

# Chapter 3

## The Geography of COVID-19 in Rio de Janeiro, Brazil: Conflicts, Tensions, and Challenges



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**Abstract** The frightening capacity for contamination and the impossibility of a medical-scientific response to tackle the coronavirus's spread revealed the fragility of the human race in the face of a powerful invisible agent. To date, there are more than twelve million people infected, and more than half a million deaths worldwide. 2020 has already become a “historic” year when we need to change our relationship with nature and our society's priorities. In addition to the poor historical conditions of basic sanitation and housing and the concentration of income in Brazil, the virus found some critical ally, which the present chapter will focus. Even having a public and universal Unified Health System (UHS), Brazil, unfortunately, became an international highlight in the number of contaminated and killed, becoming a true negative reference in the fight against the pandemic. In Rio de Janeiro, we endeavored to draw a panel of the COVID-19 pandemic impact on its territory. From its entry via global contacts in the more affluent areas, the “virus of globalization” gradually reached the suburban areas and, finally, the metropolitan peripheries which are more impoverished and susceptible to problems. In this sense, the Fluminense Lowland, formed by thirteen cities and where the Federal Rural University of Rio de Janeiro (UFRRJ) is located, has become a favorable space for contamination and dispersion of the pandemic, promoting a dynamic of accelerated expansion and aggressive lethality. Visiting the pandemic's impacts on the metropolitan peripheries is the great research challenge for all researchers committed to the community and social justice.

**Keywords** COVID-19 · Metropolitan Area of Rio de Janeiro/Brazil · Federal Rural University of Rio de Janeiro · Health policies · Urban periphery

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### 3.1 Introduction

The pandemic from the new coronavirus reveals the contradictions in the world-system. This is chiefly because of the precariousness of the accessibility to the health system—both the public and private; and also because of the lousy habitation conditions of the most part the population, especially in Latin America, Asia, and Africa.

Far from what they speak on the coronavirus, the pandemic is not democratic. This had reached the most economic impacts on the poor class in all countries in the world. This asymmetric geography is materialized in the expansion to peripheral spaces. There is real territoriality the conflicts in space when we look to the microscale. In this, we identify the actors, the dynamics, and flows of contaminations in the territory. Analysis of epidemic data is crucial for understanding these aspects of the expansion of disease and our relations with the dynamics of society's realities and the environment.

In Latin American countries, Brazil is an epicenter of contamination of the COVID-19. Studies on the postures the government for combating the pandemic added to Brazilian territory's geographical conditions serve as an example for reflecting the tensions, conflicts, and challenges in the new context. For this, it is essential to understand the process of developing the virus territory to comprehend the dynamic of the noble coronavirus in the country. We thus agree with Santos and Silveira (2001) when they indicate more critical is not the territory but your use. The notion of "the use of territory" means that the process of the formation of the territory is focused. Thus, we cannot ignore the capitalist dynamic of production in the formation of the inequalities, as the pandemic tends to materialize this same unequal geography of use the territory spatially.

In this respect, this paper presents an analysis of the expansion of COVID-19 in Brazil. We have focused on the Rio de Janeiro State to comprehend the conflicts, tensions, and challenges in the new context. For this, the text is divided into three parts. In the first part, entitled "*Pandemic trajectory in Brazil*" we present the information on the COVID-19 on a national territorial scale. We have used official statistics of the governmental and press organizations concerning the expansion of the new coronavirus.

In the second part, "Rio de Janeiro State is a Brazil's representation" we try to show the Rio de Janeiro as the second epicenter of the COVID-19 in Brazil. This section analyzes the historical series using data for by March to September 2020, presenting cartography of the pandemic in the state of Rio de Janeiro.

In the third part, "Metropolitan Area of Rio de Janeiro: a favorable space for contamination and dispersion of the pandemic," we have conducted an impact analysis of the pandemic in the metropolitan area. In this part, we have presented the

phenomena of the expansion of COVID-19 in the Baixada Fluminense<sup>1</sup> region, which represents the metropolis peripheral.

Lastly, in conclusion, we point out that the discussions on the process of disease expansion follow the inequality of territorial use and have been growing in direction to the peripheral spaces.

## 3.2 Pandemic Trajectory in Brazil

On the one hand, the high capacity for contamination and the incapability of the medical-science response to treat the COVID-19 have resulted in the high capacity for contamination. Nowadays, more than thirteen million people are infected, and more than half a million deaths worldwide. 2020 has already become a historic year that we need to change our relationship with nature and our priorities as a societal being.

In Brazil, in addition to the poor historical conditions of basic sanitation and housing and the concentration of income, the virus found an important partner: the Federal Executive, with its inability to promote action together with states and cities in favour of human health. However, it caused misinformation and many conflicts and tensions. Even with a public and universal Unified Health System—UHS, Brazil quickly became an international highlight in the number of contaminations and death toll, to become a valid negative reference in the fight against the pandemic (Table 3.1; Fig. 3.1).

Table 3.1 shows that Brazil is the third country in the world regarding the number of cases, and the second regarding the number of deaths by COVID-19. According to the World Health Organization (WHO), Brazil, India, and the USA are currently the epicenter of the illness in the World.

In Fig. 3.1 the graph shows the Total deaths per day (in yellow bars) and 7-day moving average (in blue line) that best represents the illness's evolution. The disease's highest numbers occur in the months of June, July, and August, with daily death peaks, often above 1400 people. The moving average line defines an accelerated increase in the disease during April and May and stabilizes over the months of June, July, and August. Only at the end of August does the mobile media curve show a slight downward trend, but very far from a "happy ending" and which should not slow down the isolation and care measures, which have been appropriately practiced in most cities in Brazil.

However, Brazil is a continental and complex country, like India, and its particularities must be considered. We can see the complexity and continental peculiarities of Brazil in Figs. 3.2 and 3.3. In Fig. 3.2, Brazilian states are classified according

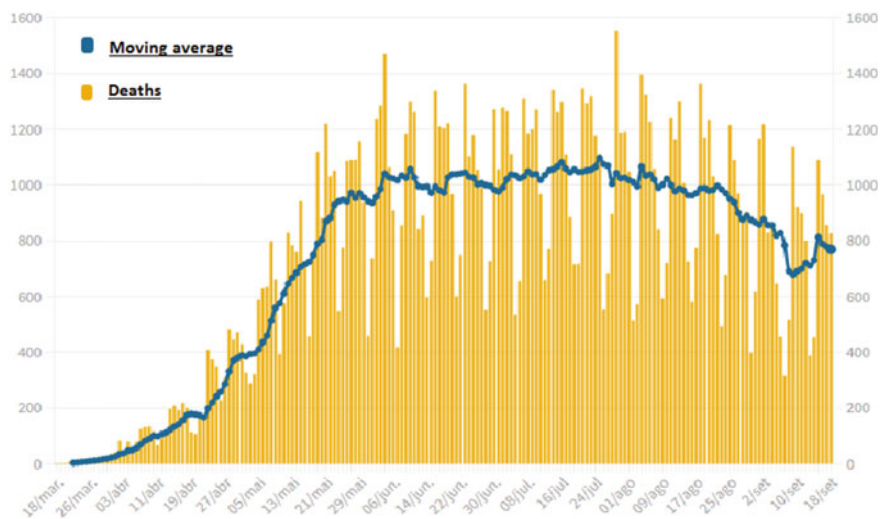
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<sup>1</sup>Fluminense is a gentile name of the Rio de Janeiro state. All people born in the Rio de Janeiro state call "fluminense". Baixada Fluminense is a political local name formed by cities in Metropolitan Area of Rio de Janeiro (MARJ) or we can translate Baixada Fluminense to "Fluminense Lowland".

**Table 3.1** Report coronavirus cases in the world in September 18

Ranking	Country	Total cases	New cases	Total deaths	New deaths	Total recovered	Total tests	Population
	World	30,371,357	+308,206	950,270	+5,568	22,032,021		
1	USA	6,874,596	+46,295	202,213	+879	4,155,039	95,235,022	331,420,450
2	India	5,212,686	+96,793	84,404	+1,174	4,109,828	60,565,728	1,382,900,689
<b>3</b>	<b>Brazil</b>	<b>4,457,443</b>	<b>+35,757</b>	<b>135,031</b>	<b>+857</b>	<b>3,753,082</b>	<b>14,617,980</b>	<b>212,883,816</b>
4	Russia	1,085,281	+5,762	19,061	+144	895,868	41,748,928	145,948,080
5	Peru	750,098	+5,698	31,146	+95	594,513	3,614,738	33,069,039
6	Colombia	743,945	+7,568	23,665	+187	615,457	3,298,415	50,998,462
7	Mexico	680,931	+4,444	71,978	+300	485,024	1,545,572	129,221,511
8	South Africa	655,572	+2,128	15,772	+67	585,303	3,983,533	59,467,369
9	Spain	654,637	+4,541	30,405	+162	N/A	10,756,835	46,758,719
10	Argentina	601,713	+12,701	12,460	+344	456,347	1,653,616	45,284,429

Data Source <https://www.worldometers.info/coronavirus/>



**Fig. 3.1** Deaths from COVID-19 per day in Brazil (from 15 March to 18 September 2020) and evolution of the moving average (*Source* Consortium of media outlets in Brazil)

to the number of deaths<sup>2</sup>: falling (green color), stable (yellow color), and high (red color) as on September 18, 2020. Since the beginning of the pandemic, this classification varies daily, showing the spatial differences in Brazil that are due to social, economic standards and public actions in the states in combating COVID-19.

Figure 3.3 shows the number of deaths per city in Brazil. The concentration of deaths is on the coast, where the largest Brazilian cities with a high rate of urbanization developed therein. However, there are frequent cases of the disease in the country's interior, i.e., in the regions of important biomes, such as the Amazon Forest and the Pantanal, which currently, during the months of August and September, suffer from forest fires (BBC 2020; GREENPEACE 2020). Many of these fires are of a criminal nature, and the smoke generated can worsen respiratory diseases.

The first confirmed case of COVID-19 in Brazil was registered on 27 February. Until that moment, little was known about the disease. In March, health authorities and the media began to give greater visibility to the pandemic. The health minister, Henrique Mandetta, with in-depth knowledge in the area, became the main protagonist for the notification and actions to contain the pandemic. Unfortunately, the

<sup>2</sup>The classification of the number of deaths follows the following criteria: researchers indicate the moving average of deaths, which calculates the average of records observed in the last seven days. The technique is best suited to observe the trend of statistics to balance the abrupt changes in numbers over the week. It is possible to talk about a drop in numbers when the decrease is greater than 15% if verified in the last 14 days. If the numbers increase more than 15%, the epidemic accelerates. Intermediate values indicate stability.

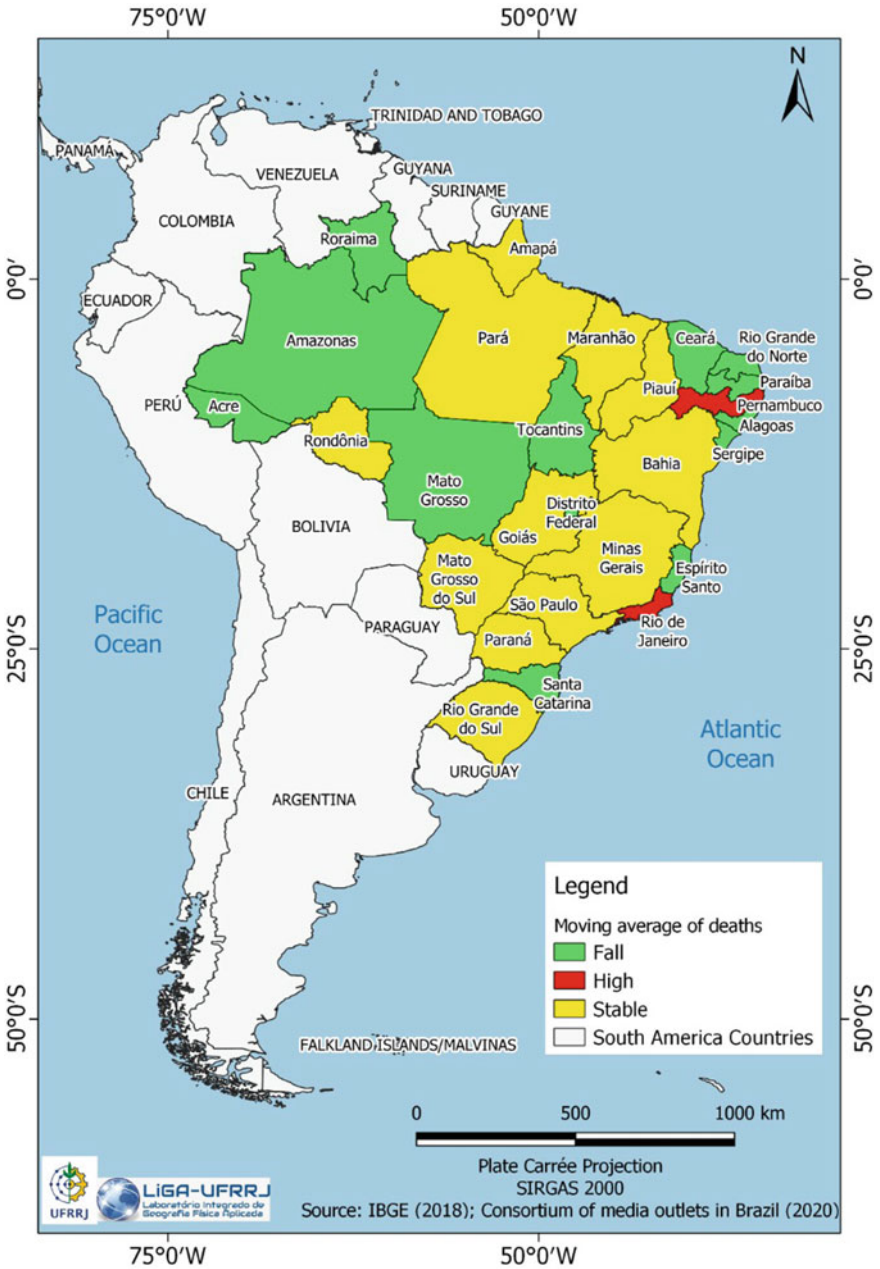
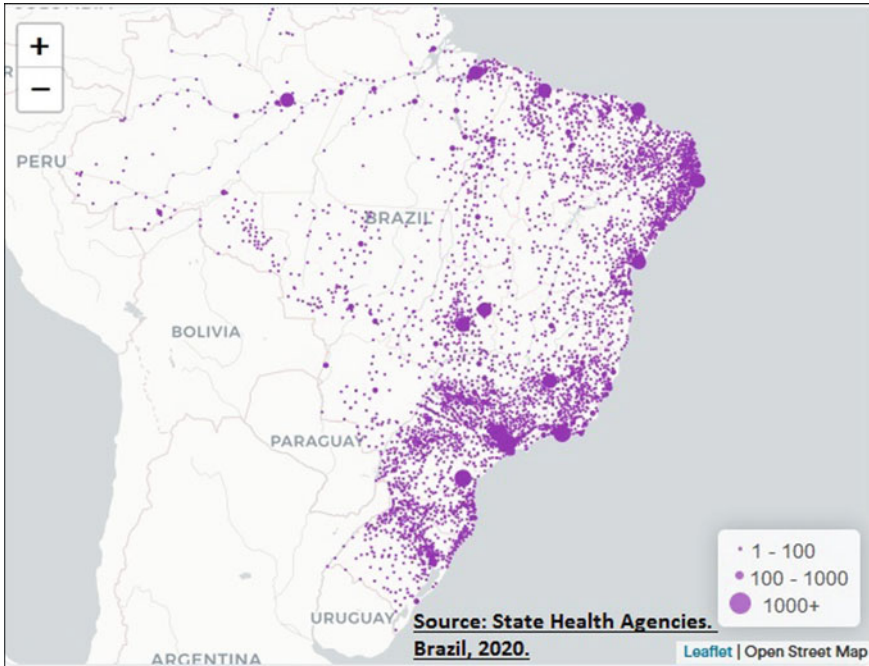


Fig. 3.2 The moving average of deaths in Brazil States on September 18, 2020



**Fig. 3.3** COVID-19 deaths in Brazil by notification city on September 18, 2020

presidency of the republic, President Jair Bolsonaro, began to deny several recommendations from the World Health Organization (WHO) (Estado 2020) and a political dispute placed Brazil as one of the countries with the expedited spread of the virus, as well as the number of deaths.

Amid political disputes between the health ministry, Mandetta was dismissed from Health Minister on 16 April (BBC 2020). The situation becomes more complicated as the conflict was not only with the guidelines of the Ministry, but also with the Governors and Mayors who started to take more rigid attitudes toward the control of the virus. A debate between containing the virus and preserving the economy started to be the center of attention, while the country witnessed an uncontrolled increase in the number of cases.

Nelson Teich, the newly appointed minister who is also a doctor, was tasked with changing the direction of the Ministry (Folha de São Paulo 2020). Based on the idea that chloroquine would be a medicine capable of curing the disease, in addition to investing in the purchase of the drug from several countries, including India, the federal government started to produce large quantities of the drug. Without proven efficacy, along with enormous pressure from the presidency regarding the use of the drug, Nelson Teich resigned for not agreeing with this protocol (BBC 2020).

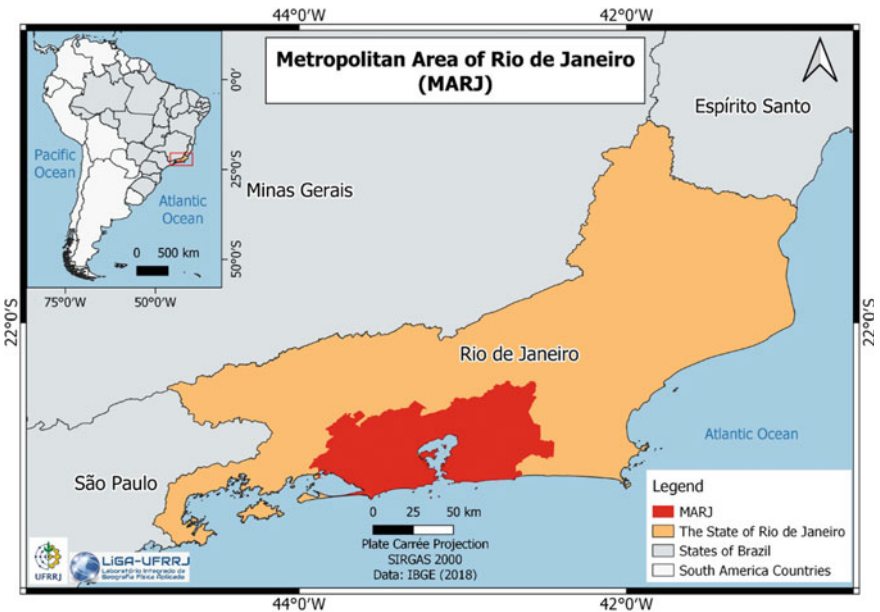
Amidst this acute health crisis, health ministry leadership was changed twice within an interval of a month. The number of cases and deaths by COVID-19 was

growing every day, and the presidency insisted on chloroquine as an effective remedy against the virus. Without having a doctor to take over the Ministry of Health, the President appointed a Brazilian Army military officer as an interim Health Minister, who lasts until today (CNN Brasil 2020).

This unfortunate political turbulence results in the increase in the number of cases in the pandemic, as well as the denial of a basic protocol: social distancing. On 22 May, Brazil becomes the second place in the number of deaths by COVID-19 in the world (Folha de São Paulo 2020). In June, the Ministry of Health changed the criteria for counting the deaths, and the press consortium became the most used source of information about the pandemic. The spread speed of the virus and the number of deaths made Brazil a country with strict international travel restrictions. The state of Rio de Janeiro ranks second in the number of deaths.

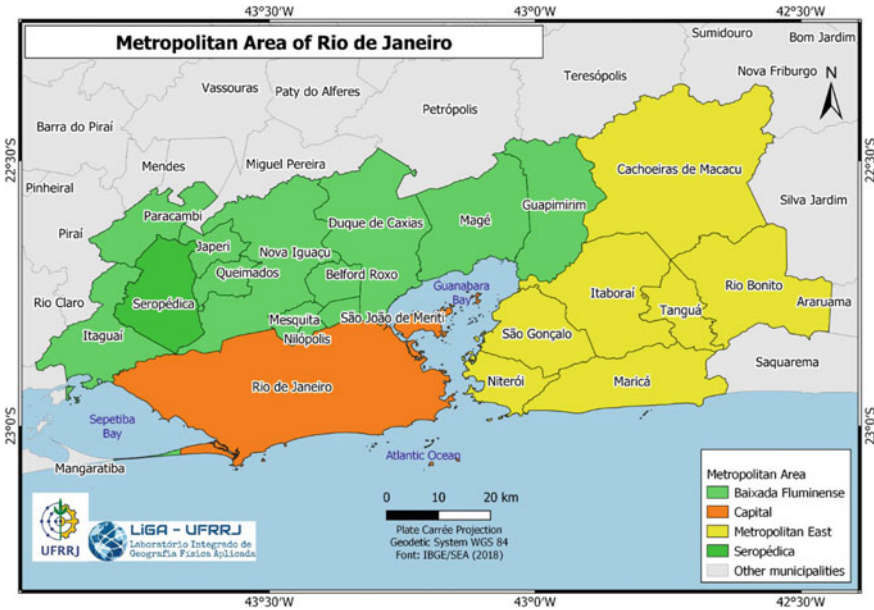
### 3.3 Rio de Janeiro State Is a Brazil’s Representation

The Rio de Janeiro state is the second most important state in Brazil (Figs. 3.4 and 3.5) with significant political, economic, social, and cultural functioning. Its capital, Rio de Janeiro city, was the capital of Brazil for a long time. It has historically concentrated economic, productive, logistical, and social investments of regional



**Fig. 3.4** Brazil and Rio de Janeiro State Map: Brazil in grey color; Rio de Janeiro State in orange color; Metropolitan Area in red color





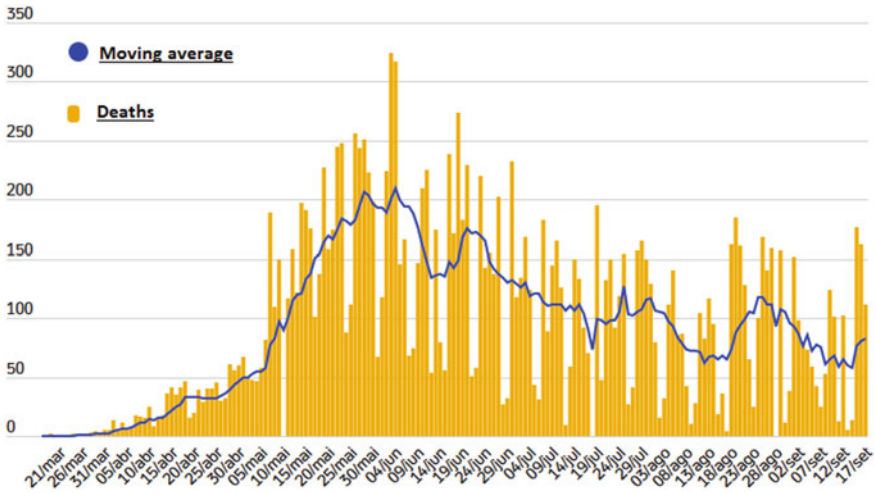
**Fig. 3.5** The Metropolitan Area of Rio de Janeiro and its subdivisions: Rio de Janeiro capital (red color); Baixada Fluminense (green color); Seropédica city (dark green color); the cities of the Metropolitan East (yellow color)

integration with the interior. Even with the productive industrial growth of certain interior areas, the city of Rio de Janeiro remains, through its immediate peripheries and with the axes of the metropolitan area, especially with regard to meeting the needs of education and health services.

In the Rio de Janeiro state, the coronavirus arrived through globalized contact networks—international flights. It first contaminated the wealthier citizens who were able to make trips abroad, and their direct employees who, even the poorest, had immediate contact with such travelers. The virus invaded the country through the flow of international flights and reached the city’s parts where the middle and upper classes are concentrated.

However, territorial routes of dispersion become robust to fuel community transmission of the disease. Soon, the West Zone districts, especially the overpopulated ones, started to exhibit high numbers, now associated with less favored financial and housing conditions. The myth of the “democratic virus” was lost, as the inhabitants of the most impoverished areas of the city, known as the *favela*,<sup>3</sup> did not achieve minimum housing conditions or access to gel alcohol and other protection items.

<sup>3</sup>It is a space of induced segregation caused by socioeconomic injustice that is very present in the landscape of South American cities. It is marked by many prejudices (for example as a place where all people are criminals). The characteristics are the insufficiency of government investments; the preponderance of poor quality buildings, quite dense and made by the residents themselves; poor education, health, safety, and basic sanitation conditions (Souza e Silva et al. 2009).



**Fig. 3.6** Deaths from COVID-19 per day in Rio de Janeiro State (from 15 March to 18 September 2020) and evolution of the moving average (*Source* Consortium of media outlets in Brazil)

Even though they were aware of the immense underreporting, the numbers started to prove to be more catastrophic and violent, especially with regard to the lethality of the disease.

The main highways of the state also become geographic axes of dispersion of the COVID-19, reaching the Region of the Middle Valley “*Paratba Fluminense*” (Local Name), the Region of the Lakes (or Coastal Lowlands), and even the North Fluminense. The dispersion of the coronavirus is still a lesson in the economic geography of the metropolis. The same meanings of metropolization in any traditional economic activities also seem to reverberate in the processes of the geographical spread of contamination by COVID-19 in the state (Fig. 3.6).

The graph in Fig. 3.6 shows the total deaths per day (yellow bars) and 7-day moving average (blue line). The disease’s peak occurred in the months of May and June, with a daily average of deaths above 200 and peaks over 300. In July, August, and September, the daily deaths did not exceed 200, although there were several days with above 150. The trend line of the moving average shows a high increase during April and May. From June onwards, there is a downward trend until the present moment in September.

However, this fall is not absolute and continuous. It is still necessary to maintain isolation measures with personal health security and social protection to restrain the resumption of the disease’s rise. Figure 3.2 illustrates the average daily death by COVID-19 in Brazil on 18 September. The state of Rio de Janeiro maintains a high number of deaths, which are higher than the daily average in Brazil. This fact reveals the need to maintain care and attention with health policies in the fight against COVID-19 and the measures of openness and social interaction that are in progress.

In Rio de Janeiro State, we draw a panel of the COVID-19 pandemic impact on its territory. From its entry via global contacts in the more affluent areas (worthy to say it a virus of globalization), it gradually reached the suburban areas and, finally, the metropolitan peripheries where the population is more impoverished and susceptible to problems. In this sense, the Baixada Fluminense, formed by thirteen cities and where the Federal Rural University is located, has become a favorable space for contamination and dispersion of the pandemic, promoting a dynamic of accelerated expansion and aggressive lethality. Visiting the pandemic's impacts on the metropolitan peripheries is a significant research challenge for all researchers committed to the community and social justice.

Figures 3.7, 3.8, 3.9, 3.10, 3.11, 3.12 and 3.13 will help the readers witnessing the spatial distribution of the evolution of the number of cases, the number of deaths, and the case fatality ratio in the Rio de Janeiro State. In March (Fig. 3.7) just twenty-four cases occurred in the Rio de Janeiro capital and Niterói city, located in the east metropolitan region. In the following months (Figs. 3.8, 3.9, 3.10, 3.11, 3.12 and 3.13) a concentration in the metropolitan area is observed in the number of confirmed cases, deaths, and case fatality ratio. The illness concentration is high in the metropolitan area and spreads, little by little, to other cities in the Rio de Janeiro State.

This situation shows the centralizing role of the metropolitan area of Rio de Janeiro in the state of the same name because it concentrates the density of the

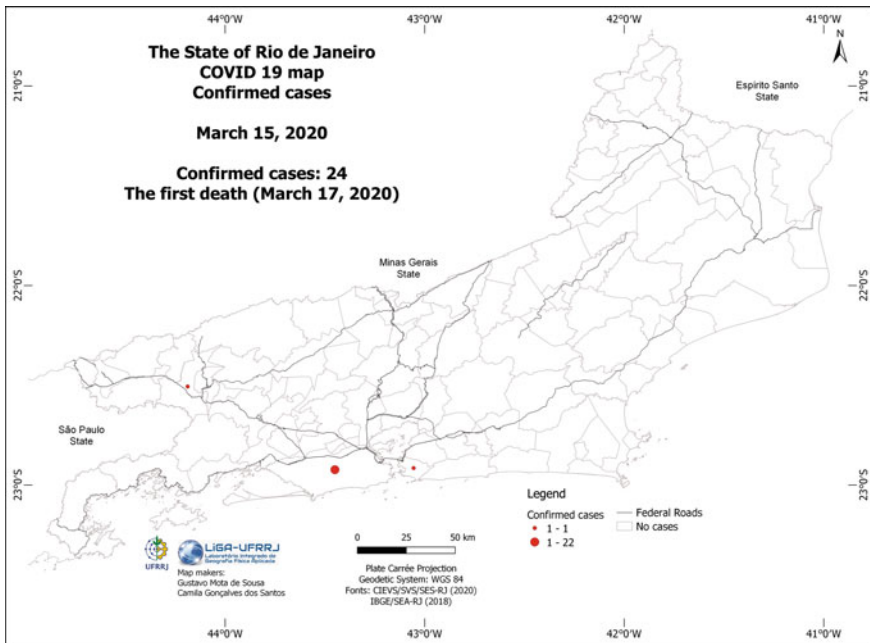
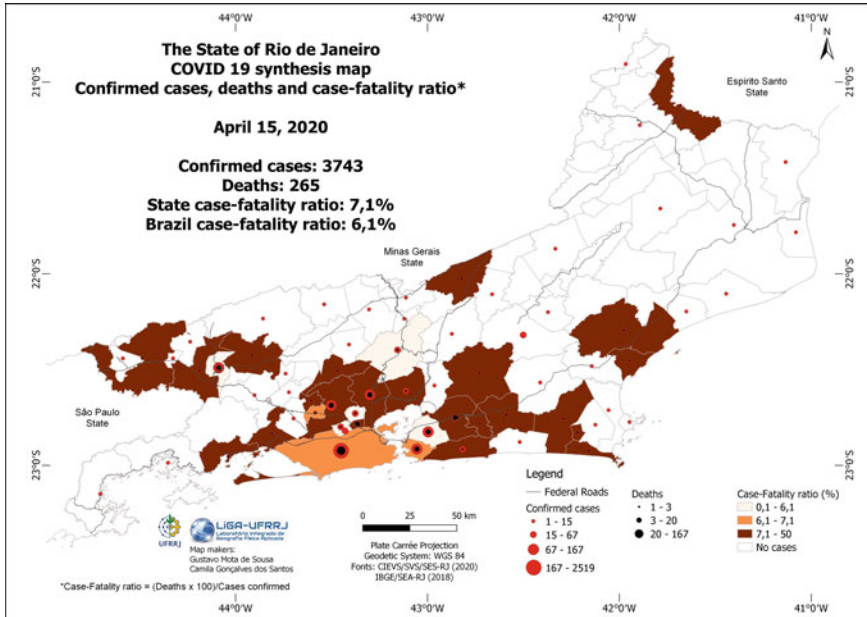


Fig. 3.7 Confirmed cases in Rio de Janeiro State on March 15, 2020

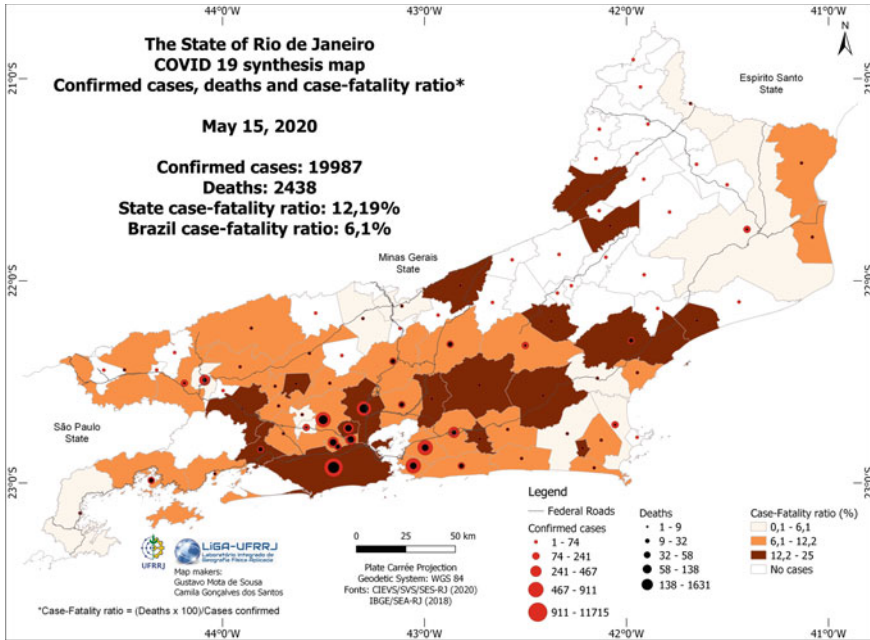


**Fig. 3.8** Confirmed cases, deaths numbers, and case fatality (the case fatality ratio is calculated by the number of deaths  $\times$  100 over the number of confirmed cases) ratio in Rio de Janeiro State on April 15, 2020

state population, the income, and the main public and private services. Likewise, it concentrates on many problems, conflicts, and challenges that are aggravated in this pandemic moment.

### 3.4 Metropolitan Area of Rio de Janeiro: A Favorable Space for Contamination and Dispersion of the Pandemic

The Metropolitan Area of Rio de Janeiro has the state capital, the Rio de Janeiro city, Niterói, the second most important city, and the Baixada Fluminense, emphasizing Nova Iguaçu and Duque de Caxias cities. The Baixada Fluminense is an area of great contradictions, where important industrial and logistic companies and other vital investments are located. Besides, this area is also a large contingent of segregated, impoverished spaces, with insufficient basic sanitation and high poverty rates. Baixada Fluminense also has internal differences, especially between the historic Baixada, with denser urbanization, and the portion of the metropolitan west end formed by the Seropédica, Itaguaí, Paracambi, Japeri, and Queimados cities, in addition to Magé and Guapimirim cities, which make up a transition with the Metropolitan



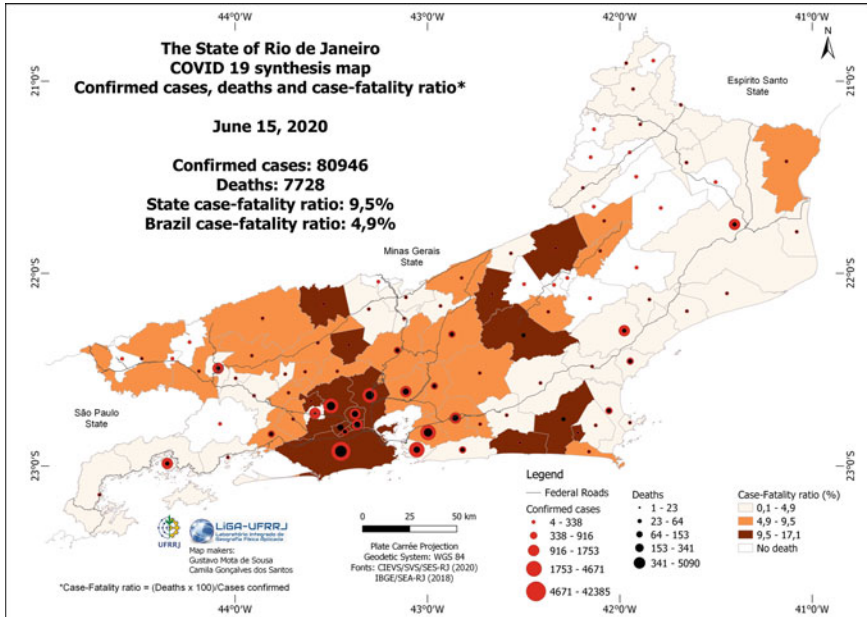
**Fig. 3.9** Confirmed cases, deaths numbers, and case fatality ratio in Rio de Janeiro State on May 15, 2020

East. The metropolitan west end has less urban characteristics and a restructuring process supported by recent investments in new logistical and industrial enterprises.

The Metropolitan Area of Rio de Janeiro and Baixada Fluminense present serious structural problems involving lack of basic sanitation (water and sewage), irregular occupations, and deficiency in health equipment, among many others. The Baixada Fluminense is connected to important traffic routes and railway axes destined for the movement of workers and goods, the poor conditions of housing, income, and basic sanitation. Altogether, they placed the Baixada Fluminense as a critical region of COVID-19 expansion in the Rio de Janeiro State.

The host city of the Federal Rural University of Rio de Janeiro (UFRRJ) (Fig. 3.14), Seropédica, is an important site for the analysis. Located at the western end of the Baixada Fluminense, it is an important logistics center. We highlight the Federal Rural University’s actions, which isolates its thousands of professors, students, and technical-administrative workers to avoid contamination. The University develops many actions toward its surroundings: the production of masks and alcohol-based sanitizers. It successfully carries out the research, extension, and disseminate information about the pandemic. The UFRRJ plays a very important for the pandemic triggered Baixada Fluminense.

UFRRJ has carried out solidarity actions producing alcohol in gels, masks, and offering organic food to the poorest. The solidarity actions are promoted by teachers,



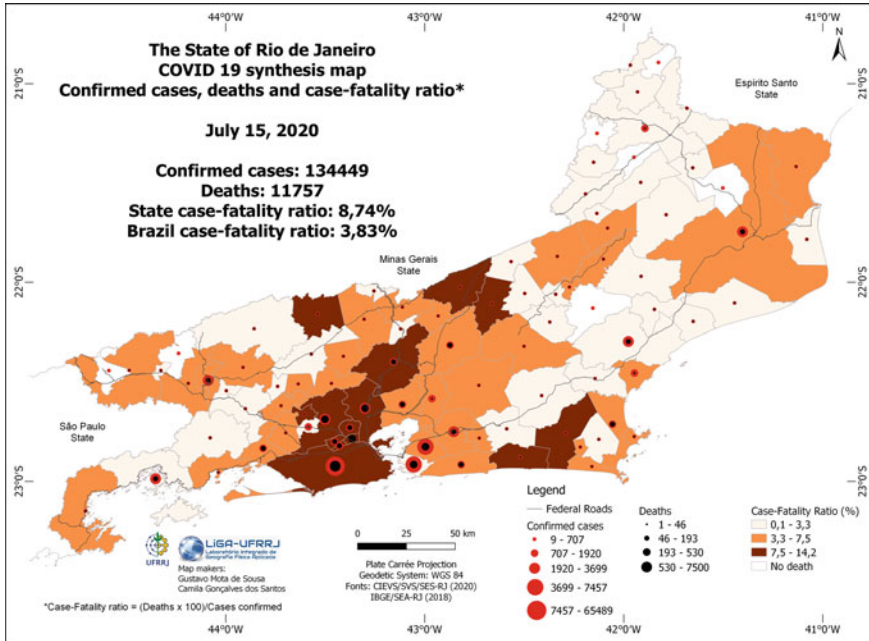
**Fig. 3.10** Confirmed cases, deaths numbers, and case fatality ratio in Rio de Janeiro State on June 15, 2020

employees, students, and people from the academic and local communities. Essential hygiene items and food donations bring comfort and hope to those most in need.

### 3.5 Conclusion

Mike Davis in his work *“The Monster at Our Door: The Global Threat of Avian Flu”* (Davis 2015), makes an important question: how would the almost defenseless cities of the third world react to a pandemic? In the peripheral realities, the concern is revealed: as the confrontation of the pandemic is related to qualified health conditions, availability of hospital spaces and medicines, sanitary conditions for survival, and even the capacity for social isolation, places with greater economic and social poverty become fragile spaces to face the COVID-19. And, Rio de Janeiro is a space of profound contradictions, with slums, a prosperous center, and impoverished periphery, and a series of economic and social problems.

So we share Mike Davis’s concern because Baixada Fluminense proves to be a space where the coronavirus pandemic has shown itself to be aggressive. With a dense population, largely with precarious living conditions, with insufficient medical facilities and equipment in its territory, and great difficulty in promoting social distance—either because of the need to build income or because of the very limitations of



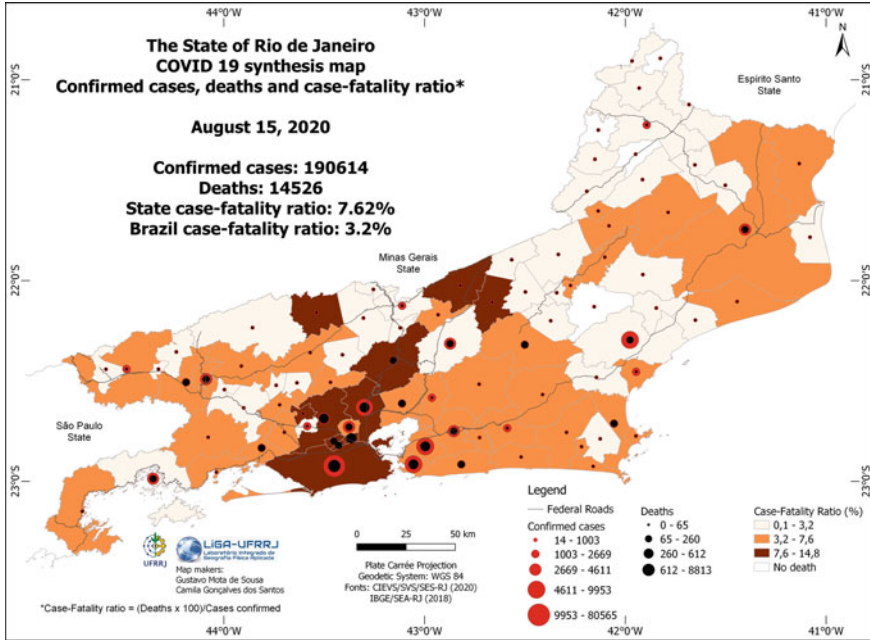
**Fig. 3.11** Confirmed cases, deaths numbers, and case fatality ratio in Rio de Janeiro State on July 15, 2020

housing—Baixada Fluminense became a sad laboratory capable of responding to Mike Davis’ concerns.

In this scenario, it is essential to highlight the effect of the divestment promoted by an agenda of fiscal adjustments that hit the Brazilian reality more acutely. In fact, we remember the words of David Harvey (2007) on the neoliberalism economy when it indicates economic adjustments in essential areas (such as health) can produce significant impacts in poor’s populations. Urban-peripheral areas, such as Baixada Fluminense, are the first to suffer a collapse of their health system, resulting in fewer hospitals, beds, and equipment and reaffirming a framework of territorial injustices. Therefore, the increase in the number of cases of COVID-19 in these cities aggravates a crisis scenario in health. The problematic case of public health is not exclusively for Brazil; As per WHO, all of the countries of the World Periphery exhibits almost the same scenario in responding to the present problems—for a significant portion of the population the access to effective health care during the emergency seems nothing but a reverie (WHO 2018).

Robust public policies are urgently needed for the Baixada Fluminense to meet the living conditions of its populations. Among the actions, we prioritize two:

- A health management model with the expansion of investments in areas with the greatest deficit in the number of beds and improve an integrated policy between cities;



**Fig. 3.12** Confirmed cases, deaths numbers and case fatality ratio in Rio de Janeiro State on August 15, 2020

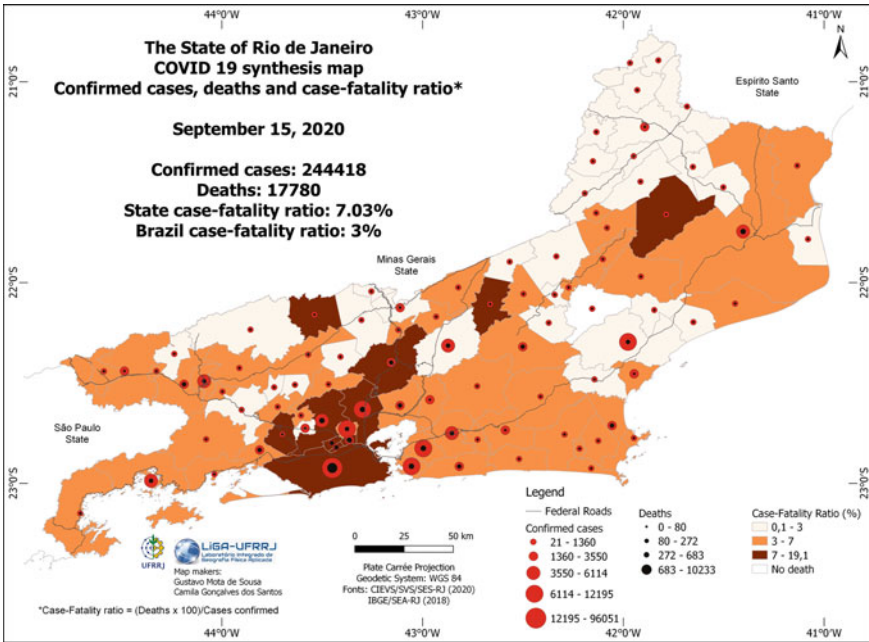
- Investments in health; improvements to urban infrastructure; actions to combat illness, and the implementation of urban infrastructure (sanitation, paving, urban floods mitigation).

This is how we have to overcome the negative representation of the Metropolitan Area of Rio de Janeiro and the Baixada Fluminense, with high levels of inequality and social violence against human life and to face crises like the COVID-19 pandemic.

COVID-19 showed that health is not an issue to be considered in times of pandemic, but a constant effort of the governments to execute social inclusion policies, poverty alleviation, and expansion of cash transfer is the key to combat against a pandemic in the developing world. City management, the right to a more environmentally friendly life, and social justice are urgent demands. The pandemic of COVID-19 is a lesson for social geographers, an alarm for democracy and justice in its true sense.

Baixada Fluminense and the Metropolitan Area of Rio de Janeiro situation may be similar to other regions around the world, such as India, which also needs attention to public policies to face the present crisis and to be prepared for the future.





**Fig. 3.13** Confirmed cases, deaths numbers, and case fatality ratio in Rio de Janeiro State on September 15, 2020



**Fig. 3.14** Area View of Main Building—Federal Rural University of Rio de Janeiro/UFRRJ

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