DOI: 10.1590/1413-81232018236.04702018

Environmental health risk reduction in Brazil: conquests, limits and obstacles

Carlos Machado de Freitas [1]
Vânia Rocha [1]
Eliane Lima e Silva [2]
Taís de Moura Ariza Alpino [1]
Mariano Andrade da Silva [1]
Maíra Lopes Mazoto [1]

Abstract *The 1988 Constitution represents an important achievement in terms of rights and an important pact sealed around a long-term strategy for the nation's future based on a social development model oriented towards reducing the risk of disease and injuries and an ecologically balanced environment. These achievements manifested themselves in policies, institutionalization and the creation of spaces for public participation. The article outlines the main achievements, limits and obstacles that have affected the environmental and health agendas in the last 30 years since the creation of the Unified Health System . The achievements are framed within the broadening of political space for public participation and the institutionalization of the theme of environmental risks within the SUS, while the limits are framed in the relationship between development and trends of environmental risk at global/regional, local and community scale. Finally, obstacles are outlined showing that the parliamentary coup of 2016 not only accentuated existing limits, but also represents a giant represent a giant step backward in various areas related to environmental health.*

Key words *Environmental health, Environmental risk reduction, Health risk reduction, Sustainable development, Unified Health System*

[1] Centro de Estudos e Pesquisas em Emergências e Desastres em Saúde, Escola Nacional de Saúde Pública, Fiocruz. Av. Brasil 4036/916, Manguinhos. 21040-361 Rio de Janeiro RJ Brasil. carlosmf@ensp.fiocruz.br
[2] Laboratório de Geografia, Ambiente e Saúde, Departamento de Geografia, Universidade de Brasília. Brasília DF Brasil.

Introduction

The promulgation of the 1988 Constitution represented an important pact sealed around a long-term strategy for the nation's future based on an underlying commitment to support citizenship and respect human dignity, providing the foundations of a democratic state founded on the rule of law (Article 1). Its fundamental objectives comprise a *fair* and *solidary* society, in which safeguarding *national development* go hand in hand with the *eradication of poverty and reduction of social and regional inequalities*, aimed at *promoting the well-being of all people* (Article 3)[1].

From this perspective, this article focuses on the *right to health* (Article 196) and *to an ecologically balanced environment considered essential to a healthy quality of life* (Article 225), which, coupled with these commitments, provide the foundations of our democracy. The first encompasses a suite of social rights (including the right to *food, work, housing, transport* and *assistance for vulnerable and disadvantaged groups*) and forms the bedrock of the Unified Health System (*Sistema Único de Saúde* - SUS), which envisions universal and equal access to health actions and services aimed at health promotion, protection and recovery and provides that the primary objective of social and economic policies should be to reduce the risk of disease and other health problems. In the second, the environment is classified as a common asset that should be preserved for present and future generations[1]. Both are directly related to the dimensions of social protection and environmental sustainability, which underpin the processes that shape the social and environmental determinants of health.

Achieving these rights represented a major step forward that should have laid the foundations for a constitutional pact grounded in a socioeconomic development model oriented towards reducing the risk of disease and other health problems and maintaining an ecologically balanced environment to ensure the well-being and quality of life of present and future generations.

However, while our Constitution is a mirror reflecting a history of hopes and social struggles, we should also consider that ... *constitutions written during turning points in history (and they almost always are) embody and express moral feelings, political projects and ambitions of justice, but also express relations of power. Many of the constituents of the time remind us of the magnitude of the projects and democratic political ambitions which at the time failed to defeat the archaic authoritarian forces present at the heart of the Constituent Assembly*[2]. Although the more conservative political forces and representatives of the economic elite held the majority in the Constituent Assembly, with leftist parties holding less than 9% of the seats, coalitions made up of NGOs, social movements and parliament members were successful in mobilizing different actors to generate support for parliamentary caucuses such as the health and green caucuses, thereby inscribing the rights to health and an ecologically balanced environment among the provisions of the Constitution[3,4].

These achievements have been marred by limits to structural changes in the economic and political spheres, which have had direct consequences for the processes that shape the social and environmental determinants of health. Brazil's transition to democracy also marked the end of a phase in the country's socioeconomic development that began in the 1930s with a fierce debate being waged as to whether to reformulate the traditional developmentalist approach or adopt the neoliberal model of development associated with globalization[5].

The capitalist logic of the market, private property and capital accumulation has made the economic dimension increasingly insular in relation to the other dimensions of society. This insulation has marked the uncertainties, disputes and conflicts surrounding the socioeconomic development model that have arisen in the past 30 years since the creation of our Constitution and the SUS, constituting what Bercovici[6] terms "*estado de exceção econômico*" (state founded on economic exclusion) and presenting a major obstacle to achieving the full realization of the rights enshrined in the 1988 Constitution[5,6]. The result is unequal and heterogeneous development, where overlapping positive and negative impacts are combined across a broad spectrum of old and new environmental health risks.

The article outlines the main achievements, limits and obstacles that have affected the environmental and health agendas in the last 30 years since the creation of SUS. The achievements are framed within the broadening of political space for public participation and the institutionalization of the theme of environmental risks within the SUS, while the limits and obstacles are framed in the relationship between development and trends of environmental risk.

Ciência & Saúde Coletiva, 23(6):1981-1996, 2018

National conferences and institucionalization within the SUS

Important achievements in the last 30 years have been the broadening of political space for public participation in governance through national conferences addressing themes related to determinants of health and the institutionalization of structures and actions related to environmental risks in the SUS.

National conferences as a sounding board for social and environmental rights

Stemming from the democratization process, the first national conference was held in 1941. Ever since, these conferences have constituted important arenas of public participation, promoting engagement and dialogue between civil society and all levels government with a view to building a common agenda[7,8]. A total of 146 national conferences were held between 1941 and 2017, 95% of which (n = 139) stemmed from the democratization process.

The breadth and depth of public participation has increased since 1986, with national conferences helping to get social issues and public demands onto the government's agenda, wherein public health played an important role. Chart 1 shows that during the Sarney and Collor administrations all national conferences were about health. In 1986, three conferences addressing public health themes were held in addition to the 8th National Health Conference, promoting the mobilization of civil society organizations and the discussion of many of the issues central to promoting equality (workers' and women's health and the health of indigenous peoples). In 19 (79%) of the 24 national conferences held up to the end of the second Cardoso administration, public health issues were the major theme.

Chart 1. National Conferences by administration between 1986 and 2017.

Administration	Year	Conference
Sarney Administration (1985-1990)	1986	1st Work Management and Health Education 8th Health 1st Oral Health 1st Women's Health 1st Workers' Health 1st Health of Indigenous Peoples
	1987	1st Mental Health
Collor Administration (1990 a 1992)	1992	9th Health 2nd Mental Health
Franco Administration (1992-1994)	1993	2nd Oral Health 2nd Health of indigenous peoples
	1994	1st Conference on Science, Technology and Innovation 1st Conference on Science, Technology and Innovation in Health 2nd Work Management and Health Education 2nd Workers' Health 1st Food and Nutrition Security
Cardoso Administration (1995-1998)	1995	1st Social Assistance
	1996	10th Health
	1997	2nd Social Assistance
Cardoso Administration (1999-2002)	2000	1st Health
	2001	3rd Social Assistance 3rd Health of indigenous peoples 3rd Mental Health 1st Health Surveillance

it continues

Chart 1. National Conferences by administration between 1986 and 2017.

Administration	Year	Conference
Lula Administration (2003-2006)	2003	1st Aquaculture and Fishing 4th Social Assistance 1st Cities 5th Children's and Adolescents' Rights 8th Human Rights 1st Children & Youth on the Environment 1stMedications and Pharmaceutical Assistance 1st Environment 12th Health
	2004	1st Local Productive Arrangements 2nd Conference on Science, Technology and Innovation 2nd Conference on Science, Technology and Innovation in Health 9th Human Rights 1st Sports 1st Women's Policy 3rd Oral Health 2nd Food and Nutrition Security
	2005	2nd Aquaculture and Fishing 2nd Local Productive Arrangements 5th Social Assistance 2nd Cities 3rd Conference on Science, Technology and Innovation 3rd Conference on Science, Technology and Innovation in Health 1st Culture 6th Children's and Adolescents' Rights 2nd Environment 1st Promotion of Racial Equality 3rd Workers' Health
	2006	1st Disability Rights 1st Rights of Older Persons 10th Human Rights 1st Solidarity Economy 1st Professional and Technological Education 2nd Sports 3rd Work Management and Health Education 2nd Children & Youth on the Environment 1st Indigenous Peoples 4th Health of Indigenous Peoples

it continues

Figure 1 and Chart 1 shows that the prominent role played by public health in the process of democratization and citizenship extended beyond the SUS, acting as a sounding board for public demands and promoting the inclusion of the government's constitutional commitment to uphold the right to health and an ecologically balanced environment on the political agenda.

National conference themes strayed from health for the first time in the Franco administration, with the 1st Conference on Science, Technology and Innovation held in 1994 (which in the following year focused on health) and the 1st Conference on Food and Nutrition Security. It is worth highlighting that the latter was the first national conference to address social rights

Ciência & Saúde Coletiva, 23(6):1981-1996, 2018

Chart 1. National Conferences by administration between 1986 and 2017.

Administration	Year	Conference
Lula Administration (2007-2010)	2007	3rd Local Productive Arrangements 6th Social Assistance 3rd Cities 7th Children's and Adolescents' Rights 2nd Women's Policy 13rd Health 3rd Food and Nutrition Security
	2008	1st Professional Learning 1st Brazilian Communities Abroad 1st Sustainable Rural Development 2nd Disability Rights 11st Human Rights 1st Basic Education 3rd Environment 1st Youth Policies 1st Lesbian, Gay, Bisexual, and Transgender Policies and Human Rights
	2009	3rd Aquaculture and Fishing 4th Local Productive Arrangements 7th Social Assistance 1st Communication 2nd Brazilian Communities Abroad 8th Children's and Adolescents' Rights 2nd Rights of Older Persons 1st Indigenous Peoples' School Education 3rd Children & Youth on the Environment 2nd Promotion of Racial Equality 1st Human Resources and Federal Administration 1st Environmental Health 1st Public Security
	2010	4th Cities 4th Conference on Science, Technology and Innovation 4th Conference on Science, Technology and Innovation in Health 3rd Brazilian Communities Abroad 2nd Culture 1st Civil Defense and Humanitarian Aid 2nd Solidarity Economy 1st Education 4th Mental Health

it continues

without any direct link to public health, albeit with the active participation of actors from this field. The conference was preceded by the publication of the "Map of the Hunger", which highlighted that 32 million people were living below the poverty line in Brazil, and the creation of the program "Citizen Action Against Hunger, Misery and for Life".

During the Cardoso administrations, five of the eight conferences addressed health and three social assistance, two of which were held in the first administration and were strongly influenced by the Map of Hunger and abovementioned program, leading to the creation of the Community Solidarity Program in early 1995, the year in which the first social assistance conference was

Chart 1. National Conferences by administration between 1986 and 2017.

Administration	Year	Conference
Rousseff Administration (2011-2014)	2011	5th Local Productive Arrangements 8th Social Assistance 3rd Rights of Older Persons 3rd Women's Policy 2nd Youth Policies 2nd Lesbian, Gay, Bisexual, and Transgender Policies and Human Rights 14th Health 4th Food and Nutrition Security
	2012	9th Children's and Adolescents' Rights 1st Decent Employment and Education 1st Transparency and Social Control
	2013	4th Aquaculture and Fishing 6th Local Productive Arrangements 9th Social Assistance 1st Technical Assistance and Rural Extension 5th Cities 4th Brazilian Communities Abroad 3rd Culture 1st Regional Development 2nd Sustainable Rural Development 4th Children & Youth on the Environment 4th Environment 3rd Promotion of Racial Equality 5th Health of indigenous peoples
	2014	2nd Civil Defense and Humanitarian Aid 2nd Education 1st Migrations and Refuge
Rousseff Administration (2015-2016)	2015	7th Local Productive Arrangements 10th Social Assistance 3rd Youth Policies 15th Health 4th Male and Female Workers' Health 5th Food and Nutrition Security
	2016	4th Women's Policy 3rd Lesbian, Gay, Bisexual, and Transgender Policies and Human Rights
Temer Administration (2016-2017)	2017	8th Local Productive Arrangements 11st Social Assistance 1st Health Communication 2nd Women's Health

Source: Authors' Elaboration.

held. Only seven years after the creation of the Constitution and the wide-scale public debate on the right to health made possible by numerous national conferences, the right to a dignified livelihood in situations of extreme poverty was now discussed with the participation of the wider population.

In 2003, the Lula administration widened the rules of procedure for convening conferences, hitherto restricted to presidential decrees, to include ministerial and inter-ministerial orders, and council resolutions, also broadening their scope to include sectoral, open-access and virtual conferences[9].

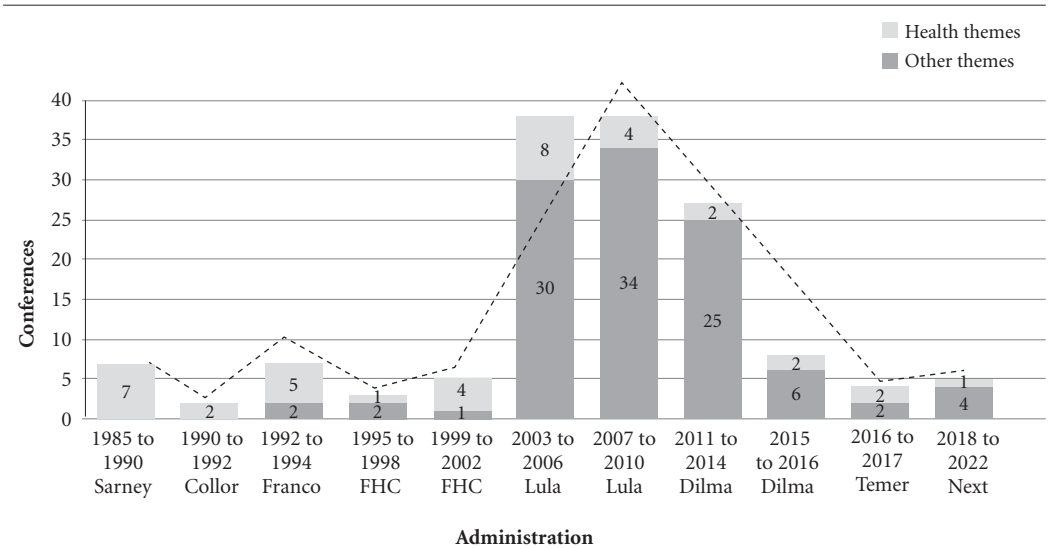

Figure 1. Number of national conferences by administration since 1985.

These changes led to the following key outcomes: first, the number of national conferences increased. As Figure 1 shows, 74% (n=103) of the 139 national conferences held since 1986 occurred during the period 2003 to 2014 (the Lula and Rousseff administrations). Second, there was an increase in participation. It is estimated that up to 6.5% of the country's adult population participated in national conferences between 2002 and 2010[9]. Third, the conferences covered a wider range of themes related to social and minority rights and the determinants of health outlined in Law 8080/90, such as the right to food, housing and sanitation, the environment, education and work (Chart 1).

Although the proportion of national conferences with core themes directly addressing public health decreased during this period (Figure 1), health issues continued to receive attention not only in the national conferences focusing on social and minority rights, but also in those involving discussions and proposals related to the processes that shape the social and environmental determinants of health: principally, cities (with a focus on household environmental health risks associated with to urbanization, housing and sanitation); and the environment (with a focus on environmental risks related to industrial and agricultural production and pollution affecting the air, soil, water and food, including climate change in 2008).

National conferences have provided important forums for discussion and sounding boards for the public's yearning for a model of development oriented towards health, quality of life and an ecologically balanced environment combined with social justice and the reduction of inequality.

The institutionalization of environmental risk-related themes within the SUS

National conferences have proved to be important spaces for public participation and the formulation of policy proposals for addressing environmental health risks, many of which have been institutionalized in the form of laws, decrees, ministerial orders, normative instruments and operational norms. Public health responses to environmental risks in the 20th century were mostly limited to sanitation and vector control. More recently however, the public health field has not only helped revive the social struggles for health that began in the nineteenth century, but also provides modern responses to new social and environmental contexts that began to emerge in the 1980s. It does this by combining varying themes ranging from pollution and degradation of ecosystems, with their new risks, with others related to the world of work, such as restructuring of production, recession, unemployment, informality and precariousness, and

their health impacts manifested in the form of accidents and diseases.

The 1st National Conference on Workers' Health took place in the same year as the 8th National Health Conference, preceding the creation of the SUS. This fact reflects the important role played by organized workers in the democratization process and meant that occupational health was inscribed among the provisions of the 1988 Constitution as one the functions of the SUS, alongside the commitment to ensure universal access to health services to all workers, irrespective of whether they work in formal or informal sector.

Law 8080/90 provides that workers' health is a function of the SUS and classifies work and the environment as determinants of health. This process gained momentum and density in 1996 as the system took shape and the scope of actions was widened (Chart 2).

The Rio Summit placed environmental risk on the political agenda of the participating countries. One of the ramifications of Agenda 21 for the health sector was the elaboration of the first National Plan for Health and the Environment in the context of Sustainable Development (see Chart 2). Environmental health began to take shape in 1998 during the Cardoso administration against a socioeconomic backdrop marked by the adoption of structural adjustment measures and the involvement of international agencies such as WHO and PAHO, with a focus on sustainable development and selective government intervention in actions such as the control of risks (including environmental risks) and epidemics[10,11]. The first year of Cardoso's second term saw Brazil signing a financing agreement to fund the structuring of environmental health surveillance in the SUS through the VIGISUS Project and the publication of a ministerial order regulating the NOB SUS 01/96 in the areas of disease control and environmental health surveillance.

The creation of the Health Surveillance Secretariat in 2003 (Chart 2), the first year of the Lula administration, initiated a process of convergence between workers' health and environmental health actions. Between 2005 and 2009, a set of normative instruments and ministerial orders institutionalized the integration of these actions. This integration was reinforced by the spaces for participation opened up by the national conferences, particularly the 3rd National Conference on Workers' Health in 2005, where healthy working environments was one of the core themes, and the 1st National Conference on Environmental Health, whose guidance document addressed production processes and workers' health, among other themes.

The institutionalization and structuring of workers' and environmental health constitute achievements, giving greater prominence to previously neglected issues and redesigning and reframing scenarios that emerged at the end of the twentieth century. However, they occurred in an initial context of adoption of and adjustment to the neoliberal model, with cuts in federal funding and limited spending on infrastructure, and management challenges that have haunted the SUS since its beginnings[12].

Development and trends of environmental risk

The last thirty years have also witnessed a transition of environmental risks and the impacts of development on health. According to Smith and Ezzati[13], these trends of environmental risk are spatially and socially delimited and can be categorized into three different spatial scales: household, community, and global.

Household environmental risks include problems such as urbanization and vulnerable settlements, housing deficits, and precarious access to safe water and sanitation. They encompass basic social rights and have a simple and direct impact on health (e.g., acute intestinal and respiratory infections). Community risks comprise local scale environmental risks associated with production and transport, air pollution caused by industry, vehicles and forest fires, and soil, water and food contamination caused by agriculture and industry. The impacts of these risks are mediated by intense socioenvironmental transformations and have both direct short-term health consequences (ranging from respiratory disease to traffic and occupational accidents) and indirect long-term consequences (cancer and cardiovascular diseases). Global environmental risks encompass risk at a regional and global scale, such as climate change. Impacts (short, medium and long-term) are mediated by more complex intensive and extensive socioenvironmental transformations. At the macro and structural scale, these risks are associated with industrialization and urbanization, as well as rapid and extensive land cover changes caused by agricultural expansion, deforestation and forest fires, and environmental disasters, resulting in multiple diseases, damage and injuries.

Both globally and in Brazil, these trends cannot be isolated or decontextualized from struc-

Chart 2. Time line showing key events and legal milestones for workers' and environmental health.

Administration	Year	Events	Comments
Sarney Administration (1985-1990)	1986	1st Workers' Health Conference	To promote the discussion of studies and proposals addressing workers' health issues: "New approaches to occupational health care" and "national workers' health policy".
Collor Administration (1990 a 1992)	1990	Law 8.080 (September 19).	Deals with health promotion, protection and recovery and the organization and operation of services, among other provisions. Determines that the promotion of occupational health is one of the functions of the SUS, stipulates that the environment and work are determinants of health, and assigns the provision of conditions that ensure the physical, mental and social well-being of people and the community to public health.
Franco Administration (1992-1994)	1994	2nd Workers' Health Conference	Reflection on and critical assessment and definition of strategies to promote the formulation of a national workers' health policy from the perspective of changes in workers' living and working conditions.
Cardoso Administration (1995-1998)	1995	National Plan for Health and the Environment in the context of Sustainable Development	"Guidelines for Implementation" addressing the linkages between health and the environment in the context of sustainable development produced by the Ministry of Health. Outcome of a work process involving the Executive Branch and civil society.
	1996	NOB-SUS 01	Determines that the promotion of occupational health is one of the functions of health care.nção à saúde.
	1998	Ministerial Order Nº: 3.120 (July 1)	Approves a normative instrument governing workers' health surveillance within the SUS.
		Normative Instrument governing workers' health surveillance	Defines basic procedures related to workers' health surveillance.
		Ministerial Order Nº: 3.908 (October 30)	Provides guidelines on the provision of occupational health services in the NHS and determines operational norms aimed at defining functions and responsibilities to guide the provision of occupational health services to urban and rural workers by state and municipal health departments, taking into consideration the differences between men and women.
		Primary Environmental Care	PAHO guidance for the implementation of Primary Environmental Care, aimed at structuring health and environmental instruments considering the strategies outlined by Agenda 21, concepts of sustainable development, and sustainable spaces, environments and cities.
	1998-1999	Incorporation of environmental surveillance in the field of public health policies	Aimed at structuring environmental health surveillance in the former FUNASA, involving health and environmental themes.

it continues

Chart 2. Time line showing key events and legal milestones for workers' and environmental health.

Administration	Year	Events	Comments
Cardoso Administration (1999-2002)	1999	Ministerial Order Nº: 1.399 (15 December)	Regulates the NOB SUS 01/96 defining the functions of the three spheres of management of the SUS in relation to, among others, epidemiology and disease control and environmental surveillance.
		VIGISUS Project	Project Structuring Health Surveillance in the Unified Health System (VIGISUS, acronym in Portuguese) - agreement between FUNASA and the World Bank aimed at structuring environmental health and enabling the monitoring of a range of environmental risk factors connected with human activity and the natural environment.
	2000	Decree Nº: 3.450 (May 9)	Restructures the National Health Foundation including as one of its functions the management of the National System of Epidemiological and Environmental Health Surveillance.
		FUNASA Directive Nº: 410 (August 10)	Approves FUNASA's internal regiment, defining the functions of the Environmental Health Surveillance General Coordination Office (CGVAM, acronym in Portuguese).
	2001	Normative Instrument Nº: 01FUNASA (September 25)	Regulates the National Environmental Health Surveillance System (SINVAS, acronym in Portuguese) and the functions of the federal, state and municipal governments in relation to environmental health surveillance.
	2002	Ministerial Order Nº: 1.679 (September 20)	Created the National Workers' Healthcare Network (RENAST, acronym in Portuguese).
Lula Administration (2003-2006)	2003	Law 10.683 (May 28)	Provides that environmental health and individual and collective health promotion, protection and recovery, including workers and indigenous peoples, shall be the function of the Ministry of Health.
		Law Nº: 10.683 (May 28)	Provides that the Ministry of Health shall be responsible for environmental health and collective health promotion, protection and recovery, including workers and indigenous peoples.
		Decree Nº: 4.726 (June 9)	Restructured the Ministry of Health creating the Health Surveillance Secretary whose function is to manage the National Health Surveillance System, which includes the National de Environmental Health Surveillance Subsystem (SINVSA, acronym in Portuguese).
	2004	Ministerial Order Nº: 777 (April 2004)	Establishes technical procedures for the mandatory reporting of occupational injuries and diseases in the Sentinel Service Network of the SUS.
	2005	Normative Instrument N° 01. Ministry of Health(March 7)	Defines the functions of the federal, state and municipal governments in relation to environmental health surveillance and provides that SINVSA shall be responsible for the following core areas: water intended for human consumption; the air and soil; environmental contaminants and chemical substances; natural disasters; accidents with hazardous materials; physical factors; and the workplace. Includes procedures related to the epidemiological surveillance of diseases and injuries diseases resulting from human exposure to agrochemicals, benzene, lead, asbestos and mercury.
		Ministerial Order Nº: 1.125 (July 6)	Lays out the aims of the SUS's workers' health policy, comprising the provision of comprehensive healthcare; intra and intersectoral integration; structuring of the workers' health information network; support for research and investigation; staff training and development; and community participation in the management of these actions.
		Ministerial Order Nº: 2.437 (December 17)	Deals with the expansion and strengthening of the RENAST within the SUS.
		3rdWorkers' Health Conference	Promoted an in-depth discussion of decent working conditions, the protection of the right to a healthy environment, decent housing and living conditions, and comprehensive healthcare.

it continues

Chart 2. Time line showing key events and legal milestones for workers' and environmental health.

Administration	Year	Events	Comments
Lula Administration (2007-2010)	2007	Ministerial Order Nº: 1.956 (August 14)	Provides that all work carried out by the Ministry of Health related to workers' health shall be managed and coordinated by the Health Surveillance Secretary (SVS, acronym in Portuguese) through the Coordinator-General of Environmental Health Surveillance, department responsible for coordinating the Environmental Health Surveillance System, including the workplace.
	2009	Ministerial Order Nº: 2.728 (November 11)	Deals with the RENAST.
		Ministerial Order Nº: 3252 (December 22)	Approves guidelines for executing and funding health surveillance actions and confirms the need for combined surveillance actions involving the different areas of surveillance (epidemiological, sanitary, environmental health, workers' health and health promotion), in order to control health risks and determinants ensuring comprehensive healthcare that adopts both an individual and collective approach to health problems.
		1stNational Conference on Environmental Health	The theme was "Environmental health in the city, countryside and forest: building citizenship, quality of life and sustainable territories". The ministries of health, cities and the environment were involved in its organization. The conference's guidance document provided important recommendations for the formulation of the National Environmental Health Policy.
	2010	1o Brazilian Symposium on Environmental Health	Proposed studies and debate about the environmental and health impacts of unsustainable production and consumption patterns, occupational diseases; environmental justice; and alternative sustainable development strategies.
Rousseff Administration (2011 a 2014)	2011	Decree Nº: 7.530 (July 21)	Created the Department of Environmental and Workers Health Surveillance (DSAST, acronym in Portuguese) within the Ministry of Health.
		Decree Nº: 7.616 (November 17)	Deals with the declaration of Public Health Emergency of National Importance (ESPIN, acronym in Portuguese), involving epidemiological emergencies; disasters and populations in need of assistance, and creates the Unified Health System National Task Force (FN-SUS, acronym in Portuguese).
	2012	Ministerial Order Nº: 1.823 (August 23)	Creates the National Workers' Health Policy
	2014	1stNational Conference on Workers' Health promoted by the CUT	Promoted awareness raising among union leaders as to the importance of centrality of workers' health-related issues.
		II Brazilian Symposium on Environmental Health	Promoted discussions regarding environmental health education, research and services.
		Public Health Emergency	Defined the SVS's strategy for preparing for and responding to public health emergencies, including epidemiological emergencies, natural disasters and emergencies involving chemical, radiological and nuclear substances.
Roussef Administration (2015 a 2016)	2015	4th Conference on Workers' Health	Discussion of and production of a guideline document for the implementation of the National Workers' Health Policy.

Sources: [22-25].

tural inequality, which concerns not only to the gap between the rich and the poor, but also access to social and environmental rights. Social groups whose rights (to education, food, health, work, housing, sanitation, security, transport and urban mobility) are poorly protected also tend to be more exposed to environmental risks where they live and work[14,15]. Deprived of their full and universal rights, these groups tend to experience the "risk overlap" more intensely than others, which manifests itself in an "overlap" of infectious and chronic diseases and traffic and occupational accidents.

Thus, although policies and programs designed to reduce social equality, such as the family assistance program *Bolsa Família* and the Family Health Strategy, have meant important achievements in the realm of social rights, significantly reducing poverty and child mortality rates[16], the structural determinants of social equality have not been transformed. Moreover, there has been little change in the dominant patterns of production and consumption, which continue to cause environmental devastation, and the use of natural capital, which continues to be based on the production of commodities and energy and resource intensive industrial processes[15,17].

Extensive cattle ranching is the leading cause of deforestation in the Amazon, accounting for over 60% of the 754,000 square kilometers cleared up to date in the region[18], compared to the production of grains, which accounts for only 5%. The latter, promotes the intensive use of agrochemicals and genetically modified organisms (GMOs), making Brazil the world's leading consumer of the former and second in terms of total area planted with GM crops, behind the US[19,20].

Meat and grain production also strongly contributes to deforestation, biodiversity loss, climate change, decline in soil fertility, desertification, reduced water quality and availability, food insecurity, extreme weather events and vector cycles - resulting in an increase in waterborne and vector-borne diseases (malaria, dengue, zika, chicungunhya, and yellow fever) - cardiorespiratory diseases, and mental and psychosocial disorders. Agrochemicals also lead to the contamination of the soil, groundwater and food chain, resulting in acute poisoning and chronic contamination, particularly affecting rural workers and populations living near plantations, with the accumulation of persistent organic pollutants in human tissues, which can have potential genetic and reproductive consequences.

Mining for example has varying environmental impacts, including disasters like the one that took place in Brazil in 2015, which saw the collapse of a tailings dam operated by the mining company Samarco in the State of Minas Gerais. Considered the world's worst mining disaster in terms of volume of waste (around 34 million m^3) and area affected (34 municipalities and approximately 650 square kilometers), the tragedy directly affected 10,000 people and caused 19 deaths, two-thirds of which were outsourced workers[21]. A study by the Ministry of Health in a nearby municipality, Barra Longa, conducted in the first semester of 2016 (six months after the disaster), showed a sharp increase in upper respiratory tract infections, suspected cases of dengue, parasitosis, and systemic arterial hypertension compared to the same period in 2014[22]. An environmental assessment of the Doce River in 2016 detected excessive levels of heavy metals such as aluminum, arsenic, cadmium, copper, chromium, manganese and nickel, with the concentration of lead and mercury being 165 and 1,465 times greater than the legal limit, respectively[21]. At the beginning of 2017, Minas Gerais was the state with the highest number of recorded cases of wild yellow fever, with the municipalities located in the Doce River Basin accounting for half of the confirmed cases and one-third of the deaths caused by the disease, giving rise to the hypothesis that the ecological imbalance caused by the magnitude of the disaster was the root cause of this outbreak[22].

The housing deficit in Brazil in 2015 stood at 6,186,503 housing units[23]. This deficit overlaps with an increase in the number of people living in shanty towns (which according to the Brazilian Institute of Geography and Statistics was over 11 million in 2010), outstripping the population growth rate and increase in the proportion of people living in urban areas over the last 30 years[24]. The precarious housing conditions experienced by millions of Brazilians combined with persistent shortfalls in sanitation mar the achievements accomplished in recent decades. Over 80% of the population has access to water, but the supply is intermittent and often does not meet water quality standards in poorer regions[25]; over half the population have access to sewage collection services, but 45% of waste is discharged into waterways without any treatment[26]; close to 100% of households have access to household waste services, but 48% Brazilian local councils dispose of this waste in open-air dumps[27].

The housing deficit and precarious housing and sanitation conditions feedback on social inequality and potentialize the combination of household and regional/global risks such as e

the association between precarious urban conditions and climate change, among other socio-environmental processes. This framework helps us to understand the risks and diseases affecting the poorer regions of the country and our cities, such as the Northeast and the poorer areas of the country's richest state, São Paulo.

In 2013, during one of the worst drought in decades, the Northeast experienced several outbreaks of diarrhea associated with inadequate access to safe water, resulting in a large number of hospital admissions and deaths in Pernambuco and Alagoas, principally in poorer municipalities[28]. In 2015, with the emergence of the zika virus, the Northeast witnessed a large number of cases of microcephaly, most of which were concentrated in Pernambuco. Prevalence rates were shown to be up to two and a half times higher among black and brown mothers compared to white mothers, in mothers with up to three years of schooling compared to those with a higher level of education, and among those who had not received prenatal care compared with those who had had six or more consultations[29].

In 2014, Campinas, which has one of the highest MHDIs in the country, faced the worst dengue epidemic in its history. Rates were highest in the most deprived areas with poor access to resources and urban services[30]. The water crisis in São Paulo between 2014 and 2015 resulted from a combination of climate change, deforestation in the region encompassing the Cantareira Water System, and water management problems, leading to an almost seven-fold increase in the number of reported cases in 2015 compared to the first semester of 2014[31], with impacts concentrated in poorer areas.

These situations arising from risk (community/local/regional/global) overlap, with the juxtaposition of disease, damage and injuries (long and short-term, know and unknown, visible and invisible), constitute expressions of a model of socioeconomic development in which the State promotes economic activities that favor capital, especially financial capital, and shows a blatant disregard for the achievements of citizenship and the right to an ecologically balanced environment and to the reduction of risk of disease and injury. Tax incentives are targeted at the automotive industry rather than urban mobility, to the burning of fossil fuels rather than renewable energies, to GMOs and agrochemicals and agribusiness rather than family farming and agroecology, to major construction companies and the financialized real estate market rather than inclusionary housing and sanitation policies. Structural inequality and environmental degradation form the basis of the processes that shape the social and environmental determinants of the trends of environmental health risks in Brazil, resulting in direct mediated and modulated impacts that are expressed in damage, disease and injuries, marring the achievements of citizenship and representing an obstacle to the realization of the right to environmental health.

Final considerations

In the last 30 years, drawing principally from the provisions laid out in the 1988 Constitution, Brazil has implemented institutions and policies aimed at the realization of social and environmental rights and resulting in a significant improvement in the health of the population, such as an increase in life expectancy and reduction in child mortality. The country has also witnessed a broadening of spaces for public participation, veritable sounding boards for public demands for a fairer country, with quality of life and an ecologically balanced environment.

These achievements were attained at a time when structural adjustment and the neoliberal model limited the consolidation of institutions and policies aimed at protecting social and environmental rights. This was caused on the one hand by cuts in federal funding and spending on infrastructure, which were not limited to the health sector, but also seriously affected the environment and, on the other, by the implementation of the recommendations of international agencies, which combined sustainable development with selective government intervention such as the control of risks and epidemics. However, these actions were not accompanied by effective measures to promote the sustainable use of natural resources and tackle the structural causes of inequality underpinning the processes that shape environmental risk determinants.

Furthermore, a significant reduction in economic inequality was achieved during the democratic regime (1985 to 2015), with the right to health contributing to this process[32]. However, its is important to consider the costs of the environmental risks for the health sector. If we disregard the environmental externalities, the contribution of the commodity boom to the reduction of inequality may be considered positive. As Arretche[32] argues, it generated increased employment, increased worker bargaining power,

and led to an increase in income and government revenues without increasing taxes. Concepts of health that are restricted to access to services or traditional health indicators will never be capable of considering the costs posed by biodiversity loss, chemical contamination, environmental degradation and changes in the hydrological cycles, climate and vectors to the life and health of people, this country and the planet.

Finally, the obstacles become even more evident after the parliamentary coup of 2016, with the government that assumed power pandering to the interests of the market and capital accumulation and bulldozing and/or disregarding the rights gained over the last 30 years. Apart from the constitutional amendment effectively freezing public spending over the next 20 years and labor reform bill, which will have a direct impact on health and working conditions, various other acts represent a giant step backward, including: the "land grabbing law"; the ministerial order on slave labor; the *marco temporal*, restricting the rights of indigenous peoples and *quilombolas* to land demarcation; the relaxing of environmental licensing rules; the freeing up protected areas for mining; and changes in the way agrochemicals are assessed to favor their commercialization.

Collaborations

CM Freitas worked on the conception, scope, analysis and interpretation of the data; as well as the write-up, revision and approval of the version for publication. V Rocha, EL Silva, TMA Alpino, MA Silva and ML Mazoto contributed to the data and information gathering, analysis and interpretation; as well as the write-up, revision and approval of the version for publication.

References

1. Brasil. Constituição (1988). *Constituição da República Federativa do Brasil.* Brasília: Senado Federal; 1988.
2. Rego WL, Pinzani A. *Vozes do bolsa família: autonomia, dinheiro e cidadania*. São Paulo: UNESP; 2013.
3. Abers R, Oliveira MS. Nomeações políticas no Ministério do Meio Ambiente (2003-2013):interconexões entre ONGs, partidos e governos. *Opin. Pública* 2015; 21(2):336-364.
4. Arretche M. O bom debate pede mais luz e menos calor. *Valor Econômico* 2017 Out 06; p.10.
5. Cardoso Jr JC, Pinto E, Linhares PT. O estado e o desenvolvimento no Brasil. In: Cardoso Júnior JC, Bercovici G, organizadores. *República, democracia e desenvolvimento: contribuições ao Estado brasileiro contemporâneo*. Brasília: Ipea; 2011. p. 467-496.
6. Bercovici G. O estado de exceção econômico e a periferia do capitalismo. *Pensar* 2006; (11):95-99.
7. Souza CHL. *A que vieram as conferências nacionais? uma análise dos objetivos dos processos realizados entre 2003 e 2010.* Rio de Janeiro: IPEA; 2012.
8. Avritzer L. *Conferências nacionais: ampliando e redefinindo os padrões de participação social no Brasil.* Rio de Janeiro: IPEA; 2012.
9. Avritzer L, Souza CHL. *Conferências nacionais: atores, dinâmicas participativas e efetividade.* Rio de Janeiro: IPEA; 2013
10. Melo MABC, Costa NR. *Desenvolvimento sustentável, ajuste estrutural e política social: as estratégias da OMS/OPS e do Banco Mundial para Atenção à Saúde*. Brasília: IPEA; 1994.
11. Rizzotto MLF, Campos GWS. O Banco Mundial e o Sistema Único de Saúde brasileiro no início do século XXI. *Saude Soc* 2016; 25(2):263-276.
12. Paim JS. A Constituição Cidadã e os 25 anos do Sistema Único de Saúde (SUS). *Cad Saude Publica* 2013; 29(10):1927-1936.
13. Smith KR, Ezzati M. How environmental health risks change with development: the epidemiologic and environmental risk transitions revisited. *Annu. Rev. Environ. Resour* 2005; (30):291-333.
14. Rigotto RM, Giraldo L. Saúde e ambiente no Brasil: desenvolvimento, território e iniquidade. *Cad Saude Publica* 2007; 23(Supl. 4):475-485.
15. Abramovay R. Desenvolvimento sustentável: qual a estratégia para o Brasil? *Novos estud-CEBRAP* 2010 (87):97-113.
16. Rasella D, Aquino R, Santos CAT, Sousa-Paes R, Barreto ML. Effect of a conditional cash transfer programme on child hood mortality: a nation wide analysis of Brazil an municipalities. *Lancet* 2013; 382(9886):57-64.
17. Porto MF, Milanez B. Eixos de desenvolvimento econômico e geração de conflitos socioambientais no Brasil: desafios para a sustentabilidade e a justiça ambiental. *Cien Saude Colet* 2009; 14(6):1983-1994.
18. Vieira L. Impacto das mudanças climáticas no Brasil. *Le Monde Diplomatique Brasil* 2014; Edição 82.
19. Bombardi LM. *Geografia do uso de agrotóxicos no Brasil e conexões com a União Europeia*. São Paulo: FFLCH – USP; 2017.
20. International Service for the Acquisition of Agri-biotech Applications (ISAAA). *Global Status of Commercialized Biotech/GM Crops: 2016*. *ISAAA Brief No. 52*. Ithaca: ISAAA; 2016.
21. Freitas CM, Silva MA, Menezes FC. O desastre na barragem de mineração da Samarco: fratura exposta dos limites do Brasil na redução de risco de desastres. *Cienc. Cult* 2016; 68(3):25-30.
22. Brasil. Fundação Nacional de Saúde (Funasa). *Vigilância ambiental em saúde*. Brasília: Funasa; 2002.
23. Brasil. Ministério da Saúde (MS). *Saúde do Trabalhador*. Brasília: MS; 2001.
24. Rohlfs DB, Grigoletto JC, Netto GF, Rangel CF. A construção da Vigilância em Saúde Ambiental no Brasil. *Cad. Saúde Colet* 2011; 19(4):391-398.
25. Santana VS, Silva JM. Os 20 anos da saúde do trabalhador no Sistema Único de Saúde do Brasil: limites, avanços e desafios. In: Brasil. Ministério da Saúde (MS). *Saúde Brasil 2008: 20 anos de Sistema Único de Saúde (SUS) no Brasil*. Brasília: MS; 2009. p. 175-204.
26. Rede Brasil Atual. *Metade dos casos de febre amarela está na região afetada pela lama da Samarco*, 3 março de 2017.
27. Fundação João Pinheiro (FJP). *Déficit habitacional no Brasil 2015: resultados preliminares*. Belo Horizonte: FJP; 2017.
28. Maricato E. The Future of Global Peripheral Cities. *Latin American Perspectives* 2017; 44(2):18-37.
29. Instituto Brasileiro de Geografia e Estatística (IBGE). *Indicadores de desenvolvimento sustentável: Brasil: 2015*. Rio de Janeiro: IBGE, 2015. p. 352.
30. Brasil. Ministério das Cidades (MCIDADES). *Secretaria Nacional de Saneamento Ambiental. Sistema Nacional de Informações sobre Saneamento. Diagnóstico dos Serviços de Água e Esgotos, 2015*. Brasília: SNSA/MCIDADES; 2017.
31. *Folha de São Paulo*. Descarte de lixo ainda é inadequado em mais da metade das cidades do país. 20 janeiro 2018.
32. Rufino R, Gracie R, Sena A, Freitas CM, Barcellos C. Surtos de diarreia na região Nordeste do Brasil em 2013, segundo a mídia e sistemas de informação de saúde – Vigilância de situações climáticas de risco e emergências em saúde. *Cien Saude Colet* 2016; 21(3):777-788.
33. Marinho F, Araújo VEM, Porto DL, Ferreira HL, Coelho MRS, Lecca RCR, Oliveira H, Poncioni IPA, Maranhão MHN, Mendes YMMB, Fernandes RM, Lima RB, Rabello Neto DL. Microcefalia no Brasil: prevalência e caracterização dos casos a partir do Sistema de Informações sobre Nascidos Vivos (Sinasc), 2000-2015. *Epidemiol. Serv. Saúde* 2016; 25(4):701-712.
34. Johansen IC, Carmo RL, Alves LC. Desigualdade social intraurbana: implicações sobre a epidemia de dengue em Campinas, SP, em 2014. *Cad. Metrop*. 2016; 18(36):421-440
35. Organização Pan-Americana da Saúde (OPAS), Ministério da Saúde (MS). *Atuação do setor saúde frente a situações de seca*. Brasília: OPAS, MS; 2015. (Série Desenvolvimento Sustentável e Saúde, 3).

36. Arretche M. Democracia e redução da desigualdade econômica no brasil: a inclusão dos *outsiders*. *Rev. bras. Ci. Soc*. 2018; 33(96):2-19.

Article submitted 05/01/2018
Approved 30/01/2018
Final version submitted 27/02/2018