 2010 (see Figure 2), referring to the rural areas of the Zona da Mata Mineira/MG, a decrease of the male rural population and an increase of the female rural population can be seen. In the State of São Paulo, this same trend was observed by Figueiredo, Branchi, Sakamoto (2012), which attributed this increase in female labor to the growth of non-agricultural activities, such as domestic work. Urban economically active populations, on the other hand, grew from 1991 to 2010 among both population segments, demonstrating a greater absorption capacity of the economically active population. According to Paiva and Toma (2005), the region follows the national trend of the beginning decline in fertility rates. This aspect reveals that the economic and social situation of the region, among other factors, tends to encourage the permanence of the population in their localities, with a decrease in emigration.

Figure 2. Economically active population according to sex, Zona da Mata Mineira 1991–2010.



Source: BGE, Censo Demográfico 1991/2010.

As for the municipal gross domestic product (GDP) of the seven microregions (see Table 8), a general correspondence between GDP and population growth could be observed: the Manhuaçu microregion, which saw population growth in 95% of its municipalities and a general population growth of more than 40% over the last 50 years, was the microregion with the highest GDP growth rate, approximately 133%. The coffee sector has driven the expansion of the economy

and population of the Manhuaçu region. On the other side of the spectrum, occupying the last place in terms of GDP growth rate, is the Ponte Nova microregion, which was the only one among the seven microregions of the ZMM to present a population decrease over the last 50 years. Likewise, the other four microregions with an economic growth higher than 30% over the last five decades—Juiz de Fora, Ubá, Muriaé, and Viçosa—had GDP growth higher than 100% in the same period. Even the picture of the Cataguases microregion, which came close to 100% growth of its GDP, revealed balance in the growth of its municipalities, since 86% of them fell into this positive situation, as can be seen in Table 8.

*Table 8.* GDP at constant prices (in million R\$). Zona da Mata Mineira, 1970—2010

Microregion	Municipal GDP					
	1970	1980	1996	2000	2010	%Total
Manhuaçu	0,192	0,624	0,748	0,911	1,2	1,0
		+69.1%	+16.5%	+17,8	+29.2%	+132,6%
Ubá	0,251	0,636	0,676	0,861	1,3	1,1
		+60.5%	+5.9%	+21.4%	+37.6%	+125.4%
Viçosa	0,144	0,389	0,419	0,524	0,737	0,593
		+62.9%	+7.2%	+19.9%	+29,0%	+118.9%
Muriaé	2,7	0,693	0,745	0,835	1,0	0,820
		+59,8%	+6.9%	+12,7%	+23.9%	+103.4%
Juiz de Fora	1,2	2,7	3,7	3,8	4,7	3,5
		+54.8%	+26.7%	+3.3%	+18.1%	+102.7%
Cataguases	0,364	0,750	0,665	0,960	1,3	0,981
		+51.4%	-11.2%	+30.7%	+28.6%	+99.5%
Ponte Nova	0,251	0,559	0,516	0,613	0,777	0,525
		+55.0%	-7.8%	+15.8%	+21.1%	+84.2%

Source: Commuting farmers' survey, based on data from IBGE (2010) and Brazil (2013).

According to Netto and Diniz (2006), the service sector in the Zona da Mata is the main generator of wealth, representing 58% of the region's GDP. According to the authors, the GDP of services in the ZMM is somewhat pulverized among four microregions: Ubá, Cataguases, Manhuaçu, and Muriaé. Despite this, the

Cataguases microregion stood out in the textile industry and in the production of electricity. The Muriaé microregion has also been developing a clothing industry, although the region has a vocation for the agricultural sector. As such, and despite the fact that most of the municipalities in the Zona da Mata Mineira with a population of less than 10,000 inhabitants depend on the constitutional transfers of the Federal Government's Municipal Participation Fund (*Fundo de Participação dos Municípios*), the vast majority of municipalities in the ZMM has nevertheless been able to show GDP and population growth over the past 5 decades. According to Netto and Diniz (2006), income from retirements and pensions contributed to the increase in the GDP of the ZMM.

Data from the João Pinheiro Foundation in 2019 show that of the 13 intermediate geographic regions (RGINT) of the State of Minas Gerais, the Juiz de Fora RGINT generated 8.27% of the state's GDP, the third largest contribution. It had the sixth largest share in agriculture and cattle-raising (8.13%), the sixth largest in industry (6.2%) and the second largest in services (9.21%). In the industry breakdown of the GDP, agriculture and cattle-raising contributed with 4.9%; industry with 16.7%; public administration with 20.5%; other services with 46.8%; and, finally, taxes with 11.1%. The ten municipalities with the highest GDP were responsible for generating 65.53% of the economic output. Juiz de Fora contributed 33.56%; Ubá, 6.01%; Manhuaçu, 5.01%; Muriaé, 4.41%; Ponte Nova, 3.46%. The GDP per capita values of the RGINT municipalities were generally lower than the state and the country. (Fundação João Pinheiro, 2019).

One can therefore see that the status of the microregion as 'Predominantly Rural', 'Urban', or 'Intermediate' is not a determinant for its population growth. Among the five microregions with a population growth higher than 30%, three were classified as 'Predominantly Rural': Manhuaçu, Muriaé, and Viçosa. The capacity to retain population locally or regionally may constitute an important way of understanding the agrarian structure and the labor dynamics in the countryside in these small municipalities of the ZMM. The observation that this mesoregion managed to present a population growth above 40% and 30% in most of its seven microregions is an important aspect to keep in mind, showing that although the rural population has decreased, this does not mean that the agrarian structure and the agricultural economy has decreased in the ZMM. The case of the coffee-producing Manhuaçu microregion with its expressive population growth, is testament to this. Another factor is the small municipalities that have helped in the understanding of the phenomenon of commuting, that is, the (daily, weekly, biweekly, etc.) coming and going. According to Schindegger and Krajasits (as cited in Balsadi, 2001), the increase in people's mobility is a reaction to the process of geographic concentration of labor demand in the market in a few privileged regions. Small towns are located in an urbanized environment, and rural areas benefit from this. In addition, rural areas often continue to supply labor to urban areas. The geographical distance of some municipalities and their rural areas facilitate these new urban–rural social relations. The following section will examine in more detail the agrarian structure and agricultural economy of the ZMM.

### ***3.3 Agrarian Structure of the Zona da Mata Mineira Between 1996 and 2017***

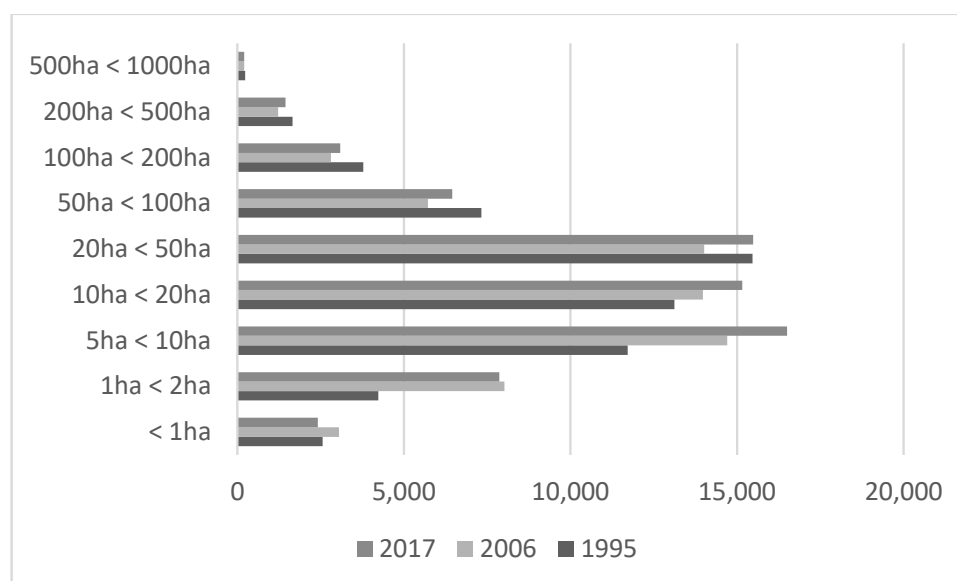
When analyzing the distribution of the number and area of agricultural establishments of the ZMM in the 2017, 2006, and 1996 censuses, it should be stressed that there was a change in the IBGE methodology in 2017 regarding how the establishments were counted. As of 2017, agricultural establishments of the same owner were counted as a single one, regardless of the fact that they



were contiguous or not. That is, one would expect there to be a general trend toward a decrease in the number of agricultural establishments due to the joining of several establishments into one, as a result of the owner being the same. The decrease in the number of establishments would also be expected due to a decrease in the rural male and female population in the ZMM. This was not what happened however.

When looking at Figure 3, which presents the distribution of the number and area of agricultural establishments in the ZMM, one can notice an increasing trend for the strata below 50ha, which represented most agricultural establishments, when comparing the 2017 Census with those of 2006 and 1995. In the strata above 50 ha, a tendency to exceed the number of farming establishments in the 2017 census in relation to that of 2006 can be observed, although this does not happen in relation to 1995. But in general terms, one could say that in the ZMM, where the average area of agricultural establishments is around 35 ha, no decrease in the number of agricultural establishments was observed among the strata below 50 ha, and even those establishments exceeding this area trended toward the 1996 census regarding their area. In other words, the strata related to small rural landowners did not lose their agricultural establishments, even though the rural population decreased. This already points to the importance of the economic dynamics of the small municipalities in the region and to the development of non-agricultural activities by some of the family members of these farmers for the reproduction of these agricultural establishments.

Figure 3. Absolute distribution of the number of agricultural establishments according to size (hectares). Zona da Mata, 1996–2017.



Source: IBGE (2019); Agricultural Census (2017).

In 1996, agricultural establishments represented 60,095 units. In 2006, the agricultural census found that they had risen to 63,726. And in 2017, there was a total of 68,651 agricultural establishments, an increase of 12.46%. In 1995, properties with less than 2 hectares represented 4,236 establishments; in 2006, there were 8,021 such establishments; and in 2017, this type of property corresponded to 7,869 units, an increase of 46.16% between 1995 and 2017. The establishments with less than 10 hectares in 1995 represented 11,716 units; in 2006 these establishments reached 14,704 units and in 2017, 16,508 units. The 2017 agricultural census indicated that agricultural establishments with less than

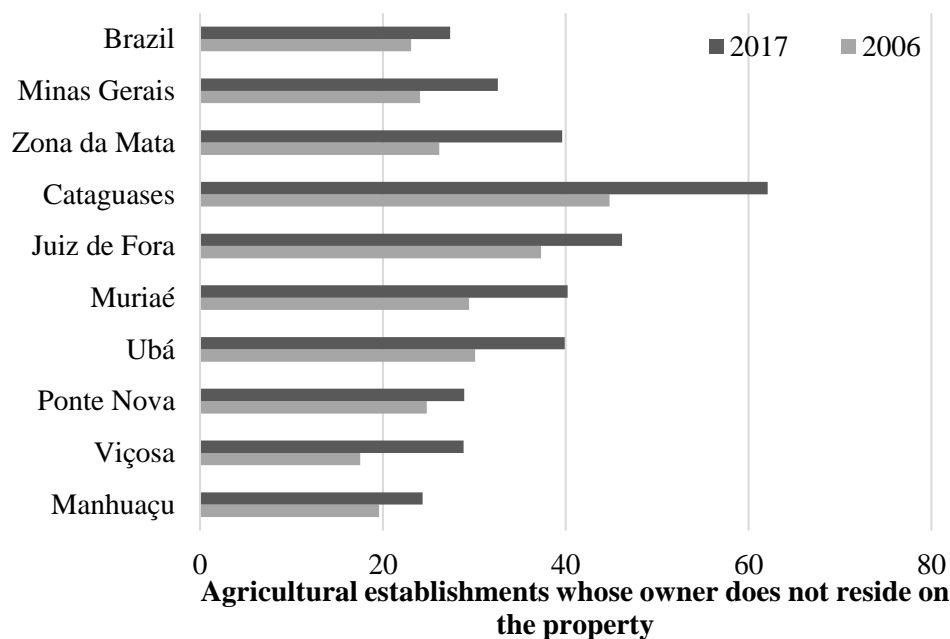
50 hectares were the most prominent: first, those with an area between 5 and 10 hectares, which represented 16,508 agricultural establishments; followed by those with an area between 20 and 50 hectares, which represented 15,489 establishments and, finally, those between 10 and 20 hectares, which represented 15,157 agricultural establishments. The ZMM is characterized, therefore, as a region where small properties predominate. This is clear when you look at the establishments with more than 1,000 hectares: in 1995, they corresponded to 233; in 2006, they decreased to 205; and in 2017, they accounted for 210 agricultural properties.

According to Rodrigues (2019), the 2006 agricultural census shows that the total area of agricultural establishments was 2,238,568 hectares, 49.6% used by family farmers and 51.4% by non-family farmers. Among these areas used by family farmers, 92.32% were self-owned, 4.46% were leased, 1.79% were partner-owned, and 1.34% were occupants. In the 2017 agricultural census, the total area of agricultural establishments was 2,484,464 hectares (9.8% increase), 75.5% used by family farmers and 24.4% by non-family farmers. Of the areas used by family farmers, 86.9% were self-owned, 3.2% were leased, 5.2% were partner-owned, and 0.29% were occupants. There was an increase in the participation of family farm owners, therefore, as well as in the number of partners. On the other hand, there was a decrease in the number of non-family farm owners, tenants, and occupants. In other words, the agrarian structure of the ZMM continues to show an upward trend, just as its population and economic dynamics.

One piece of data that may help in understanding this dynamic of resumption of the increase in the number of small farms, with less than 50 hectares, despite the loss of population in the rural areas of the ZMM, is the percentage of farms whose owners do not reside on the property. Figure 4 shows that this is a typical phenomenon in the ZMM, with higher rates than those found in Brazil and in the state of Minas Gerais. In other words, if the number of small farming establishments with less than 50 ha increased in the ZMM between 1996 and 2017, and if the rural population decreased, then this occurred because the way these farms are managed, and the choice of economic activities developed there is compatible with the fact that the family does not necessarily have to continue living on the farm.

As such, it can be deduced that the growing trend of the agrarian structure in the 1995 to 2017 censuses finds a logical and reasonable explanation for its existence in this coming and going between the 'street' and the 'farm', which is part of the daily life of a significant segment of rural landowners in the ZMM. A rural area that has seen a sharp decline in residential homes does not necessarily correspond to the productive dismantling of the countryside, as can be seen through the coffee and milk production in the region. If coffee has shown itself to be more profitable than milk, the latter, even though it has shrunk in terms of its presence in the agricultural establishments of the ZMM over the last 50 years, still remains significant numerically. Fiúza et al. (2020) observed that in 76% of the 142 municipalities in the ZMM, the phenomenon of living outside the agricultural establishment grew between 2006 and 2017. This data clearly suggests the intertwining of the countryside-city interrelationship in the lives of the owners of farming establishments who live in small municipalities with less than 20,000 inhabitants.

Figure 4. Percentage of agricultural establishments whose owner does not reside on the property. Brazil, Minas Gerais, Zona da Mata and Microregions, 2006–2017.



Source: IBGE (2019); Agricultural Census (2017).

#### 4.0 Concluding Remarks

The objective of this paper was to investigate the interrelations between the demographic and economic dynamics and the agrarian structure of small municipalities where the agricultural economy is relevant, such as those of the ZMM. The data collected in our study showed that the ZMM mesoregion managed to present a population growth between 30% and 40% in the last 50 years in most of its seven microregions. Among the five microregions with a population growth higher than 30%, there were three microregions classified as ‘Predominantly Rural Near City’—Manhuaçu, Muriaé, and Viçosa. The other two regions with a growth higher than 30% in the same period, Juiz de Fora and Ubá, were classified as ‘Predominantly Urban’ and ‘Intermediate’, respectively. Among the microregions that had a relative growth in population, therefore, the presence of at least one urban center with more than 50,000 inhabitants showed to be a common characteristic in the midst of the predominance of municipalities with medium HDIs (Human Development Index).

However, if on the one hand the great majority of the 142 municipalities of the ZMM managed to retain their population over the last 5 decades, on the other hand, a concentration of the urban population occurred in these municipalities in the 1990s. But this outflow of the population residing in rural areas did not mean a retraction in the number of agricultural establishments, as can be seen in the agricultural censuses of 1995 and 2017. On the contrary, there was an increase in the number of rural properties with less than 50 ha in this period. As such, it is reasonable to deduce that not living in the countryside cannot be taken as not working in the countryside, even more so in a region in which the coffee crop is so important, which does not require daily and continuous work throughout the year. However, this is a region where dairy production also stands out. Further research is therefore necessary on how the management practices of these farms have been carried out. It is already clear, however, that commuting from homes

in these small municipalities to the rural area is a common practice, which other studies carried out in the ZMM have already highlighted.

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