



JOURNAL OF
GLOBAL STUDIES

ISSN 1518-1219

<http://www.meridiano47.info>

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Megacities in climate governance: the case of Rio de Janeiro

Megacidades na governança climática: o caso do Rio de Janeiro

DOI: <http://dx.doi.org/10.20889/M47e17013>

Meridiano 47, 17: e17013, 2016

Abstract

This paper shows the vital role of cities in climate governance, as places where the crisis is expressed in latent form, but also as emblematic spaces in terms of technological innovation and social empowerment. It discusses challenges of megacities like Rio de Janeiro, given their vulnerability, resilience and environmental risks to the transition of a more intelligent and sustainable patterns of urbanization, through its domestic policies and paradiplomacy networks.

Resumo

Este artigo mostra o papel vital das cidades na governança do clima, como lugares onde a crise se expressa de forma latente, mas também como espaços emblemáticos em termos de inovação tecnológica e empoderamento social. Discute os desafios de megacidades como Rio de Janeiro, considerando suas vulnerabilidades, riscos socioambientais e resiliências para a transição de modelos mais inteligentes e sustentáveis de urbanização, através de suas políticas domésticas e redes de paradiplomacia.

Keywords: Megacities, governance, climate change; global change; climate governance; paradiplomacy networks.

Palavras-chave: Megacidades; governança; mudanças climáticas; mudanças globais; governança climática; redes de paradiplomacia.

Recebido em 03 de abril de 2015
Aprovado em 18 de agosto de 2016

Introduction

Given the current multidimensional crisis of civilization, governance is *the key issue* in the context of global change, and the climate changes represent one of the biggest global challenges in the twenty-first century, gaining visibility and importance on the agenda of multilateral institutions, national

states and subnational governments. Megacities play a decisive role in contemporary multilevel governance.

In line with the COP-21 results (December 2015) and implementation of the Habitat III Conference (October 2016), and in the wake of the objectives set out in the ambitious “*Transforming our world: the 2030 Agenda for Sustainable Development*” of the Nations (UN, 2015), the search for resilience and sustainability of cities and settlements, combined with urgent action to combat climate change, indicates the approach to urban climate governance as an absolute relevance issue. This debate strongly articulates the climate problem with social issues and environmental justice. The intertwining of these issues will crystallize as one of the key agendas in the “*era of sustainable development*” (Sachs, 2014).

With increasing involvement in international cooperation networks and global forums, major cities, especially the megacities, who through their productive activities (transport, energy) cause deep effects in the atmosphere and climate (Folberth *et al.*, 2015), not only they are being impacted by climate change, but also they have a strategic role in coordinating and implementing local and regional mitigation and adaptation policies in addressing this problem. Cities are certainly part of the problems brought about by unrestrained industrialization and capitalistic urbanization, but they also constitute the transformation stages for new models of civilization, founded on low carbon economy, environmental prudence and economic prosperity.

Like other mega-cities scattered in different continents, Rio de Janeiro in the context of rapid urbanization in Latin America and the Caribbean suffers severe consequences and damages caused by climate change, considering its high population profile density, air pollution and emissions from high energy consumption. However, Rio de Janeiro has assumed a vanguard role in public governance initiatives in the fight against climate changes and transitions to a green low-carbon saving.

In Addition to the introduction and conclusion, this article also has two parts. The first reflects on the new challenges of geopolitics and threats of global climate change. The second part discusses the role of megacities in climate governance, discussing the state of art challenges and advances of the city of Rio de Janeiro on the agenda of low-carbon and resilient urban saving.

Geopolitical and global climate change

In recent decades, with the end of bipolarity and the Cold War, the geopolitical world has been deconstructed and updated in the context of complexity and multipolarity, with distinct geographical cutouts, actors and agendas that gain prominence in the definition of global public policy. In addition to the multilateral institutions, other substate actors, epistemic networks and citizens will take initiatives that once were under the monopoly of nation states. Topics such as new technologies, migration, environmental refugees, human rights violations, depletion of natural resources, climate change and energy security, take place on the agenda of the major problems of geopolitics and political ecology.

The old hierarchy of issues established by high and low politics are losing direction and leveling the international security system, because wars and conflicts (which monopolized the decisions of world politics in World War II) share concerns about the risks and threats of social inequalities, natural resource scarcity and global heating. The paradigm of Western hegemonic development has dragged the world into a swirl of crises of multiple causes and consequences. The human catastrophes derived largely from a social exclusion model and uncontrolled urbanization, which has translated into high levels of violence, pollution and environmental degradation, are visible signs of a deep crisis of civilization in the context in which it praises productivist and consumerist patterns as the base of today's society.

The structural imbalances of capitalism in the wake of the false idea of modernity and progress, as the result of the ideology of unlimited growth and critical perception of inability of threats and insecurities that go around human societies, such as water scarcity, loss of biodiversity, and the dark climate change scenarios in the tragic scenario of excluding globalization, confirm the transposition of planetary boundaries, as follow: "climate change, ocean acidification, stratospheric ozone depletion, nitrogen and phosphorus cycles, freshwater use, change in land use, rate of biodiversity loss, chemical pollution, and atmospheric aerosol loading" (Viola *et al.*, 2012), and allowing inevitable turbulence and global concerns. The current globalization is marked by the "simultaneity of scientific outbursts and technological outbreaks, ongoing and interactive, in all fields of knowledge, activity and human existence" (Dreifuss, 1996: 17). New planetary dynamics shaped by global capitalism crisis put on the agenda many challenges, actors and agendas. It is now imposed the great collective task of managing globalization (Ottone, 2011).

The references of national societies are being replaced by the emergence of a global society. As the theorist of soft power Joseph Nye says: "The States remain the dominant players on the world stage, but they will find the stage far more populated and difficult to control" (Nye, 2012, 152). The emergence and vitality of new players in a global scene in many different themes (environmental justice, human rights, gender, migration and the combat against poverty) and spheres of activity (local, regional, national and transnational), notably international governmental organizations (IGOs), transnational corporations (TNCs), non-governmental organizations (NGOs), epistemic networks, associations and individuals, have produced the enlargement of spaces and governance strategies, setting new themes and political and geopolitical cross-cutting debates. The conformation of a new global political space includes the recognition of a multifaceted environment by the presence of several actors who claim a leading role in public policy agendas.

The fact is that the globalization of the post-Cold War capitalism has changed the distribution of power in the international society, changing the correlation of forces among the many political actors. Despite the legitimacy maintained by national states, other actors also began to gain ground, forming a complex network of interdependence that does not recognize national borders. In this sense, subnational governments have assumed an increasing importance in the search for solutions to global problems and the expansion of its competitive advantages (Yahn Filho, 2011).

With the profusion and influence of non-state and transnational actors, the world governance system has become more complex and problematic to deal with multiple development challenges and agendas: from local to global. The challenges of global changes point to the connections and interdependence of actions and actors on the need to create global governance mechanisms and structures to face issues of collective interest (Held, 1995; Rosenau; Czempiel, 2000).

In the scenario of global changes, the phenomenon of climate change constitutes a civilizational vector and fundamental planetary frontier for human security (Rockström *et al*, 2015). Global warming is no longer the delirious and catastrophic view attributed to radical environmentalists in the last quarter of the twentieth century. The year of 2015 was the hottest year on record, since the measurement of the increase in average global temperatures began. The complex conjuncture of climate changes connects environment, international security and political economy. The emergence of the global risk society and the social and environmental impacts, incorporating climate dimension on the agenda of international security and the investments to a global low carbon economy, are aspects that challenge the new architecture of governance of the global climate.

The energy pattern dependent on fossil fuels (oil, coal, natural gas), along with the devastation of forests, is directly interfering in the life cycles of the biosphere in a chaotic way. They forge a multicivilizational societal deadlock character, which ignores borders, territoriality, cultures and races. The global climate changes are undermining the carrying capacity of terrestrial ecosystems through uncontrolled emissions of greenhouse gases from developed economies that adopt highly intense productive models in non-renewable energy, and styles of sumptuary consumption. The turbulence of the contemporary climate change exposes in a visceral way the emergence of a world risk society. The early move to the Anthropocene in the second half of the twentieth century brought the realization that human action is becoming the main driver of planetary changes and is producing an increasingly severe systemic imbalances.

The Global warming which results in a harmful climate change is a complex and multidimensional challenges. In the field of sociology, analytical clippings return to the fight against poverty and social inequalities (Pardo, 2010), in addition to approaches from the perspective of an environmental / climate justice and the welfare of most vulnerable populations, especially in developing countries (Thakkar, 2015). Giddens (2010) discusses the perspective of public policy and Stern (2015) accounts for the costs of immediate action to minimize impacts on the economy. It is also considered the ethical dimension as the foundation of intergenerational solidarity, capable of generating the responsible use of natural resources.

The disclosure of the 4th Assessment Report (AR4), was a watershed and meant a turning point in world politics, when affirming with grounds and scientific basis that the determining factors in the increase in average global temperatures are derived from human actions, from industrialization and destruction of forests, which reinforces the previous reports (IPCC, 2007).

Megacities in climate governance: the case of Rio de Janeiro

Megacities are critical places of multiple vulnerabilities, where the climate crisis is expressed most clearly and relentlessly, but also, it is in the huge metropolises with its bold architectural drawings, multiculturalism and economic dynamism, where it is located the epicenter of emblematic technological innovation initiatives and community empowerment. It is in large cities and influential megacities that citizens and social movements in a network become players, charging and influencing public interventions and participatory citizenship actions in pursuit of an efficient management system towards to a new urban transition (UN-Habitat, 2012).

The growth model of large megacities in Latin America in recent decades has directly affected public services and the quality of life, therefore increasing social tensions and squandering our environmental heritage. In pursuit of economic development through industrialization, Sao Paulo, Mexico City, Buenos Aires, Rio de Janeiro, Lima and Bogota (CEPAL, 2013), grew under the sign of uncontrolled processes of urbanization and expansion of the urban network, promoting territorial occupation without public planning and population swelling in large-scale.

The fact is that Latin American cities are marked by great social inequalities. Today these cities face chronic problems of transportation, infrastructure, air pollution combined with the increasing effects of global warming and climate change as commitment to water resources and vegetation coverage. In the wake of the worsening urban climate crisis, these megacities are feeling the adverse effects of climate changes and searching for alternatives to face this reality.

Rio de Janeiro is the second largest city in Brazil and the largest city of the Brazilian coast, with a population of about 11.5 million. It is the sixth most populous city in America, and it is also considered a Beta global city by the 2008 inventory from Loughborough University (GaWC). Rio de Janeiro is considered an important financial center in the global investment market.

Recent studies have shown that the approaches on cities and climate change are incipient in the Brazilian context (Reis *et al.*, 2015). In this sense, the climate policy of the City of Rio de Janeiro, coordinated by the Municipal Environment Department (SMAC) through its Management of Climate Change and Sustainable Development, is a pioneer in the context of local policies, especially climate change mitigation. It acts transversely articulating at the various sectors of municipal and metropolitan government administration. It embraces a network of partnerships and shared actions in order to ensure efficiency and common results in the sectors of solid waste management, transportation, urban planning, energy and civil defense, among others, to ensure systemic sustainability.

Rio de Janeiro was one of the first cities in Brazil to establish a Municipal Policy on Climate Change and Sustainable Development, setting goals to reduce the emissions of greenhouse gases (GHG) for the coming years: up to 8% in 2012, 16% in 2016 and 20% in 2020 with respect to emissions recorded in 2005 by the Inventory of Greenhouse gas emissions prepared by SMAC in partnership with Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia (COPPE). These goals will be properly controlled by the entry into operation of the greenhouse gases monitoring system in 2012. It was also created the Carioca Forum on Climate Change and Sustainable Development,

composed by representative segments of the government, the private sector and civil society, whose objective is to contribute to the search of viable solutions to adopt public policies in order to reduce and combat the climatic effects on the city.

The insertion of Rio de Janeiro on the agenda of climate governance of public policy has been effected through synchronous and complementary processes: from one side, in conjunction with regional and international cooperation networks called Paradiplomacy networks. It is worth noting that the issue of international participation of sub-national governments has to do with the emergence of globalization and decentralization of power, issues that influenced the weakening of the nation-state and strengthened the role of subnational governments in the international arena. These actors seek its international insertion in different ways, in addition to projecting the city internationally, they also promote international cooperation partnerships, effecting their local policies and promoting local development.

Undoubtedly, the achievement of UNCED in Rio de Janeiro in 1992, projects the “wonderful city” as a place marked by demonstrations and global decisions that led to the institutionalization of major environmental problems, notably the approval of UNFCCC and the emergence of governance climate globally. This Convention has opened up a menu of initiatives by governmental and non-governmental actors that through the synergy of international networks and coalitions, founded important agendas of battles against climate change.

In the field of international paradiplomacy, it should be mentioned the International Council for Local Environmental Initiative (ICLEI), which promoted the campaign – Cities for Climate Protection (CCP), involving numerous national and subnational actors, and with the joining of the city of Rio de Janeiro in 1998. Besides ICLEI, the city of Rio de Janeiro participates in transnational networks with the C40 Group of Great Cities for Climate Leadership, Cities and Local Governments, Solutions Network for Sustainable Development, UCCLA (Union of Capital Cities of the Portuguese language); Metropolis (World Association of Major Metropolises); UCCI (Union of Ibero-American Capital Cities); Foreign foundations such as the Rockefeller and the Konrad Adenauer as well as UN organizations such as the UN-Habitat, UNDP, UNESCO, UNISDR and UNICEF.

It is important to mention the creation in the post-Rio + 20 of two important cooperation networks for the advancement of sustainability policies at the national and international levels: a) Sustainable Development Solution Network of the United Nations (SDSN) and CB-27 Network. These networks reinforce and legitimize the strategy used to attract mega events and shows to the city, especially in recent years, gaining visibility and international recognition, such as the 5th World Urban Forum (2011), the World Economic Forum on Latin America and Rio + 20 (2012), the FIFA Confederations Cup and the World Youth Day (2013), the FIFA World Cup (2014) and this year (2015) celebrates the 450th anniversary of the city. It also can't be forgotten that in 2016, will host the Summer Olympics. These events tend to consecrate the Rio de Janeiro as a global city.

The government of Rio de Janeiro, along with an extensive network of local, national and international partners is seeking to ensure the fulfillment of the greenhouse gas reduction goals, previously established by the climate policy of the city, such as the duplication of bike paths, the expansion of reforestation program, the installation of the Waste Treatment Center, the burning of

biogas, the rationalization of public transportation with the implementation of exclusive bus lanes (Transcarioca, Transolímpica, Transoeste and Transbrasil) among others. Based in the new world inventory standards established by WRI, World Bank, C-40 and ICLEI, that is, with more consistent, reliable and comparable data, internationally recognized, the city of Rio de Janeiro has updated systematically their emissions inventory of greenhouse gases. This activity is relevant as a planning instrument of public policies.

From the point of view of risks and threats, RMRJ presents a high degree of vulnerability to extreme events due to rains, floods, landslides hills, urban pollution, solid and hazardous waste. This whole metropolitan network has suffered with heavy rains that have generated tragedies such as occurred in 2010 and 2011. The phenomenon El Nino in 2015 has led to heat waves in southeastern Brazil, mainly in the states of Sao Paulo, Rio de Janeiro and Minas Gerais, causing water insecurity, spreading diseases and air humidity levels compared to desert regions. The water crisis jeopardize food production and supply reservoirs, causing considerable impact on the populations of RMRJ.

Rio de Janeiro was the first mega city in Latin America to update its inventory on greenhouse emission gases that was prepared by COPPE-UFRJ, based on the methodology of IPCC. The challenges planned to Rio de Janeiro concerning the Climate Change phenomena, INPE predicts damages related to floods, especially in the summer season, and particularly in the coastal plains. The mapping indicates that, in Rio de Janeiro, the most critical points are the Rodrigo de Freitas lagoon, in the south area of the city, and the areas near the Guanabara bay and Sepetiba, which also cover the “Baixada Fluminense”, in the metropolitan region. With climate change, the occurrence of strong and unpredictable rainfall is expected to become more frequent, which should increase the incidence of flooding in these areas.

Urban Innovation is also one of the protagonist elements of Rio de Janeiro that internalizes the concepts of smart cities and resilient cities. The revitalization project of the port area called “Porto Maravilha” in the downtown area will receive solution and technology tools developed by startups supported by the private sector to improve the efficiency and functioning of the city. The idea is to make the area of “Porto Maravilha” an example of intelligent and human neighborhood through a connected platform and technological services. They are tools that will make the city more accessible and safe: applications for monitoring sounds that serve to identify potential risk situations; smart bus stops for passengers with visual disabilities; information on establishments accessible to people with reduced mobility; solid waste management in the drains to avoid flooding, and geo-social interaction tools. It is a way to connect people so that they can interact. It is also important to consider that the city of Rio de Janeiro has the largest cycling network in Latin America, with 380 km of bike paths distributed in all regions of the county.

Conclusion

Due to the acceleration of globalization and emergence of interdependence and cooperation networks on common global management, particularly when it concerns the deepening of the climate crisis, the issue of governance arises high on the agenda, especially with the emergence of forces

and subnational actors establishing new divisions in the governance game, and the cities (especially megacities) have a leading role in defining and implementing regional and local public policies. In the scenario of political decentralization and opening of citizenship spaces, cities are being provoked and responding to the challenges posed by an effective territorial reorganization and administration management focused on social inclusion and sustainable development projects.

Cities will have an increasingly vital role in the new international governance of climate change and global sustainability, considering the acceleration of urbanization, particularly in emerging and developing countries, most industrialized countries will have to account for the increase in population that will join the metropolitan areas of major cities, especially in Europe and USA.

In Latin America, the megacity of Rio de Janeiro is an example of economic integration and international presence through strategic planning that combines urban regeneration processes and technological modernization closer to the idea of smart city models. For having held two world conferences (Rio-92 and Rio + 20), Rio de Janeiro became a symbol of the great discussions and political decisions on sustainability and global environmental governance issues. The city attempts to pursue the path of economic progress as a global city, receptive, with beautiful natural scenery and the glamour of how it is described: “wonderful city”.

In this sense, it has assumed a vanguard role in public governance initiatives in the fight against climate change and transition to a green low-carbon economy, with major advances in the field of institutionalization and regulatory landmarks, insertion into transnational networks of cities and diplomatic protocols as well as cross-cutting actions and synergies with public, private, academic and scientific sectors. The use of multimodal transportation (car, train, bus, subway) and urban planning strategy, has certainly contributed to mitigate the production of toxic waste and greenhouse gases, contributing to the reduction of GEE emissions, besides having the largest bicycle path network of South America.

The lesson is that the more we delay the adoption and implementation of climate policies (adaptation and mitigation) and energy transition (low carbon economy / renewable resources), the more we will suffer the impacts of climate change. Large and megacities already experience the adverse consequences of disordered and chaotic urbanization.

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