v. 2, n. 33, 2022

International Journal of Human Sciences Research

SOCIO-SPATIAL INEQUALITIES AND ENVIRONMENTAL AND SOCIOCULTURAL EXISTENTIAL MINIMUM IN THE METROPOLITAN REGION OF SALVADOR, BAHIA, BRAZIL: FUNDAMENTAL RIGHTS, SANITATION CHALLENGES AND SOCIAL HEALTH CONDITIONS

Manuel Vitor Portugal Goncalves
PPG Territory, Environment and Society (UCSAL), Salvador, Brazil
http://lattes.cnpq.br/8028380853221190

Débora Carol Luz da Porziuncula
PPG Territory, Environment and Society (UCSAL), Salvador, Brazil
http://lattes.cnpq.br/1801383100333154

Cristina Maria Macêdo Alencar
PPG Territory, Environment and Society (UCSAL), Salvador, Brazil
http://lattes.cnpq.br/2257876241055037

Manoel Jeronimo Moreira Cruz
PPG in Petroleum Geochemistry and Environment (UFBA),
PPG in Geology (UFBA), Salvador, Brazil
http://lattes.cnpq.br/0904466257879054

Antonio Bomfim da Silva Ramos Junior
State University of Feira de
Santana (UEFS), Brazil
http://lattes.cnpq.br/7770561630314291

Rodrigo Alves Santos
Geochemistry of Interfaces
(UFBA), Salvador, Brazil
http://lattes.cnpq.br/6434127457327063

Ana Carina Matos Silva
Geochemistry of Interfaces
(UFBA), Salvador, Brazil
http://lattes.cnpq.br/1857233182689023

Flavio Souza Batista
Doctoral student of the PPG
in Geology (UFBA)
http://lattes.cnpq.br/9541421462821227

Vinnie Mayana Lima Ramos
PhD student in Society, Economics,
State and Environment, at the PPG of
Integration of Latin America (PROLAM/
USP), São Paulo-São Paulo
http://lattes.cnpq.br/9037309575561587

Thiago Guimaraes Siqueira de Araújo
PhD student at the PPG Territory,
Environment and Society
(UCSAL), Salvador, Brazil
http://lattes.cnpq.br/6460670706400864

Glaucio Alã Vasconcelos Moreira
PhD student at the PPG Territory,
Environment and
Society (UCSAL), Salvador, Brazil
http://lattes.cnpq.br/5240499025063564

ABSTRACT: The material and symbolic reproduction of life depends on the realization ofguarantee the fundamental rights to drinking water, sanitation, a healthy and ecologically balanced environment, associated with the inviolability of the principles of socio-environmental existential minimum and human dignity and the aim was to investigate the relationship between socio-spatial inequalities in access to sanitation and health threats in the Metropolitan Region of Salvador (RMS), Bahia, Brazil. An interdisciplinary approach was adopted, covering the use of water quality indicators, sanitation indicators, social health conditions and the adoption of space as a category of social analysis. It was revealed that the child population (< 5 years old) of the groups that declared themselves to be brown or black, regardless of sex, have the greatest social demand for hospitalizations for diarrhea and public policies for access to sanitation, a healthy environment and ecologically balanced and health, especially in the municipalities of Itaparica and Vera Cruz. The infant mortality rates (IMR) and the infant mortality rate (IMR) in the RMS were similar to what was observed in Latin America and the Caribbean, but differed from the IMR and IMR in the South and Southeast regions of Brazil, in South America. North, Western Europe and Australia and New Zealand. There is a demand for environmental management and public policies that focus on improving education and sanitation, reducing the number of hospitalizations for diarrhea and preventable deaths of children in the RMS.

Keywords: Environment and Health, Reserva do Possível, TMI and TMIN, Latin America.

INTRODUCTION

The socio-environmental emergence of struggles for drinking water, in the context of struggles for territory and the guarantee of social and fundamental rights in Latin America and in the world, opposes the capitalist appropriation of nature, in obedience to the development model of the urban civilization pattern -industrial. Sachs (2000) considers that the development model obedient to the urban-industrial civilization pattern is socially unfair, economically unfeasible and ecologically imprudent and a threat to life and human dignity.

Thus, within the scope of the critique of the urban-industrial civilization pattern, the socio-environmental issues of sanitation failures and the struggles for social rights and fundamental rights to water, health and life in Latin America emerge, explained by the Pan American Organization of Health (OPA, 2011). It is estimated that 40 million people do not have drinking water and 117 million people do not have adequate sanitation in Latin America, where struggles for the fundamental rights to drinking water and sanitation affect ± 160 million people in Latin America. Fachin and Silva (2011) emphasize that fundamental rights emerge from social achievements in history and demand social control and legal protection.

It is noteworthy that the General Assembly of the United Nations (UN) recognized, in 2010, according to Hespanhol (2006), De Carvalho and Adolfo (2012) and Castro, Heller and Morais (2015), access to safe drinking water. and sanitation as the fundamental rights, where the forfeiture of these rights exposes a portion of the population to socio-environmental injustice, threat to health and the guarantee of effectiveness of social rights. Bobbio (1992) highlighted the relevance of the rights to health, life, sanitation and an unpolluted environment for human dignity and the effectiveness of guaranteeing social rights.

In addition, criticism of the biomedical and sanitary paradigms of health has emerged since the Declaration of the Conference on Primary Health Care, of 1978, carried out by the United Nations International Emergency Fund (UNICEF) and the World Health Organization (WHO).). Since then, a paradigmatic view of health in its multiple determinations was consolidated and assumed as a fundamental right, where the paradigm of collective health emerged (PORTO, 2005; PEÇANHA et al., 2012). in addition, Porto and Martínez-Alier (2007) emphasize that the collective health paradigm has embraced the social, environmental and economic processes of development.

The struggles for drinking water and sanitation have occupied the political agenda of the socio-environmental movement in Latin America and in the world in recent decades, residing in the relationships between health, environment, society and territory. The territory is nature and society, economy, politics and culture and welcomes interactions in place and the potential of development (SAQUET, 2007). It is assumed, therefore, that the struggles for land, water, life and sanitation in Latin America are specters of political struggles for territory, which are based on the principles of the socio-environmental existential minimum and human dignity.

PES (2019) propose that the rights to drinking water, sanitation and health have a subjective nature that can be enforceable, because they include the principles of human dignity and the existential environmental minimum. In addition, the principle of the environmental existential minimum contemplates, in addition to ensuring biophysical survival, it contemplates a sociocultural existential minimum, which

explains the multiple relationships between society and nature (SARLET, 2010).

De Carvalho and Adolfo (2012) consider that access to basic and environmental sanitation are fundamental rights to guarantee social and environmental protection, the minimum socio-environmental existential and human dignity. Sanitation failures and asymmetries in access to sanitation contribute to the deterioration of environmental quality and health conditions. Buss and Pellegrini (2007) relate inequalities in access to drinking water and sanitation to social health conditions, the population's living conditions and environmental health. It is understood, therefore, that social conditions interfere in the health-disease process and in health inequalities.

In addition, it is sometimes seen in Brazil that the guarantee of fundamental rights is threatened by a limited interpretation of the public power of the principle of reserve of the possible, which resides in the Federal Constitution of 1988. This principle aims to reconcile social demands by policies to enforce the guarantee of rights and the availability of public resources from the State (CARCARÁ et al.; 2019). However, the theory of reserve of the possible contributed, in the world, with regard to jurisdictional control, mainly, the guarantee of the realization of fundamental rights (LEAL; ALVES, 2016).

With this, we emphasize the critical position of Sarlet and Fensterseifer (2010) in relation to the reserve of the possible and the minimum socio-environmental existential, so that these authors understand that environmental quality needs to be recognized as an integral part of the normative content of the principle of dignity of the human person in the face of the imperative of reproduction of life. Carcará et al. (2019) understand that the notion of reserve of the possible is relevant, but must not be invoked when it affects human dignity, such as public policies aimed at the realization of fundamental rights.

In this sociopolitical context, it is made explicit that the studies carried out in the Metropolitan Region of Salvador (RMS) by Porciúncula (2017), Porciúncula and Alencar (2019), Porciúncula, Gonçalves and Alencar (2021), Gonçalves et al. (2021) reveal the presence of social, environmental, health and access to drinking water and sanitation inequalities on an intra-metropolitan scale, which accompany restrictions on potability, bathing and water use.

Porziuncula (2011), Porciúncula and Alencar (2019) and Porciúncula et al. (2021) explain the tensions caused by the use of water in the RMS, according to the analysis of water supply interruption events, asymmetries in access to this service and water quality. They revealed a space of disputes for the appropriation of water in the RMS, with origins in the urban-industrial rationality.

In this sense, research by Pereira (2009), Carvalho and Cruz (2010) and Souza e Silva (2015) revealed the loss of quality of coastal groundwater and surface water and changes in bathing conditions in the municipalities of Itaparica and Vera Cruz, on RMS. Furthermore, Álvares et al. (2010), Nascimento (2008), Alves et al. (2016), Alves et al. (2019), Silva et al. (2020) and Silva et al. (2021) demonstrated the deterioration of water quality in the municipality of Salvador, in the RMS. These authors attributed the loss of water quality in the RMS in particular to sanitation failures and land uses.

Based on the above, we agree with the political and socio-environmental perspective of health problems and social health conditions by Ayach et al. (2012), which understands that human health impairments reflect multiple health determinations, such as land use, social asymmetries, social and

economic vulnerabilities, sanitation failures, socio-environmental health conditions and housing. In this sense, it is assumed that the multiple determinations of health are unequally expressed in the municipalities of the RMS, in Bahia, in Brazil, or anywhere in the world.

The multiple determinations of health emerge in the urban and rural spaces and in the spaces of coexistence of the rural in the urban and metropolitan areas of the RMS, in Latin America and in the world. This way, andThis work aims to understand the relationships between sanitation failures and their threats on chemical-microbiological groundwater quality and social health conditions in the municipalities of Vera Cruz and Itaparica, which are part of the RMS, in Bahia, Brazil.

STUDY AREA

The Metropolitan Region of Salvador (RMS), in Bahia, Brazil, encompasses the municipalities of Salvador, the metropolitan metropolis, Camaçari, Candeias, Dias D'Ávila, Itaparica, Lauro de Freitas, Madre de Deus, Mata de São João, Pojuca, São Francisco do Conde, São Sebastião do Passé and Vera Cruz (Figure 1). The RMS occupied the 8th position in the national metropolitan scenario in relation to population, Gross Domestic Product (GDP) and GDP per capita, based on information from the Brazilian Institute of Geography and Statistics (IBGE, 2010).

Silva et al. (2014) analyzed the sectoral distribution of GDP in the Metropolitan Region of Salvador, based on dataof the IBGE. classifiedthe economy of the RMS of municipalities with some expression of

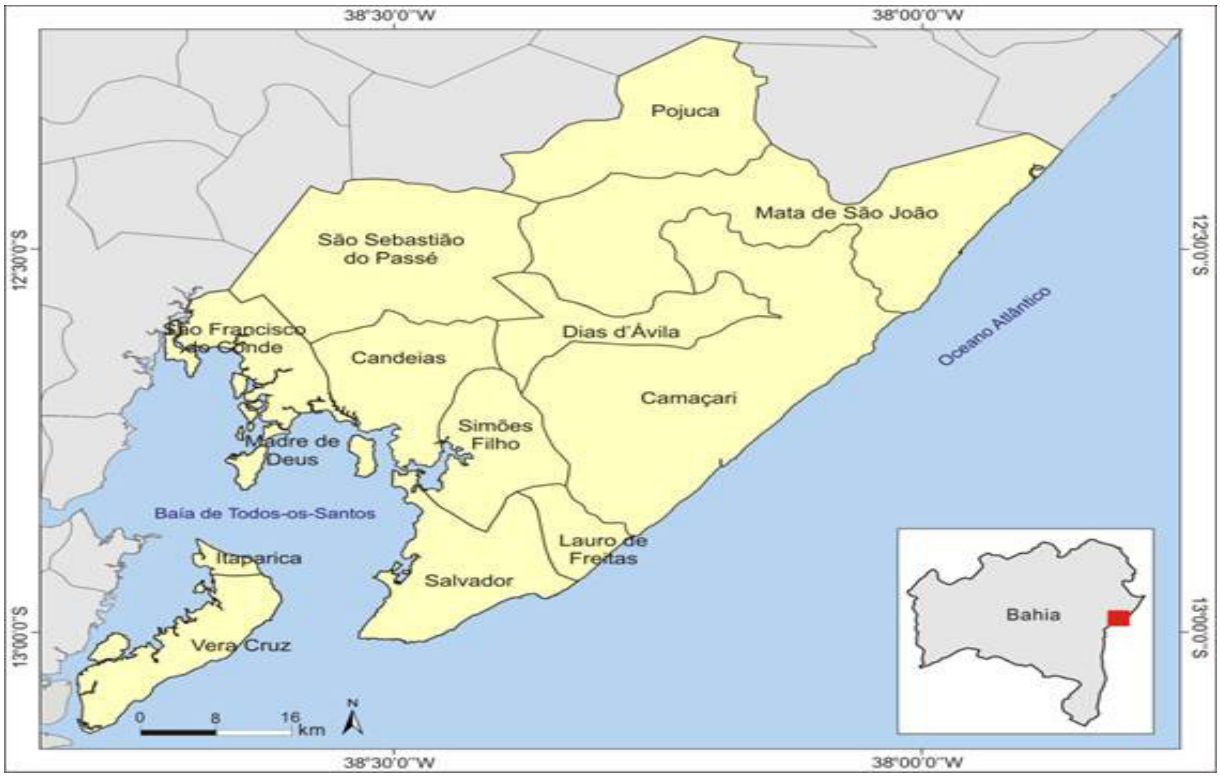

Figure 1. Location and situation map of the municipalities that make up the Metropolitan Region of Salvador, in the State of Bahia, in Brazil.

Source: Silva et al. (2014).

agriculture (Mata de São João, Vera Cruz, Itaparica and São Sebastião do Passé), services (Itaparica, Lauro de Freitas, Madre de Deus, Mata de São João, Salvador and Vera Cruz), predominantly industrial municipalities (Camaçari, Candeias, Dias d'Ávila, Pojuca and São Francisco do Conde) and services and industry (São Sebastião do Passé and Simões Filho). The petrochemical and energy industries, automobiles, tires, auto parts, wind equipment, cellulose, acrylic products, beverages, metallurgy and mechanics stood out.

MATERIALS AND METHODS

SOCIOECONOMIC, SOCIAL HEALTH AND SANITATION CONDITIONS

The research was based on the analysis of socio-spatial inequalities and the scope of socioeconomic aspects, sanitation indicators and social health indicators in the RMS, from 2007 to 2017, according to data from the Brazilian Institute of Geography and Statistics (IBGE) (2010; 2019; 2020) andfrom the Department of Informatics of the Unified Health System (SUS), DATASUS. In this context, the main indicators adopted for social health conditions and sanitation conditions are briefly presented in Table 1.

A socio-spatial analysis of data on hospitalizations of children (< 5 years of age) due to diseases associated with education and hygienic-sanitary conditions in the Health Regions of Salvador (29020) and Camaçari (29004) was adopted. serve 3,489,230 inhabitants and 626,687 inhabitants. In addition, information was sought in the DATASUS Hospitalization System (SIS), where cases were selected according to morbidity, based on the 10th International Classification of Diseases (ICD-10): infectious diarrhea and gastroenteritis (A09), cholera (A00), shigellosis (A03), amoebiasis (A06), leptospirosis (A27), schistosomiasis (B65), hookworm (B76), other helminthiasis (B83) and other infectious intestinal diseases (Z22.1).

In this context, an ecological, space-time approach was adopted in the universe of descriptive epidemiology and collective health, based on the perspectives of Vetter and Simões (1981), Bezerra Filho et al. (2007), Porto and Martinez-Alier (2007) and Oliveira (2017), for the analysis of the relationship between environment and health of the municipalities that make up the Metropolitan Region of Salvador, Bahia.

STATISTICAL ANALYSIS

Statistical analysis was based on a descriptive and inferential approach to data on socioeconomic, sanitation, social health and water quality indicators. Covered the normality test (Shapiro-Wilk) at a significance level of 0.5% and the multiple comparison tests for non-parametric (Kruskal-Wallis) or parametric (ANOVA) data.

RESULTS AND DISCUSSION

SOCIOECONOMY AND SANITATION

The socioeconomic profiles and the total percentage were obtainedby class of average monthly household income per capitaof the municipalities in the Metropolitan Region of Salvador – RMS, based on census information provided by the IBGE (2010) (Table 1). It is observed that the percentages of households withaverage monthly incomehouseholds, on average, up to one minimum wage per capita ranged from 23% to 51% among the municipalities in the RMS.

As a result, the values ofaverage monthly incomehousehold between ½ (half) and 5 (five) minimum wages per capita (Table 1). Furthermore, the socio-spatial and economic inequalities between the municipalities of the RMS are made explicit, or a pact is demanded between the different segments of organized

Demographic and Social Health Indicator	Indicator Description
Infant mortality rate - IMR	Number of obtained from children under 1 year of age for every thousand live births
Childhood mortality rate - TMIN	Number of obtained from children aged between 1 and 5 years old for every thousand live births
Neonatal mortality rate - TMN	Number of obtained from children aged between 0 and 27 days of life for every thousand live births
Post-neonatal mortality rate - TMPN	Number of deaths of children aged between 28 and 364 complete days of life for every thousand live births.
Demographic and Sanitation Indicator	**Indicator Description**
Rate of Hospitalizations for diarrhea/thousand inhabitants	Number of hospitalizations for diarrhea per thousand inhabitants, which portrays the demand for health expenses associated with the absence, incipient or failures of sanitation, education and hygienic-sanitary conditions of a population.
Destination of Solid Waste	It includes a universe of information about the challenges for the universal collection and final disposal of solid waste in a technically, socially and environmentally appropriate way.
Water Supply Form	It encompasses a universe of information about springs and challenges for the universalization of public water supply, in compliance with the principles of environmental and sociocultural existential minimum and human dignity.
Coverage of the General Sewage and Pluvial Network	It expresses the challenges for universalization of adequate sanitary sewage services, with dignity, and for the promotion of health and environmental sanitation.
Existence of Bathroom or Toilet	It expresses the challenges for universal coverage of adequate sanitation, with dignity.
Adequate Sanitary Sewage (%)	It can express the percentage of service provided by the sanitary sewage service of a municipality, state or country. It allows inferences about the negative impacts of sanitation failures on environmental quality and threats to health.
Percentage of Use of Rudimentary Trenches (%)	It allows inferences about the direct negative impacts of sanitation failures on environmental quality and health. It guides society and environmental, sanitation and health managers on what sanitation priorities would be.

Table 1. Description of demographic indicators and social health conditions.

Source: Prepared by the authors.

civil society and the public power for the elaboration and implementation of policies to overcome intra-metropolitan inequalities.

The municipalities of Candeias, Itaparica, Vera Cruz and Mata de São João showed the highest number of households with an average monthly household income per capita of up to one minimum wage, whose profile differed from that of Salvador (Table 1), whose medians differed from each other, according to the Kruskal-Wallis test (Figure 2).In addition, the Municipal Human Development Index (HDI-M) of the municipalities in the RMS point to a change from the low development pattern in 1991 to medium development in 2010, but Salvador and Lauro de Freitas occupy the 383rd and 467th national positions for the HDI-M (Table 2).

In addition to analysis of the socio-spatial distribution of sanitary sewage revealed the profile of intrametropolitan inequalities in the RMS, with more critical situations in the municipalities of Itaparica and Vera Cruz (Figure 3). The sanitation profile in Brazil can be associated, in general, with the proportions of morbidity and mortalitychildishdiarrhea (PAIVA; SOUZA, 2018).

In terms of sanitation, it was observed that the percentage of solid waste collection ranged from 78% (Itaparica) to 99% (Lauro de Freitas) and the general public water supply network serves 72% (São Sebastião do Passé) to 99.7% (Madre de Deus) of the RMS households (Table 3). These data point to a trend towards universalization of the coleta of solid waste and water supply in the RMS, but the local failures and social asymmetries in access to such services in the RMS cannot be disregarded.

FUNDAMENTAL RIGHTS AND SOCIAL HEALTH CONDITIONS

The presence of socio-spatial inequalities in the intra-metropolitan scale of the percentages of adequate sanitary sewage coverage in the municipalities that make up the Metropolitan Region of Salvador was revealed (Figure 4). Thus, the municipalities of Vera Cruz, Mata de São João, Itaparica and Dias d'Ávila had the highest proportions of households using rudimentary septic tanks and the lowest adequate sewage coverage. Batista et al. (2021a) understand that the adoption of rudimentary septic tanks or the dumping of liquid effluents in natura into water bodies are environmentally unsustainable practices because they compromise the quality and possible uses of water.

With this, it is emphasized that the drama of environmental pollution associated with sanitation failures represents a threat to nature conservation and human and animal health and, ultimately, to the material and symbolic reproduction of life. This is because environmental pollution violates the principles of socio-environmental existential minimum and human dignity and intensifies social asymmetries and struggles for the rights to drinking water, sanitation and health in Latin America.

In Latin America, sanitation problems reach, according to the OPA (2011), where there are ± 157 million people who do not have drinking water and adequate sanitation, as well as ± 34 million people live under conditions of precarious life and defecate in soils and water bodies. Therefore, a collective health issue was created, associated with social asymmetries and access to drinking water and sanitation services.

In this horizon of meanings, it was observed that diarrhea, intestinal gastroenteritis and other intestinal infectious diseases mainly affected the child population (< 5 years of age) in the municipalities of Simões Filhos and Camaçari, in the Camaçari Health Region, and Salvador, Candeias,

County	Total of Households (1)	Percentage distribution (%) by average income classes monthly household per capita (minimum wage)							
		No Income	up to 1/2	1/2 to 1	Σ SR to 1	1 to 2	2 to 5	5 to 10	> 10
Brazil	**57,320,555**	**4.00**	**4.00**	**14.00**	**22.00**	**23.00**	**33.00**	**14.00**	**8.00**
Bahia	**4,093,619**	**6.00**	**10.00**	**23.00**	**39.00**	**27.00**	**23.00**	**7.00**	**4.00**
Salvador (Metropolis)	858,496	6.00	4.00	17.00	27.00	23.00	28.00	12.00	10.00
Camaçari	73,921	5.00	5.00	13.00	23.00	27.00	34.00	11.00	5.00
Candeias	24,892	5.00	21.00	25.00	51.00	28.00	8.00	2.00	11.00
Dias D'Ávila	19,923	9.00	6.00	20.00	35.00	27.00	28.00	8.00	2.00
Itaparica	6,334	8.00	10.00	25.00	43.00	29.00	22.00	4.50	1.50
Lauro de Freiras	49,453	5.00	3.00	16.00	24.00	24.00	28.00	11.00	13.00
Madre de Deus	5,172	9.50	5.50	18.00	33.00	24.50	29.50	10.00	3.00
Mata de São João	11,693	11.00	6.00	25.00	42.00	26.00	25.00	5.00	2.00
pojuca	9,605	7.00	6.00	23.00	36.00	27.00	27.00	8.00	2.00
S.Francisco do Conde	9,429	7.00	4.00	23.50	34.50	29.00	28.00	7.00	1.50
Sao Sebastiao do Passé	12,317	8.00	9.00	22.00	39.00	27.00	25.00	7.00	2.00
Simões Filho	34,963	7.50	6.00	22.00	35.50	28.00	28.00	7.00	1.50
Vera Cruz	11,749	7.00	12.00	26.00	45.00	27.00	21.00	5.00	2.00
Descriptive Statistics - Sample Estimators									
Minimum		4.00	3.00	13.00	23.00	23.00	8.00	2.00	1.50
Maximum		11.00	21.00	26.00	51.00	29.00	34.00	14.00	13.00
Average		7.00	7.43	20.83	35.27	26.43	25.83	7.90	4.57
median		7.00	6.00	22.00	35.50	27.00	28.00	7.00	2.00
Standard deviation		1.92	4.58	4.25	8.46	1.95	6.11	3.21	3.95
Standard Error		0.50	1.18	1.10	2.18	0.50	1.58	0.83	1.02
Coefficient of variation (%)		27.40	61.59	20.40	01.24	7.39	23.63	40.61	86.40
Shapiro-Wilker (p value)		0.810 A	0.002 B	0.116 A	0.67 A	0.050 B	0.011 B	0.853 A	0.001 B

It is read: *THE* Gaussian distribution; B non-Gaussian distribution.

Table 1. Average monthly per capita income class and percentage distribution of permanent private households in the Metropolitan Region of Salvador - 2010.

Source: Based on information from the 2010 Demographic Census (IBGE, 2010).

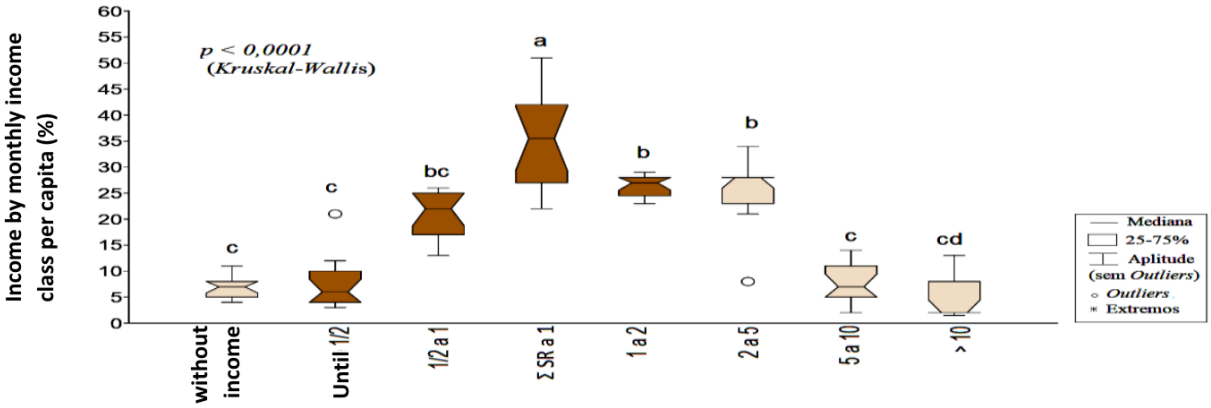

Figure 2. Box-plot diagram applied in the analysis of income distribution by monthly per capita income class, on average, in households in the municipalities of the RMS, Bahia (2010).

Source: Prepared by the authors, based on the 2010 Demographic Census (IBGE, 2010).

County	Population	Density (inhab. km2)	Gross Domestic Product (x1000)	HDI-M			Adequate Sanitary Sewage (%)	Hospitalizations for diarrhea per thousand inhabitants
				1991	2000	2010		
Brazil	**190,755,799**	**22.40**	**190,755,799.00**	-	-	-	**75.00 (A)**	-
Bahia	**14,873,064**	**24.82**	-	**0.386**	**0.512**	**0.660**	**46.00**	-
Salvador	**2,675,656**	**3,859,44**	**40,762,687.00**	**0.563**	**0.654**	**0.759**	**92.80**	**0.20**
Camaçari	242,970	309.65	12,446,027.00	0.422	0.551	0.697	64.80	0.20
Candeias	83,158	321.87	2,191,978.00	0.408	0.548	0.691	73.90	0.10
Dias D'Ávila	66,440	360.64	2,206,179.00	0.416	0.540	0.676	59.60	0.10
Itaparica	20,725	175.58	237,118,72.00	0.407	0.522	0.670	**49.50**	2.10
L. de Freiras	163,449	2,833,38	3,652,178.00	0.474	0.616	0.754	80.50	0.20
Madre de Deus	17,376	539.61	347,394.00	0.467	0.565	0.708	92.00	0.20
Mata de S.João	40,183	63.46	613,777.00	0.378	0.506	0.668	42.80	0.10
Pojuca	33,066	113.97	939,102.00	0.445	0.524	0.666	87.60	0.30
S.F. do Conde	33,183	126.24	5,323,914.00	0.355	0.518	0.674	67.20	0.10
SS do Passé	42,153	78.30	487,337.00	0.401	0.508	0.657	66.60	0.10
Simões Filho	118,047	586.65	5,813,345,83	0.430	0.545	0.675	64.60	0.40
Vera Cruz	37,567	125.33	275,129.00	0.412	0.521	0.645	24.60	0.70

THE: Average of data from 2014, 2015 and 2018 (IBGE, 2019).

Table 2. Permanent private households with sanitation service and indication of hospitalizations for diarrhea in the Metropolitan Region of Salvador, according to IBGE 2010.

Source: Prepared by the authors, based on data from the 2010 Demographic Census (IBGE, 2010).

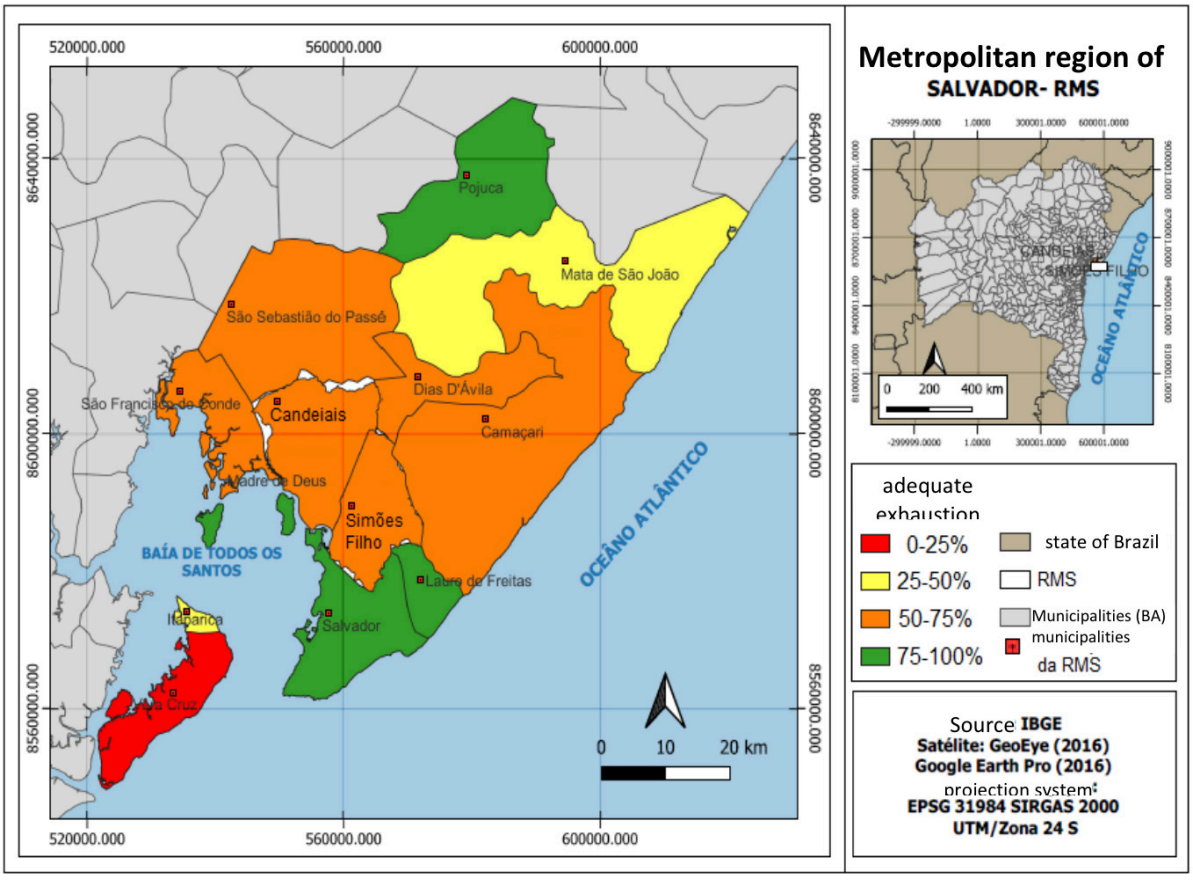

Figure 3. Distribution map of adequate sanitary sewage in the municipalities of the RMS.

Source: Prepared by the authors.

County	Total of households	Final Destination of Solid Waste					
		Collected	buried (On the ground)	thrown into the river, lake or sea	Played on the ground common land or patio	burnt	Other
Salvador (Metropolis)	**858,496**	**830,157 (97%)**	**96**	**768**	**24,017**	**1,727**	**2,122**
Camaçari	73,921	69,371 (94%)	101	31	1,817	2,346	325
Candeias	24,921	21,849 (88%)	26	37	1,636	1,312	32
Dias D'Ávila	19,923	17,793 (89%)	36	5	1,346	630	78
Itaparica	6,334	4,955 (78%)	16	4	766	553	47
Lauro de Freiras	49,453	48,816 (99%)	25	3	316	261	14
Madre de Deus	5,172	5,137 (99%)	-	two	26	6	1
Mata de São João	11,698	9,742 (83%)	79	3	161	1674	34

Pojuca	9,605	8,690 (90%)	30	4	100	761	20
San Francisco do Conde	9,436	8,756 (93%)	15	9	164	444	41
Sao Sebastiao do Passé	12,334	10,161 (82%)	48	two	305	1,760	39
Simões Filho	34,983	29,445 (84%)	41	103	2,959	2,364	71
Vera Cruz	11,749	9,613 (82%)	45	19	922	1,022	128

a) Destination of garbage in the city of Salvador and in the RMS - 2010.

County	**Total households**	**Water Supply Form**					
		Well/spring on the property	Well/spring outside the property	General Network	Rainwater stored in cisterns or other	kite car	River, weir, lake or stream, others
Salvador (Metropolis)	**858,496**	**2,604**	**923**	**849,341 (99%)**	**99**	**571**	**5,236**
Camaçari	73,921	2,281	1,087	69,095 (93%)	190	169	1,169
Candeias	24,921	593	388	23,306 (94%)	18	8	579
Dias D'Ávila	19,923	670	270	18,245 (92%)	19	158	526
Itaparica	6,334	209	213	5,599 (88%)	33	14	273
Lauro de Freiras	49,453	988	144	47,911 (97%)	14	40	318
Madre de Deus	5,172	1	-	5,159 (99.7%)	1	-	14
Mata de São João	11,698	1,035	1,064	9,301 (80%)	12	6	275
Pojuca	9,605	428	598	8,360 (82%)	3	28	188
San Francisco do Conde	9,436	104	191	8,718 (92%)	19	106	291
Sao Sebastiao do Passé	12,334	702	2,378	8,856 (72%)	10	8	367
Simões Filho	34,983	986	727	32,408 (93%)	38	83	1,058
Vera Cruz	11,749	335	135	10,860 (92%)	8	two	409

b) Form of water supply in the city of Salvador and RMS - 2010.

County	Total households	They didn't have a bathroom or toilet.	Existence of a bathroom or toilet and Sanitary sewage					
			General sewage or rainwater network	septic tank	rudimentary pit	Ditch	river, lake, sea	Other
Salvador (Metropolis)	**858,496**	**3,621**	**779,870 (91%)**	**19,906 (2%)**	**21,483 (2.5%)**	**19,251**	**10,978**	**3,387**
Camaçari	73,921	1,185	38,416 (52%)	9,921 (13%)	20,165 (27%)	1,473	2008	753
Candeias	24,921	481	16,020 (64%)	2,422 (10%)	3,499 (14%)	1,571	369	559
Dias D'Ávila	19,923	230	8,618 (43%)	3,327 (17%)	6,879 (35%)	317	243	309
Itaparica	6,334	195	2,520 (40%)	524 (8%)	2,605 (41%)	325	95	70
Lauro de Freiras	49,453	248	27,237 (55%)	12,748 (26%)	6,776 (14%)	908	1,358	160
Madre de Deus	5,172	21	4,693 (91%)	64 (1%)	191 (4%)	23	163	17
Mata de São João	11,698	400	3,089 (26%)	1,930 (16%)	5,549 (47%)	232	164	334
Pojuca	9,605	134	7,575 (79%)	800 (8%)	443 (4.6%)	62	74	517
San Francisco do Conde	9,436	400	4,724 (50%)	1,531 (14%)	1,258 (13%)	320	774	429
Sao Sebastiao do Passé	12,334	652	6,454 (52%)	1,734 (14%)	1,687 (13.7%)	856	437	514
Simões Filho	34,983	700	20,121 (53%)	2,762 (8%)	7,643 (22%)	1,050	2,114	593
Vera Cruz	11,749	377	1,606 (14%)	1,373 (12%)	7,753 (66%)	119	278	243

c) Existence of bathroom and sanitary sewage in Salvador and RMS -2010.

Table 3. Urban and rural permanent private households and the existence of basic sanitation services in the municipalities of the Metropolitan Region of Salvador, Bahia - 2010.

Source: Prepared by the authors, based on the 2010 Demographic Census (IBGE, 2010).

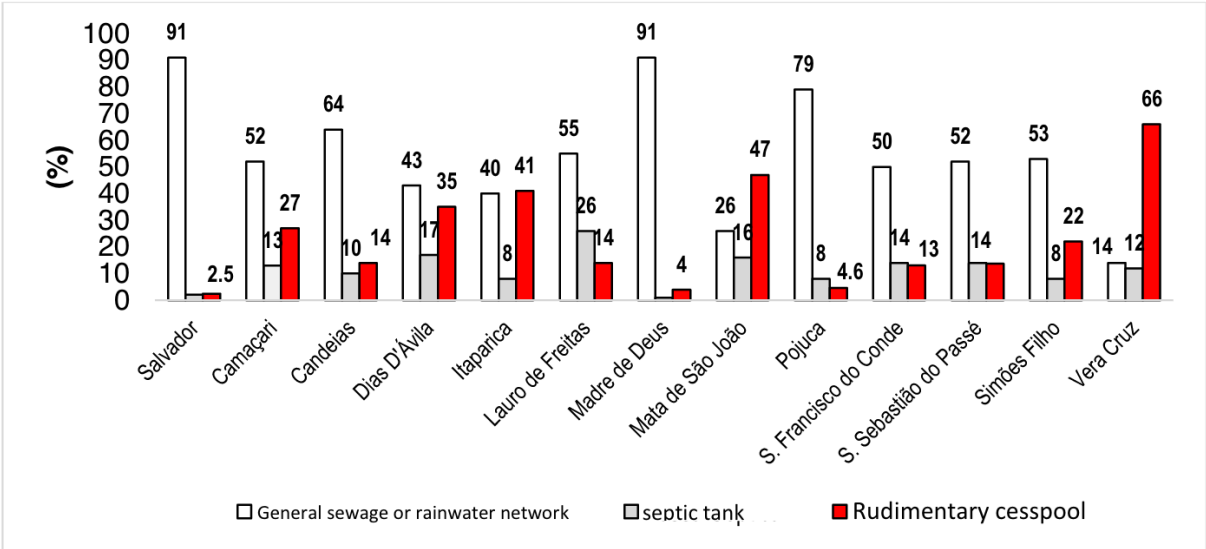

Figure 4. Synthesis of the results of the analysis of basic sanitation data in the RMS.

Source: Based on data from the 2010 Demographic Census (IBGE, 2010).

Lauro de Freitas, Itaparica and Vera Cruz, in the Health Region of Salvador (Table 4).

It is proposed that the magnitude of hospitalizations for diarrhea in children in Salvador, which hasone of the most extensive offerings of the RMS public sanitation, health and education services must be explained from the multiple determinants of health, such as demography, social injustices and the forfeiture of fundamental rights expressed in the same neighborhood or between working class and privileged class neighborhoods.

It was revealed, in view of what was discussed, that the hospitalizations of children for infectious diarrhea and gastroenteritis, or for other intestinal infectious diseases, leptospirosis, amebiasis, shigellosis configures a complex public and collective health problem, being inseparable from the conditions of life, socio-environmental and education-hygienic-sanitary education in the RMS (Tables 4, 5 and 6).

In this clipping, the demand for policies and interventions in sanitation and health conditions was made explicit, especially for the fractions of the population that declared themselves to be black or mixed race, regardless of sex or age (Table 6). It is also necessary to investigate why some patients do not self-declare their color and what is the relationship between this social phenomenon and health, where this epidemiological and sociocultural information would contribute to the elaboration of public policies for specific groups and for social equity.

It is understood that diarrhea is a public and collective health problem that encompasses several health determinants: cultural, educational, socio-environmental, economic and access to social rights (ESCOBAR et al., 2015; KUIAVA et al., 2019; NASCIMENTO, 2019). In addition, hospital admissions for cholera demand health surveillance, due to virulence, lethality and the relevance of water to the forms of transmission of the pathogen.

Table 7 shows a statistical summary of the following social health indicators, on different scales of socio-spatial analysis: Infant Mortality Rate (IMR), Neonatal Mortality Rate (NMR), Post Neonatal Mortality Rate (PNMR) and Infant Mortality Rate. Childhood Mortality (BMR). Thus, it is emphasized that the median values of these social health indicators in the municipalities of Itaparica and Vera Cruz differed significantly from the profile of these indicators observed in the RMS, Bahia, in the Northeast, South and Southeast regions, or in Brazil, based on the Kruskal-Wallis test result.

While the values of the median childhood mortality rate (2006 to 2017) were presented, in different geographic scales, in descending order, as follows: Sub-Saharan Africa > South Asia Bahia > Latin America and the Caribbean > Northeast > RMS > Brazil > Southeast > South > North America > Australia and New Zealand > Western Europe (Tables 7 and 8).

It is recognized that sanitation failures, inequities in access to public services and the forfeiture of fundamental rights aggravate TMIN in the RMS, because children aged 1 to 5 years have greater mobility and autonomy, which make them susceptible to areas polluted and eating unsuitable food and water. Werneck and Struchiner (1997) and Batista et al. (2021b) highlight the relationship between public health, the environment and land use.

Magalhães et al. (2018) highlight that the IMR reduced from 47.1 to 14.0 deaths per thousand live births and the IMR reduced from 53.7 to 16.4 deaths per thousand live births, between the years 1990 to 2016, especially in the NE region of Brazil. The improvement in child health in Brazil was partly attributed to the creation of the Unified Health System

Health Region	Diarrhea and Gastroenteritis Infectious (A09)		Other infectious intestinal diseases (Z22.1)		Cholera (A00)	
	2008-2017	2018-2021	2008-2017	2018-2021	2008-2017	2018-2021
29004 - Camaçari	**600**	**90**	**294**	**114**	**24**	**1**
Simões Filho	208	29	103	28	9	-
Dias D'Ávila	116	4	15	4	8	-
pojuca	13	2	4	4	0	-
Camaçari	197	29	133	73	1	1
Mata de São João	36	4	34	4	0	-
29020 - Salvador	**3,006**	**693**	1,270	173	**66**	**20**
Sao Sebastiao do Passé	64	20	8	1	0	-
Madre de Deus	22	3	8	0	0	-
Itaparica	53	15	117	2	0	-
San Francisco do Conde	9	11	2	1	0	
Salvador	2,379	603	943	156	63	20
Vera Cruz	42	10	110	4	0	-
Candeias	124	16	20	2	0	1
Lauro de Freitas	146	14	43	6	2	-

Table 4. Distribution of hospital admissions due to microbial infections in children (up to 4 years of age) in the Health Regions of Camaçari and Salvador (2008 to 2021).

Source: Prepared by the authors, based on information available from the Ministry of Health - SUS Hospital Information System (SIH/SUS).

Health Region	Leptospirosis (A27)					
	icterohaemorrhagic		Other Forms		Does not specify	
	2008-2017	2018-2021	2008-2017	2018-2021	2008-2017	2018-2021
29004 - Camaçari	**4**	**-**	**1**	**4**	**46**	**114**
Simões Filho	3	-	-	1	33	8
Dias D'Ávila	-	-	-	2	2	-
pojuca	-	-	-	1	3	1
Camaçari	1	-	1	-	7	6
Mata de São João	-	-	-		1	-
29020 - Salvador	**18**	**20**	**26**	**19**	**719**	**98**
Sao Sebastiao do Passé	-	1	-	-	-	-
Madre de Deus	17	-	-	-	1	2
Itaparica	-	-	-	-	1	1
San Francisco do Conde	-	-	-	-	3	3

Salvador	1	17	23	18	688	85
Vera Cruz	-	-	-	-	3	1
Candeias	-	1	2	-	4	-
Lauro de Freitas	-	-	1	1	11	4

a) Hospital admissions due to leptospirosis infection.

Health Region	Amebiasis (A06)		Shigellosis (A03)		Typhoid and Paratyphoid Fever (A01)	
	2008-2017	2018-2021	2008-2017	2018-2021	2008-2017	2018-2021
29004 - Camaçari	**5**	**0**	**1**	**1**	**3**	**0**
Simões Filho	3	-	-	-	-	-
Dias D'Ávila	-	-	-	-	-	-
Pojuca	-	-	-	-	-	-
Camaçari	1	-	1	1	2	-
Mata de São João	-	-	-	-	1	-
29020 - Salvador	**43**	**10**	**18**	**2**	**59**	**0**
Sao Sebastiao do Passé	-	-	-	-	-	-
Madre de Deus	-	-	-	-	-	-
Itaparica	-	-	1	-	1	-
San Francisco do Conde	-	-	-	-	-	-
Salvador	32	9	13	2	58	-
Vera Cruz	1	-	-	-	-	-
Candeias	-	1	-	-	-	-
Lauro de Freitas	2	-	1	-	-	-

b) Hospital admissions due to infection by protozoa (amoebiasis) and bacteria.

Health Region	Schistosomiasis (B65)		Hookworm (B76)		Other Helminthiases (B83)	
	2008-2017	2018-2021	2008-2017	2018-2021	2008-2017	2018-2021
29004 - Camaçari	**6**	**1**	**0**	**0**	**59**	**8**
Simões Filho	1	-	-	-	29	1
Dias D'Ávila	-	-	-	-	8	1
pojuca	-	-	-	-	1	-
Camaçari	4	-	-	-	10	5
Mata de São João	-	-	-	-	8	-
29020 - Salvador	**30**	**7**	**0**	**0**	**68**	**9**
Sao Sebastiao do Passé	-	1	-	-	1	1
Madre de Deus	-	-	-	-	-	-

Itaparica	-	-	-	-	1	-
San Francisco do Conde	-	-	-	-	1	-
Salvador	28	3	1	-	61	8
Vera Cruz	-	-	-	-	-	-
Candeias	-	-	-	-	-	-
Lauro de Freitas	1	3	-	-	4	1

c) Hospital admissions for cholera, diarrhea and infectious gastroenteritis.

Table 5. Distribution of hospital admissions for diarrhea and gastroenteritis of presumptive infectious origin in children (< 4 years of age), according to gender and color, in the Health Regions of Camaçari and Salvador (2008 to 2021), Bahia, Brazil.

Source: Prepared by the authors, based on information available from the Ministry of Health - SUS Hospital Information System (SIH/SUS).

Health Region	**White color**				**Black color**				**Color - Brown**			
	2008-2017		2018-2021		2008-2017		2018-2021		2008-2017		2018-2021	
	male	**female**	**male**	**female**	**male**	**female**	**male**	**female**	**male**	**female**	**male**	**female**
29004 - Camaçari	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**40**	**42**	**7**	**3**
Simões Filho	-	-	-	-	-	-	-	-	8	6	3	1
Dias D'Ávila	-	-	-	-	-	-	-	-	-	2	-	-
Pojuca	-	-	-	-	-	-	-	-	-	4	1	-
Camaçari	-	-	1	-	-	-	-	-	26	27	1	1
Mata de São João	-	-	-	-	-	-	-	-	3	1	1	-
29020 - Salvador	**8**	**7**	**1**	**3**	**19**	**19**	**12**	**6**	**95**	**94**	**62**	**49**
SS do Passé	-	-	-	-	-	-	-	-	3	2	-	1
Madre de Deus	-	-	-	-	-	-	-	-	7	2	2	-
Itaparica	-	-	-	-	-	-	-	-	-	-	3	-
Sao F. do Conde	-	-	-	-	-	-	-	-	-	-	1	-
Salvador	8	6	1	3	18	18	12	5	62	63	54	44
Vera Cruz	-	-	-	-	1	-	-	-	-	-	-	-
Candeias	-	-	-	-	-	1	-	1	12	14	2	1
Lauro de Freitas	-	1	-	-	-	-	-	-	1	4	-	3

a) Hospital admissions by sex and color (white, black, mixed race) (< 1 year of age).

Health Region	White color				Black color				Color - Brown			
	2008-2017		2018-2021		2008-2017		2018-2021		2008-2017		2018-2021	
	male	**female**	**male**	**female**	**male**	**female**	**male**	**female**	**male**	**female**	**male**	**female**
29004 - Camaçari	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**107**	**89**	**31**	**14**
Simões Filho	1	-	-	-	-	-	-	-	23	20	5	4
Dias D'Ávila	-	-	-	-	-	-	-	-	1	-	-	1
pojuca	-	-	-	-	-	-	-	-	3	1	-	-
Camaçari	-	-	-	1	-	-	-	-	67	53	13	4
Mata de São João	-	-	-	-	-	-	-	-	3	10	-	-
29020 - Salvador	**25**	**20**	**4**	**4**	**50**	**24**	**20**	**22**	**238**	**222**	**130**	**98**
SS do Passé	-	-	-	-	-	-	-	-	-	1	-	-
Madre de Deus	-	-	-	-	-	-	-	1	7	5	-	-
Itaparica	-	1	-	1	-	-	-	-	-	-	7	3
Sao F. do Conde	-	-	-	-	-	-	-	-	2	2	6	4
Salvador	24	19	4	3	45	18	20	21	127	130	110	82
Vera Cruz	-	-	-	-	-	1	-	-	-	-	-	3
Candeias	-	-	-	-	-	-	-	-	34	28	5	4
Lauro de Freitas	-	-	-	-	2	4	-	-	6	10	1	2

b) Hospital admissions by sex and color (white, black, mixed race) (1 to 4 years old).

Health Region	Color – SI (< 1 year old)				Color – SI (1 to 4 years old)				Color – Yellow (< 4 years old)			
	2008-2017		2018-2021		2008-2017		2018-2021		2008-2017		2018-2021	
	male	**female**	**male**	**female**	**male**	**female**	**male**	**female**	male	female	male	female
29004 - Camaçari	**57**	**42**	**9**	**5**	**112**	**110**	**8**	**8**	**0**	**0**	**0**	**1**
Simões Filho	28	20	4	4	54	48	2	6	-	-	-	-
Dias D'Ávila	19	16	1	-	33	45	1	-	-	-	-	1
pojuca	1	2	-	-	2	-	1	-	-	-	-	-
Camaçari	6	1	2	1	10	7	2	1	-	-	-	-
Mata de São João	2	3	1	-	8	6	1	1	-	-	-	-
29020 - Salvador	**377**	**304**	**56**	**34**	**821**	**677**	**94**	**79**	**3**	**4**	**2**	**1**
SS do Passé	6	8	1	-	23	22	9	9	-	-	-	-
Madre de Deus	-	-	-	-	-	1	-	-	-	-	-	-
Itaparica	3	5	-	-	21	23	1	-	-	-	-	-
Sao F. do Conde	1	1	-	-	1	2	-	-	-	-	-	-
Salvador	329	261	50	34	690	555	77	65	2	4	2	1
Vera Cruz	4	7	4	-	16	11	1	2	-	-	-	-
Candeias	4	6	-	-	14	10	1	1	1	-	-	-
Lauro de Freitas	25	15	1	-	44	34	5	2	-	-	-	-

c) Hospital admissions by sex and color (yellow and without information-SI) (<4 years of age).

Table 6. distribution of hospital admissions for diarrhea and gastroenteritis of presumptive infectious origin (A09) in children (< 4 years of age), according to gender and color, in the Health Regions of Camaçari and Salvador (2008 to 2021), Bahia, Brazil.

Source: Prepared by the authors, based on information available from the Ministry of Health - SUS Hospital Information System (SIH/SUS).

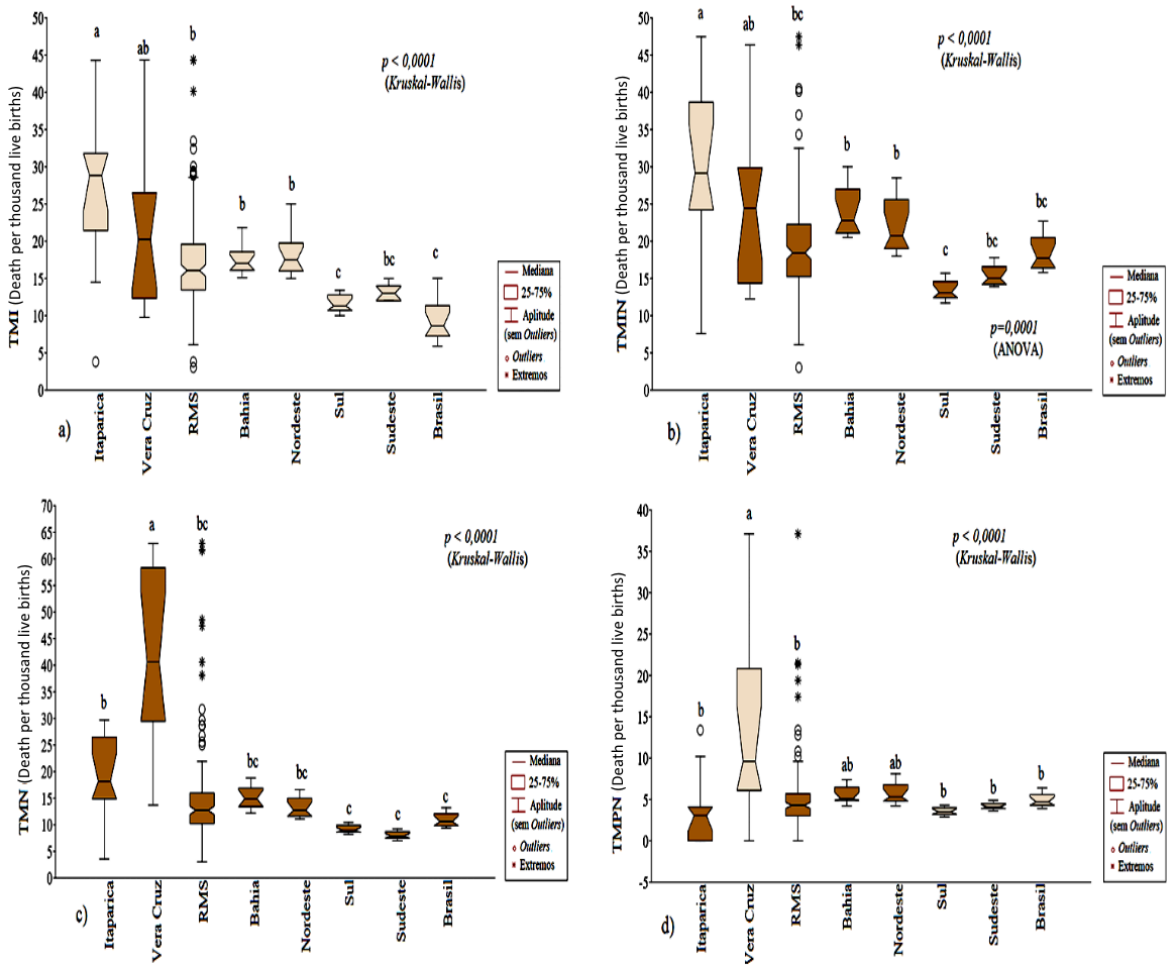

Figure 5. Box-plot diagram of the distribution of infant mortality rate and infant mortality rate values in the municipalities of the Metropolitan Region of Salvador, Bahia.

Source:Prepared by the authors from the National Household Sample Survey 2019.

Sample estimator	Itaparica	Vera Cruz	RMS	Bahia	North East	South	Southeast	Brazil
Size (N)	12	12	156	12	12	12	12	12
Minimum	3.80	9.77	3.03	15.10	15.00	10.00	12.00	13.00
Maximum	44.30	44.35	44.35	21.82	25.00	13.40	15.00	22.00
Average	27.02	21.12	17.48	17.52	18.25	11.56	13.08	16.08
Median	28.83	20.23	16.07	17.03	17.50	11.30	13.00	15.00
Standard deviation	10.73	10.29	6.54	1.93	3.08	1.11	1.16	2.84
Standard Error	3.10	2.97	0.52	0.56	0.89	0.34	0.34	0.82
Coefficient of variation (%)	39.70	48.73	37.41	11.01	16.87	9.64	8.90	17.68
Shapiro-Wilker (p-value)	0.72A	0.43 A	< 0.0001 B	0.47 A	0.04 B	0.63 A	0.021 B	0.052 A

It is read:[THE]Gaussian distribution; B non-Gaussian distribution.

a) IMR values between 2006 and 2017 (number of deaths < 1 year of age per live births).

Sample estimator	Itaparica	Vera Cruz	RMS	Bahia	North East	South	Southeast	Brazil
Size (N)	12	12	156	12	12	12	12	12
Minimum	3.56	13.70	3.03	12.20	11.10	8.20	7.00	9.40
Maximum	34.33	62.90	62.90	18.80	16.60	10.40	9.20	13.20
Average	20.55	39.99	16.15	15.17	13.24	9.15	7.99	10.93
Median	21.59	39.35	13.28	14.90	12.70	8.90	7.80	10.60
Standard deviation	9.34	16.97	10.20	2.12	1.91	0.75	0.66	1.30
Standard Error	2.70	4.90	0.82	0.64	0.57	0.23	0.20	0.39
Coefficient of variation (%)	45.46	42.42	63.18	14.00	14.40	8.22	8.27	11.92
Shapiro-Wilker (p-value)	0.72 A	0.43 A	< 0.0001 B	0.4855 A	0.18 A	0.43 A	0.77 A	0.36 A

It is read:*THE*Gaussian distribution; B non-Gaussian distribution.

b) MMR values between 2006 and 2017 (number of deaths from 0 to 27 days per live births).

Sample estimator	Itaparica	Vera Cruz	RMS	Bahia	North East	South	Southeast	Brazil
Size (N)	12	12	156	12	12	12	12	12
Minimum	0.00	0.00	0.00	4.20	4.20	2.90	3.60	3.90
Maximum	34.33	37.10	46.37	7.40	8.10	4.30	4.90	6.40
Average	6.02	13.91	7.51	5.59	5.69	3.61	4.17	4.95
median	3.23	13.02	4.81	5.10	5.30	3.50	4.10	4.70
Standard deviation	9.90	10.29	7.86	1.02	1.24	0.46	0.40	0.78
Standard Error	2.86	2.97	0.63	0.31	0.37	0.14	0.12	0.24
Coefficient of variation (%)	164.66	73.97	104.63	18.32	21.73	12.78	9.65	15.75
Shapiro-Wilker (p-value)	0.0003 B	0.35	< 0.0001 B	0.32 A	0.22 A	0.72 A	0.85 A	0.53 A

It is read:*THE*Gaussian distribution; B non-Gaussian distribution.

c) TMPN values from 2006 to 2017 (number of deaths from 28 to 364 days per live births).

Sample estimator	Itaparica	Vera Cruz	RMS	Bahia	North East	South	Southeast	Brazil
Size (N)	12	12	156	12	12	12	12	12
Minimum	7.60	12.24	3.03	20.50	18.00	11.70	13.90	15.80
Maximum	47.47	46.37	47.47	30.00	28.50	15.70	17.80	22.70
Average	29.11	24.08	19.51	23.94	21.99	13.43	15.44	18.47
median	29.15	24.41	18.45	22.80	20.70	13.10	15.00	17.70
Standard deviation	11.50	10.46	6.91	3.37	3.62	1.33	1.32	2.33

Standard Error	3.32	3.02	0.55	1.02	1.09	0.40	0.40	0.70
Coefficient of variation (%)	39.52	43.42	35.42	14.09	16.46	9.94	8.54	12.62
Shapiro-Wilker (p-value)	0.65 A	0.32 A	< 0.0001 B	0.10 A	0.17 A	0.60 A	0.32 A	0.29 A

It is read:[THE]Gaussian distribution; B non-Gaussian distribution.

d) MMR values between 2006 and 2017 (number of deaths between 0 and 5 years old per live births).

Table 7. Statistical summary of the variables infant mortality rate, neonatal mortality rate (NMR), post-neonatal mortality rate (TMPN) and infant mortality rate, according to data from urban and rural permanent private households studied made available by the National Survey by Household Sample 2019.

Source:Prepared by the authors from the National Household Sample Survey 2019.

Sample estimator	**Metropolitan Region of Salvador**	**Latin America and the Caribbean**	**Sub-Saharan Africa**	**south asia**	**North America**	**Western Europe**	**Australia and New Zealand**
Size (N)	156	12	12	12	12	12	12
Minimum	3.03	17.28	80.58	44.22	6.52	3.90	4.40
Maximum	47.47	**55.00**	119.17	73.63	7.71	5.05	6.04
Average	19.51	20.84	97.48	58.23	7.05	4.37	6.00
median	18.45	20.18	95.78	57.78	7.00	4.29	5.21
Standard deviation	6.91	2.73	12.62	9.70	0.41	0.39	0.56
Standard Error	0.55	0.79	3.64	2.80	0.12	0.11	0.16
Coefficient of variation (%)	35.42	13.12	12.95	16.66	5.75	8.88	10.65
Shapiro-Wilker (p value)	< 0.0001 B	0.23 A	0.73 A	0.83 A	0.55 B	0.39 A	0.87 A

It is read:[THE]Gaussian distribution; B non-Gaussian distribution.

Table 8. Statistical summary of infant mortality rate (IMR) deaths per thousand live births) for Latin America and the Caribbean, Sub-Saharan Africa, North America, Europe and Australia and New Zealand and South Asia (2006 to 2017), according to data from UNICEF (2018).

Source:Prepared by the authors, from the information available by UNICEF (2018).

(SUS). In addition, TMIN depends on access to public services of education, health, sanitation, ordinary cultural practices, income, education and hygienic-sanitary of the mother (OLIVEIRA, 2017). In addition, the social determinants of TMIN embrace, more broadly, the father, family members and the network of affection, solidarity and the child's social relationships.

In this perspective, it is reiterated that sanitary sewage failures threaten the social uses of nature and the health of the population of the municipalities of the RMS, being distributed asymmetrically on the intra-metropolitan scale. Thus, Teixeira and Pungirum (2005), Buhler et al. (2014) and Batista et al. (2021b) point out the relevance of the relationship between sanitation and environment in the study of the population's health problems, such as waterborne diseases. Cappi et al. (2011) and Mendonça et al. (2017) highlighted that access to drinking water reduces the prevalence and severity of waterborne diseases and monitoring the quality of water sources helps in health promotion.

Moraes et al. (2012) emphasize that the understanding of sanitation assumes different contents in each culture, because the relationship between society and nature and in each social class, is associated with the material conditions of existence and the level of information and knowledge. In addition, they pointed out that the relationship between society and nature is dynamic in terms of history, for this reason, concerns in the field of sanitation began, over time, to contemplate health and socio-environmental issues.

With this issue, in the plan of history, the paradigm of collective health emerged and the perspectives of environmental sanitation and the fundamental rights to drinking water, basic and environmental sanitation and health, based on the principles of human dignity and the environmental and sociocultural existential minimum. In this horizon of meanings, the notion of environmental healthiness gained notoriety, as explained and presented from this critical perspective by Moraes et al. (2012).

> Ensuring environmental health, essential for health security and improving the quality of life, is a right and duty of all human beings and an obligation of the State, ensured by public and social policies, financial priorities, appropriate technologies and managerial efficiency that enable access universal and egalitarian to the benefits of environmental sanitation. And environmental health can be understood as the state of environmental quality capable of preventing the occurrence of diseases related to the environment and promoting ecological conditions favorable to the full enjoyment of the health and well-being of the population (Moraes et al., 2012: p.48).

This way, it is assumed that the life and dignity of children and of any person are inviolable civilizing values and fundamental rights, which must be protected indiscriminately anywhere on the planet. In order to do so, social subjects who recognize themselves and form a territory need, in the struggle for the social reappropriation of nature, at the level of history, based on the political ecology perspective of socio-environmental justice by Martinez-Alier (2007), to build a social development from the ethical project that aims at sustainable, dignified, sufficient and fair economic and social conditions.

FINAL CONSIDERATIONS

The interpretation of indicators of social health conditions and of sanitation revealed that the child population (< 5 years old) of Itaparica and Vera Cruz, in the Metropolitan Region of Salvador (RMS), was the most vulnerable to sanitation failures, especially sanitary sewage,

because they degrade the environment and threaten human health and environmental. In addition, it was noted that the children who most demanded hospitalizations for diarrhea, intestinal gastroenteritis and other intestinal infectious diseases were the ones thatself-declared brown or black, regardless of sex.

The highest median values of social health indicators (TMN, TMPN, TMI and TMIN) were obtained in the municipalities of Itaparica and Vera Cruz when comparing the municipalities of the RMS. Furthermore, it was noted that the distribution of medians of social health indicators in the RMS were similar to the profiles of the Northeast Region of Brazil and Latin America and the Caribbean, but differed from the profiles of these indicators obtained in the South and Southeast Regions of Brazil, South America Northern, Western Europe and Australia and New Zealand.

In this sense, the socio-environmental emergency of sanitation failures demanded public policies that reside in the improvement of sanitation, in the reduction of hospitalizations for diarrhea and avoidable deaths of children in the RMS. Therefore, it is understood the relevance of the realization of social rights, fundamental rights and the inviolability of the existential environmental minimum and human dignity for the material, symbolic and social reproduction of the life of the social groups that reside and imprint their cosmovisions and territorial identities to the territories that emerge from social relations, knowledge and power in the Metropolitan Region of Salvador, in Brazil, in Latin America and in the world.

THANKS

We are grateful for the contribution of researchers from the Geochemistry of Interfaces groups, from the Federal University of Bahia (UFBA) and Development, Society and Nature, from the Catholic University of Salvador (UCSAL).

REFERENCES

ÁLVARES, M. L. P. MORAIES, l. R. S.; SANTOS, E. P.; PINHO, J. A. G.; SANTOS, F. P.; COSTA, N. C. A. Qualidade das águas dos rios de Salvador. **Revista Vera Cidade**, v. 6, p.1-12, 2010.

ALVES, H. M. A.; ALMEIDA, A. R.; MONTEIRO, T. M. S.; SANT'ANNA, J. C.; MOREIRA, U. A.; MARTINS, D. de S.; GARCIA. R. J. L.; LIMA, C. do E.; CONCEIÇÃO, E. K. dos S. Avaliação da Qualidade das Águas das Principais Fontes Públicas de Salvador (BA). **Interfaces Científicas-Saúde e Ambiente**, v. 5, n. 1, p. 65-80, 2016. https://doi.org/10.17564/2316-3798.2016v5n1p65-80

ALVES, L. DA S.; MARTINS, L. A.; DE JESUS, L. B. Avaliação da qualidade da água na bacia do rio Camarajipe (Salvador–Brasil): diagnóstico dos parâmetros físico-químicos, microbiológicos e determinação do IQA. **Revista Brasileira de Meio Ambiente**, v. 6, p. 71-80, 2019. https://doi.org/10.5281/zenodo.3312009

AYACH, L. R.; DE LIMA GUIMARÃES, S. T.; CAPPI, N.; AYACH, C. Saúde, saneamento e percepção de riscos ambientais urbanos. **Caderno de Geografia**, v. 22, n. 37, p. 47-64, 2012.

BATISTA, F. S.; JUNIOR, A. B. D. S. R.; CRUZ, M. J. M.; SANTOS, R. A. CONDIÇÕES DE SANEAMENTO E QUALIDADE DAS ÁGUAS SUBTERRÂNEAS DE MUNICÍPIOS DO OESTE DA BAHIA (BR). **Geoingá: Revista do Programa de Pós-Graduação em Geografia (PGE/UEM)**, v. 13, n. 1, p. 202-224, 2021a. https://doi.org/10.4025/geoinga.v13i1.56385

BATISTA, F. S., CRUZ, M. J. M.; GONÇALVES, M. V.P.; RAMOS JUNIOR, A. B. D. S.; SANTOS, R. A.; PORCIÚNCULA, D. C. L.; ALENCAR, C. M. A.; ANDRADE, J.J. S.; RODRIGUES, A. Condições sociais de saúde, saneamento e qualidade da água subterrânea de municípios do Oeste da Bahia (BR). *In*: SALES, F. O. (Org.). **Conhecimentos pedagógicos e conteúdos disciplinares das ciências exatas e da terra**. Ponta Grossa - PR: Atena, 2021b. https://doi.org/10.22533/at.ed.2422131088

BEZERRA FILHO, J. G.; KERR, L. R. F. S.; MINÁ, D. D. L.; BARRETO, M. L. Distribuição espacial da taxa de mortalidade infantil e principais determinantes no Ceará, Brasil, no período 2000-2002. **Cadernos de Saúde Pública**, v. 23, p. 1173- 1185, 2007. https://doi.org/10.1590/S0102-311X2007000500019

BOBBIO, N. **A era dos direitos**. Trad. de Carlos Nelson Coutinho Rio de Janeiro: Campus, 1992.

BÜHLER, Helena Ferraz et al. Análise espacial de indicadores integrados determinantes da mortalidade por diarreia aguda em crianças menores de 1 ano em regiões geográficas. **Ciência & Saúde Coletiva**, v. 19, p. 4131-4140, 2014. https://doi.org/10.1590/1413-812320141910.09282014

BUSS, P. M.; PELLEGRINI FILHO, A. A saúde e seus determinantes sociais. **Physis: revista de saúde coletiva**, v. 17, n. 1, p. 77-93, 2007. https://doi.org/10.1590/S0103-73312007000100006

CAPPI, N.; AYACH, L. R.; DOS SANTOS, T. M. B.; DE LIMA GUIMARÃES, S. T. Qualidade da água e fatores de contaminação de poços rasos na área urbana de Anastácio (MS). **Geografia Ensino & Pesquisa**, v. 16, n. 3, p. 77-92, 2012. https://doi.org/10.1590/S0103-73312007000100006

CARCARÁ, M. S M.; SILVA, E. A.; MOITA, J. M. Saneamento básico como dignidade humana: entre o mínimo existencial e a reserva do possível. **Engenharia Sanitaria e Ambiental**, v. 24, n.3, p. 493-500, 2019. https://doi.org/10.1590/S1413-41522019183905

CARVALHO, M. S.; CRUZ, M.J.M. **Qualidade da água da fonte da Bica de Itaparica, Bahia, NE do Brasil**. **PLURAIS-Revista Multidisciplinar**, n1, n.1, p.178-200, 2010. https://doi.org/10.29378/plurais.2447-9373.2010.v1.n1.%p

CASTRO, J. E.; HELLER, L.; MORAIS, M. P. **O direito à água como política pública na América Latina**. Brasília: Ipea, 2015.

DE CARVALHO, S. A.; ADOLFO, L. G.S. O direito fundamental ao saneamento básico como garantia do mínimo existencial social e ambiental. **Revista Brasileira de Direito**, v. 8, n. 2, p. 6-37, 2012. https://doi.org/10.18256/2238-0604/revistadedireito.v8n2p6-37

ESCOBAR, A. L.; COIMBRA, C. E.; WELCH, J. R.; HORTA, B. L.; SANTOS, R. V.; CARDOSO, A. M. Diarrhea and health inequity among Indigenous children in Brazil: results from the First National Survey of Indigenous People's Health and Nutrition. **BMC public health**, v. 15, n. 1, p. 1-11, 2015. https://doi.org/10.1186/s12889-015-1534-7

FACHIN, Z.; DA SILVA, Z. M. **Acesso à água potável**: direito fundamental de sexta dimensão. São Paulo: Millennium, 2012.

GONÇALVES, M. V. P.; SANTOS, R. A.; CRUZ, M. J. M.; PORCIÚNCULA, D. C. L. Condições Sociais de Saúde, Saneamento e Qualidade das Águas Subterrâneas de Itaparica e Vera Cruz, Região Metropolitana de Salvador, Bahia (BR). **Geoingá: Revista do Programa de Pós-Graduação em Geografia (PGE/UEM)**, v. 13, n. 1, p. 121-145, 2021. https://doi.org/10.4025/geoinga.v13i1.56389

HESPANHOL, I. Água e saneamento básico. *In*: REBOUÇAS, A. C.; BRAGA, B.; TUNDISI, J. G. (Orgs.). Águas doces no Brasil: capital ecológico, uso e conservação. 3. ed. São Paulo: Escrituras, 2006. p. 269-323.

IBGE - Instituto Brasileiro de Geografia e Estatística (2010). Dados do Censo demográfico. **Diário Oficial da União** de 24/11/2010, Brasília.

IBGE - Instituto Brasileiro de Geografia e Estatística (2019). **Cidades e Estados do Brasil**. Disponível em: https:// idades.ibge.gov.br/brasil/ba/Salvador/BA/panorama. Acessado em: 22 agosto de 2019.

IBGE - Instituto Brasileiro de Geografia e Estatística (2022). **Cidades e Estados do Brasil**. Disponível em: https:// idades.ibge.gov.br/brasil/ba/Salvador/BA/panorama. Acessado em: 05 setembro de 2022.

KUIAVA, V. A.; PERIN, A. T.; CHIELLE, E. O. Hospitalização e taxas de mortalidade por diarreia no Brasil: 2000-2015. **Ciência & Saúde**, v. 12, n. 2, p. e30022-e30022, 2019. https://doi.org/10.15448/1983-652X.2019.2.30022

LEAL, M.C.H.; ALVES, F.R.S. Razoabilidade e teoria da reserva do possível como fundamentos para o controle jurisdicional de políticas públicas: uma análise a partir da teoria do discurso. Espaço Jurídico Journal of Law, Joaçaba, v. 17, n. 2, p. 587-606, 2016. http://doi.org/10.18593/ejjl.v17i2.9255

MAGALHÃES, M. de L.; CORTEZ-ESCALANTE, J.; CANNON, L. R. C.; COIMBRA, T. S.; PADILLA, H. Desafios da mortalidade infantil e na infância. *In*: **Relatório 30 anos de SUS, que SUS para 2030?**, 2018. p. 75 -101.

MARTÍNEZ-ALIER, J. **O Ecologismo dos pobres**: conflitos ambientais e linguagens de valoração. São Paulo: Contexto, 2007.

MENDONÇA, M. H. M.; ROSENO, S. A. M.; CACHOEIRA, T. R. L.; SILVA, Á. F. S.; JÁCOME, P. R. L. D. A.; JÁCOME, A. T. Análise bacteriológica da água de consumo comercializada por caminhões-pipa. **Revista Ambiente & Água**, v. 12, p. 468-475, 2017. https://doi.org/10.4136/ambi-agua.1934

MORAES, D. S. L.; JORDÃO, B. Q. Degradação de recursos hídricos e seus efeitos sobre a saúde humana. **Revista de Saúde Pública**, São Paulo, n. 36, v.3, p. 370-374, 2002. https://doi.org/10.1590/S0034-89102002000300018

MORAES, D. S. L.; ÁLVARES, M. L. P.; SANTOS, F. P. S.; COSTA, N. C. A. Saneamento e qualidade das águas dos rios em Salvador, 2007-2009. **Revista Interdisciplinar de Gestão Social**, v. 1, n. 1, p.47-60, 2012. https://doi.org/10.9771/23172428rigs.v1i1.12067

NASCIMENTO, D. S. **Fatores Socioambientais Associados a Doença Diarreica em Crianças**. Dissertação (Mestrado Profissional em Planejamento Ambiental), Universidade Católica do Salvador, Salvador, 2019.

NASCIMENTO, S. A. de M. **Diagnóstico hidrogeológico, hidroquímico e da qualidade da água do aqüífero freático do alto cristalino de Salvador - Bahia**. 2008. 195 f. Tese (Doutorado em Geologia), Universidade Federal da Bahia, Salvador, 2008.

OLIVEIRA, S. Meio ambiente, saneamento e saúde: alguns indicadores. In: ZHOURI, A. ZHOURI, Andréa; LASCHEFSKI, Klemens (Orgs.). **Desenvolvimento e conflitos ambientais.** Belo Horizonte: Editora UFMG, 2017. p. 329-350.

OPS – ORGANIZACIÓN PANAMERICANA DE LA SALUD. **Agua y saneamiento**: evidencias para políticas públicas con enfoque en derechos humanos y resultados en salud pública. Washington: OPS, 2011.

PAIVA, R. F. D. P. D. S.; SOUZA, M. F. D. P. D. Associação entre condições socioeconômicas, sanitárias e de atenção básica e a morbidade hospitalar por doenças de veiculação hídrica no Brasil. **Cadernos de Saúde Pública**, n.34, v. 1, p. e00017316, 2018. https://doi.org/10.1590/0102-311X00017316

PEÇANHA, M. P.; FREITAS, N.; LOURENÇO, R.; DONALISIO, M.; CORDEIRO, R Saúde e meio ambiente. ROSA, A.H.; FRACETO, L.F.; MOSCHINI-CARLOS, V. **Meio ambiente e sustentabilidade. Porto Alegre: Bookman**, p. 155-176, 2012.

PEREIRA, E. R. S. **Caracterização Hidrogeoquímica da Ilha de Itaparica, Bahia**. Dissertação (Mestrado em Geologia), Universidade Federal da Bahia, Salvador, Brasil, 2009.

PES, J. H. F. Direito fundamental de acesso à água e o mínimo existencial ambiental. **Revista de Direito da C**idade, v. 11, n. 4, p. 275-301, 2019. https://doi.org/10.12957/rdc.2019.40604

PORCIUNCULA, D. C. L. **Tensões territoriais no uso da água em Dias d'Ávila – Bahia**. Dissertação (Mestrado), Universidade Católica do Salvador, Salvador, 2011.

PORCIUNCULA, D. C. L. **O fenômeno das águas doces na Região Metropolitana de Salvador**: usos, alterações e abandono. 2017. 565 f. Tese (Doutorado), Universidade Católica do Salvador, Salvador, 2017.

PORCIUNCULA, D. C. L.; ALENCAR, C.M.M. Tensões territoriais no uso das águas na Região Metropolitana de Salvador (RMS), Bahia. **Revista Política e Planejamento Regional**, v. 6, n. 2, p.150-149, 2019.

PORCIUNCULA, D. C. L.; GONÇALVES, M. V. P.; ALENCAR, C.M.M. Indicador qualitativo de tensões no uso das águas em identidades territoriais de vida rural e urbana: evidências empíricas na Região Metropolitana de Salvador, Bahia (Brasil). **Desenvolvimento e Meio Ambiente**, v. 58, p.105-125, 2021. http://dx.doi.org/10.5380/dma.v58i0.69907

PORTO, M. F. Saúde do trabalhador e o desafio ambiental: contribuições do enfoque ecossocial, da ecologia política e do movimento pela justiça ambiental. **Ciência & Saúde Coletiva**, v. 10, p. 829-839, 2005. https://doi.org/10.1590/S1413-81232005000400008

PORTO, M. F.; MARTINEZ-ALIER, J. Ecologia política, economia ecológica e saúde coletiva: interfaces para a sustentabilidade do desenvolvimento e para a promoção da saúde. **Cadernos de Saúde Pública**, v. 23, p. S503-S512, 2007. https://doi.org/10.1590/S0102-311X2007001600011

SACHS, I. **Caminhos para o desenvolvimento sustentável**. Coleção Idéias Sustentáveis. Organizadora: Paula Yone Stroh. Rio de Janeiro: Garamond, 2000.

SAQUET, M. A. As diferentes abordagens do território e a apreensão do movimento e da (i) materialidade. **Geosul**, v,22, n.43, p.55-76, 2007.

SARLET, I. W. M. **A eficácia dos direitos fundamentais**. 10 ed. Porto Alegre: Livraria do Advogado, 2010.

SARLET, I.W.; FENSTERSEIFER, T. Direito à saúde e proteção do ambiente na perspectiva de uma tutela jurídico-constitucional integrada dos direitos fundamentais socioambientais (DESCA). **Boletim do Instituto de Saúde**, v. 12, n. 3, p. 248-253, 2010. https://doi.org/10.52753/bis.2010.v12.33760

SILVA, A. C. M.; CRUZ, M. J. M.; AZEVEDO, I. H.S.; MILAZZO, A. D. D. Investigation of geochemical quality of water from public fountains of Salvador. **Águas Subterrâneas**, v. 34, n. 1, 2020. https://doi.org/10.14295/ras.v34i1.29877

SILVA, A. C. M.; AZEVEDO, I. H.S.; GONÇALVES, M. V. P.; CRUZ, M. J. M. Variabilidade sazonal da qualidade de água em Lagoas urbanas no Nordeste do Brasil. **Geociências**, v. 40, n. 1, p. 207-220, 2021. https://doi.org/10.5016/geociencias.v40i1.14865

SILVA, S. B. de M.; SILVA, B. N.; SILVA, M. P. A Região Metropolitana de Salvador na rede urbana brasileira e sua configuração interna. **Como anda Salvador: transformações na ordem urbana. Rio de Janeiro: Letra Capital: Observatório das Metrópoles**, 2014.

SOUZA, J. L.; SILVA, I. R. Avaliação da qualidade ambiental das praias da ilha de Itaparica, Baía de Todos os Santos, Bahia. **Sociedade & Natureza**, n.27, v.3, p. 469-483, 2015. http://dx.doi.org/10.1590/1982-451320150308

TEIXEIRA, J.C.; PUNGIRUM, M.E.M.D.C. Análise da associação entre saneamento e saúde nos países da América Latina e do Caribe, empregando dados secundários do banco de dados da Organização Pan-Americana de Saúde-OPAS. **Revista Brasileira de Epidemiologia**, v. 8, p. 365-376, 2005. https://doi.org/10.1590/S1415-790X2005000400005

UNICEF - United Nations Children's Fund. **Estimation, Levels & Trends in Child Mortality**: Levels and trends in child mortality - Report 2018. New York: UNICEF, 2018. Acesso em: 01.07.2021. Disponível em: file:///C:/Users/Vitor/Desktop/UN-IGME-Child-Mortality-Report-2018.pdf

VETTER, D. M.; SIMÕES, C. C. da S. Acesso à infra-estrutura de saneamento básico e mortalidade. **Revista Brasileira de Estatística, Rio de Janeiro**, v. 42, n. 165, p. 17-35, 1981.

WERNECK, G. L.; STRUCHINER, C. J. Estudos de agregados de doença no espaço - tempo: conceitos, técnicas e desafios. **Cadernos de Saúde Pública**, v. 13, p. 611-624, 1997. https://doi.org/10.1590/S0102-311X1997000400005