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Urban development and 2030 Agenda: challenges and solutions for sustainable cities

Marcia Regina Farias da Silva
PhD Professor, UERN, Brazil
marciaregina@uern.br

Nildo da Silva Dias
Professor Doctor, UFERSA, Brazil
nildo@ufersa.edu.br

Carlos Aldemir Farias da Silva
Professor Doctor, UFPA, Brazil
carlosfarias1@gmail.com

Alexandre de Oliveira Lima
Professor Doctor, UERN, Brazil
alexandrelimarn@gmail.com

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ABSTRACT

Discussions about the Sustainable Development Goals (SDGs) and urban sustainability can help in the search for elucidating urban problems, considering the imprecision and conflicts that orbit around the debate on urban sustainability and the term sustainable development. This debate can contribute to future actions and proposals for urban public policies. Thus, the objective was to discuss Objective 11 of the 2030 Agenda, which deals with Sustainable Cities and Communities, from the perspective of collaborating with the debate on urban sustainability, based on the case study of Mossoró (RN). As a methodological procedure, documental and bibliographical research was carried out, around themes such as urban sustainability, sustainable development, and the 2030 Agenda, aiming to raise a theoretical reflection on these themes. Primary sources were researched in public archives of the Municipality of Mossoró and academic websites. In addition, 70 questionnaires were applied together to students and public servants of Mossoro's public university . It was found that the city only fulfills its social function when it guarantees its inhabitants, habitation; circulation, leisure; work, accessibility, education, and health. The challenges to thinking about sustainable cities are numerous and, on the other hand, the solutions are in place, and, therefore, the admission of public policies aligned with the production and adoption of technologies for sustainable cities is the possible path.

KEYWORDS: Urban sustainability. Sustainable cities. Urban problems.

1. INTRODUCTION

In the last two decades of the 20th century, until today the issue of sustainable urban planning has become one of the main themes addressed in urban planning discourses and practices in Brazil. The intersection between urban planning and sustainability was set up after the United Nations (UN) Conference on the Environment – the Earth Summit, Rio-92, or Eco-92 – when the notion of Sustainable Development (SD) was transferred to be linked to the settlements human beings, that is, to cities. Since then, a planning practice has been sought to implement social participation in a transforming perspective of the urban, to materialize the idea of what is called a sustainable city.

The linking of DS to the city resulted from the perception that this is the main mechanism for appropriating nature and the most complex artifact built by the human mind (MENEGAT; ALMEIDA, 2004). In contemporary times, a period marked by the advancement of science and technology, the globalization of economic, social, including political relations, and the fierce industrialization process, the phenomenon of urbanization has reached an unprecedented scale.

In this process, historically observed problems were not resolved and, at the same time, new ones emerged, consubstantiating the aggravation of what is called the urban crisis. As a result, the city is today a world in which human beings do not seem to identify, which maintains and reproduces segregation, social inequalities, isolation, traffic congestion, inefficiency in public services, violence and crime, the increase in environmental pollution, the lack of housing, housing in risky areas, land tenure illegality, not to mention other serious problems such as poverty and hunger (CARLOS, 2009).

In this confused and chaotic stage in which the urban environment has become, the use of the expression sustainability is linked to discourses that associate the term with the use of natural resources to the satisfaction of essential gifts that do not compromise the satisfaction of the needs of future generations, always from a perspective related to improving the life's quality (MANEGAT; ALMEIDA, 2004). Under this pretext, the expression is used in different situations: in product advertisements, including real estate – condominiums, buildings, and even neighborhoods – service offers and other projects.

In this direction, everything that is "sustainable" seems to seduce, attract and convince the consumer market. And the market, for that very reason, does not spare the use of the expression. However, these so-called sustainable products have what character to be classified as such? What is sustainable development? Is sustainable urban development possible? These are some of the questions posed to the debate on urban sustainability.

Considering that currently, most of the the world's population lives in urban areas, cities have become the center of problems such as pollution, the generation of solid waste, and the waste of natural resources. Due to this fact, urban centers are challenged to reinvent themselves, to guarantee the future of the next generations and that this is better than the world we live in today.

This challenge translates into the need to think about sustainable cities and, for a city to be considered sustainable, it must correctly allocate and reuse solid waste, offer quality water without depleting springs, reuse rainwater, create and use renewable energy sources, offer alternative and quality transport for the population, guarantee cultural and leisure options, access to health, education, housing and work, promotion of accessibility, among others.

Fully sustainable cities are still a utopia around the world. However, examples of good practice are observed in different cities and can be adapted, as urban problems are different from one city to another. Despite converging points, there are environmental, economic, social, cultural, and political differences that make them. In developed countries, for example, the challenge is to find alternative energy sources to replace fossil fuels. In developing countries, the issues are more basic, such as discussions on urban solid waste management, basic sanitation, the quality of public transport, accessibility, green spaces, leisure, housing, among others.

Based on this reflection, the task of understanding what sustainable urban development, urban sustainability, and sustainable cities means were proposed, through the understanding of the concept of "sustainable development", as a first, broader expression, which gave rise to the others, taking as an example the city of Mossoró, Rio Grande do Norte (RN), Brazil. In this direction, the purpose of this article is to discuss Objective 11 of Agenda 2030, which deals with Sustainable Cities and Communities, intending to contribute to the debate on urban sustainability, based on the case study of Mossoró (RN).

2 METHODOLOGY

The municipality of Mossoró is in the state of Rio Grande do Norte (RN), Northeastern Brazil. It has a territorial area of 2,100 km², and, according to the IBGE (2021), there are 300.618 thousand inhabitants, being the second most populous municipality in Rio Grande do Norte. It is limited to the municipalities of Tibau, Grossos, Areia Branca, Serra do Mel, Açu, Upanema, Governador Dix-Sept Rosado and Baraúna (IBGE, 2021). This municipality is in the northwestern portion of the state and due to its characteristics, size, economic and social dynamics, it presents itself as an average city, as shown in Figure 1.

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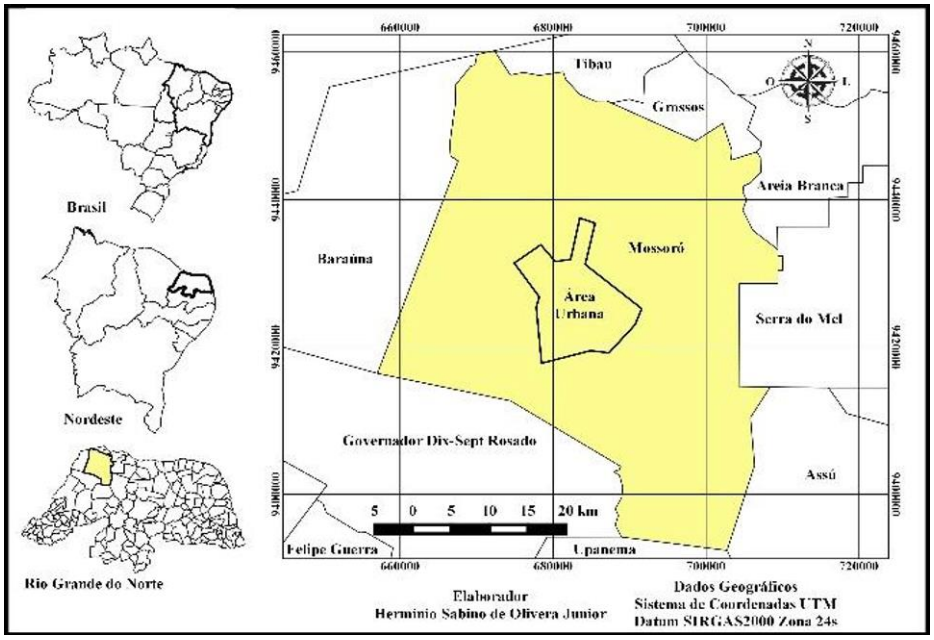
Figure 1: Political map: the location of Mossoró (RN), Brazil, 2021.



Source: Oliveira Júnior, Silva and Câmara (2016).

The research adopted a qualitative approach and, as a methodological procedure for the elaboration of this study, we sought to establish a theoretical discussion of what is sustainable urban development, urban sustainability, and the understanding of the Sustainable Development Objective 11 "Sustainable Cities and Communities" to outline the understanding of what comes to be “Sustainable City”.

Thus, bibliographical research was carried out in books, scientific articles, master's dissertations, and doctoral theses, identified in search engines and the sector library of the Central Campus of the State University of Rio Grande do Norte (UERN). Bibliographic research can be understood as "[...] that which is developed trying to explain a problem from theories published in different types of sources: books, articles, manuals, encyclopedias, annals, electronic media, etc." (HEERDT; LEONEL, 2007, p. 67).

In carrying out the bibliographical research, a search was made for keywords in databases of Google Academic, Periodical Portal of the Coordination for the Improvement of Higher Education Personnel - CAPES, Brazilian Digital Library of Theses and Dissertations - BDTD, in the *Scientific Electronic Library Online – SciELO*-Brazil is on *sites* qualified related to the UN, looking for publications that could contribute to the achievement of the objective of the study. The main keywords used in the searches were: (i) sustainable development; (ii) urban sustainability; (iii) 2030 Agenda; (iv) sustainable cities.

To expand the sources of investigation, documentary research was also carried out, based on the Federal Constitution (BRASIL, 1988); the Statute of Cities (BRASIL, 2001), and the UN Agenda 2030 (BRASIL, 2015), as well as an attempt to understand the urban dynamics of the city of Mossoró from documents and files seen at the City Hall. With documentary research was carried out based on these materials, which according to Gil (2008) can be understood as that which uses materials that have not yet been treated analytically, or, if they have already been, that can be treated differently to achieve the objective that is intended in the research.

It is noteworthy that this study began with the research carried out by Salles, Grigio, and Silva (2013). Later, it was resumed in 2019, with field research. In the empirical research, the technique of applying semi-structured questionnaires with open and closed questions was used, with the academic community of UERN (RN), having as a criterion to be over 18, have lived in Mossoró for more than 5 years, have participated in any action or work related to environmental conservation and (or) preservation, and be a student or servant of the institution.

The questionnaires were applied in April and May 2019, with a total of 70 people, being civil servants and students, at the undergraduate and graduate levels. The choice for this audience was due to the understanding that university institutions are the loci for debates and discussions of themes related to environmental issues. Finally, it is noteworthy that, during the application of the questionnaires, participants were asked to sign the Informed Consent Form (FICF).

2.1 DATA ANALYSIS

After collecting the bibliographic and documentary material, the titles and abstracts of the articles and other materials found were read, selecting only those that brought essential and fundamental information to achieve the research objective. Therefore, a content analysis was performed.

The data were described in the light of content analysis, which is understood as a set of analysis techniques aimed at obtaining, by systematic procedures and objectives of the description of the content of messages, indicators (quantitative or not) that allow the inference of knowledge regarding the conditions of production/reception (inferred variables) of these messages or writings (BARDIN, 2011).

In this sense, content analysis contributed to the reading scope of selected bibliographic and documental materials, deepening the analysis of the information produced concerning the researched themes. The same data treatment was applied to the questionnaires. After this procedure, the information was organized and described in this article in three thematic axes, namely: (i) Contributions to the debate on sustainable development and urban sustainability; (ii) Conceptual reflections on urban sustainability and sustainable cities; (iii) Sustainable City, challenges and solutions, from Mossoró (RN).

3 RESULT AND DISCUSSION

3.1 CONTRIBUTIONS TO THE DEBATE ON SUSTAINABLE DEVELOPMENT AND URBAN SUSTAINABILITY

The notion of sustainable development (SD) did not emerge abruptly and instantly. Before, it resulted from a gradual process of harmful environmental experiences resulting from the predatory economic model that started more markedly in the century XIX and resulted from industrialization, which provided the basis for what is called modernity. Its concept was incorporated into the list of world concerns after the publication of the Our Common Future report (CMMAD, 1991), which became known as the Brundtland Report, a milestone that ensured its political strength. However, its definitive consecration took place at the United Nations Conference on Environment and Development, which became known as the Earth Summit, Rio-92, or Eco-92. The event brought together 178 countries and signed the document

called Agenda 21, which served as a milestone for the adoption of the SD concept for cities, proposing sustainability guidelines for territorial management based on a new development concept that combined preservation, environmental balance, and social equity.

The Brundtland Report consolidated the definition of SD as "[...] one who meets the needs of the present without compromising the possibility of future generations meeting their own needs" (CMMAD, 1991, p. 46). Based on this document, a singular idea was defined: that of economic development that would reconcile concern for the environment. In other words, in a world structured by capitalist productive forces, committed to the perspective of increasing development, a new notion: the need to ensure a careful relationship with natural resources. Two other key concepts are also mentioned in the Brundtland Report DS concept:

> The concept of "needs", above all the essential needs of the world's poor, who should receive the highest priority; the notion of limitations that the stage of technology and social organization imposes on the environment, preventing it from meeting present and future needs (CMMAD, 1991, p. 46).

The concept of SD, thus put, associates development and social justice, resulting in the relationship between development and the environment being established "[...] through moral considerations involving the issue of justice" (LENZI, 2006, p. 102). In these terms, DS would be a process of change that seeks to satisfy fundamental human needs whose satisfaction is a matter of social justice.

It should be noted that one of the criticisms of the concept of DS lies in the fact that the Report does not clearly express the needs it refers to. However, he characterizes them as historically and culturally achievable, understood as essential for the human being that, if not satisfied, compromise their physiological functioning, as well as their constitution as a person (LENZI, 2006).

From this perspective, guaranteeing environmental resources is a matter of social justice. The conceptual tripod of DS was based on three dimensions – economic, environmental, and social – which have, in isolation, their rationality and perspectives. The economic refers to a lower financial expense for carrying out the activity; the environmental refers to alleviating or compensating for the impacts generated on nature resulting from human activities; and the social aims to seek benefits for society – distribution of goods and services, technical and social infrastructure – to generate a better quality of life for all.

As is evident, the convergence of distinct dimensions that are, at least at first, antagonistic, could never be considered an easy discursive effort (PRADO, 2015). However, despite the conceptual contradictions that the expression raises, the concept of SD always leads to a perspective of the future, which associates it with practices in which desirable or undesirable effects, from the point of view of sustainability, can occur.

Thus, that set of practices that carry sustainability in the future is sustainable today (PRADO, 2015). DS, therefore, suggests a permanent legacy from one generation to the next so that everyone can provide for their needs. When considering that the concept of SD suggests the construction of a legacy from one generation to another, "[...] sustainability, that is, the quality of what is sustainable incorporates the meaning of ad external maintenance and conservation of the natural resources" (BARBIERI, 2009, p. 32).

Discussing development sustainability, Barbieri (2009) warns that this requires the democratization of the State, and not its abandonment and replacement by the market, because the State is the only agent capable of confronting it. The author points out that, for its promotion, it is necessary to expand the spaces of citizenship. These, in turn, require the maintenance of democratic regimes and the continuous and constant improvement of their institutional base. This is equivalent to saying, in the words of the author, that "[...] institutional sustainability can be considered as one of the dimensions of sustainability" (BARBIERI, 2009, p. 41).

Another relevant aspect in this discussion on sustainability is the dimension taken by the urban in recent decades, which has changed the focus of environmental problems – previously associated only with the maintenance and preservation of natural ecosystems – towards the city and its management. This direction came from the recognition that the contemporary world lives predominantly in cities and that this is constituted as the main mechanism for appropriating nature.

For Menegat and Almeida (2004), Agenda 21, as a planning instrument for the construction of sustainable societies, in different geographic bases, which reconciles methods of environmental protection, social justice, and economic efficiency, can be considered as a roadmap for sustainability because it implies an ethical commitment of contemporary generations with those of the future. However, the challenges of implementing this Global Agenda were numerous and many criticisms were made about its non-accomplishment.

The discussion on the need to adopt a Global Agenda focused on environmental issues continued and was debated at Rio+20, the United Nations Conference on Sustainable Development, held in the city of Rio de Janeiro in 2012. This Conference marked the 20th year since the United Nations Conference on Environment and Development (Rio-92), contributing to the creation of an agenda aimed at sustainable development for the coming decades.

In short, this event was intended to renew the political commitment to the DS and based on the gaps and assessment of the progress of previous agendas, contribute to the implementation of the decisions adopted by the summits on emerging themes. Thus, themes such as the green economy in the context of the DS, the eradication of poverty, and the institutional structure for the DS were the main themes addressed at the Conference. The final document of this Conference, entitled: The future we want, was the basis for the elaboration of the 2030 Agenda.

In this sense, SDG 11, which deals with "Sustainable Cities and Communities", is presented with the aim of "making cities and human settlements inclusive, safe, resilient and sustainable" (UN, 2015, online). A set of goals are listed to achieve that objective. Here, goal 11. a is highlighted, which deals with supporting positive economic, social, and environmental relations between urban, peri-urban, and rural areas, reinforcing national and regional development planning, and goal 11.6, which aims, by 2030, to reduce the per capita negative environmental impact of cities, including paying special attention to air quality, municipal waste management and others (UN, 2015).

It is observed that, in Goal 11 of Agenda 2030, themes intrinsically related to urbanization, such as mobility, solid waste management, and sanitation, are included in the goals, as well as the planning and increase of resilience of human settlements, considering the needs differentiated from rural, peri-urban and urban areas. Problems that are present in all human settlements become a global concern and challenge the State, institutions, non-governmental

organizations, universities, and society to think of sustainable solutions to minimize environmental problems.

3.2 CONCEPTUAL REFLECTIONS ON URBAN SUSTAINABILITY AND SUSTAINABLE CITIES

The linking of the SD concept to the urban environment occurred for a reason observed in most countries, including Brazil: increasingly, the relationship between humanity and nature is equated through the city, because of the intense urbanization process initiated with industrialization in the 19th century. If, in the first moments, the environmentalist agenda focused the discussion more expressively on the conservationist plan of ecosystems, from the 1990s onwards a new design was configured at the level of the sustainability discourse: the city, as a central locus for the DS.

The United Nations Conference on Environment and Development, known as the Earth Summit, Rio-92 or Eco-92, through Agenda 21, established a milestone for the SD concept, associating it with cities. After this event, several other conferences took place around the world discussing DS and the terms recommended in Agenda 21. One of them, the Second United Nations Conference on Human Settlements - Habitat II, took place in Istanbul, in 1996.

Since then, the concept of a sustainable city emerged related to the search for an alternative form of development to overcome the difficulties imposed by capitalism as a concentrating and excluding economic model. Comprehensive and interdisciplinary, the debate on sustainability, regardless of its field of approach, is always marked by different perspectives, sometimes conflicting and even skeptical. In the specifically urban setting, it is no different: concerns are expressed, and futures are projected regarding what is called sustainable development in the city.

But what are sustainable cities? Sustainable City can be understood as the most lasting type of settlement that human beings are capable of building. It is the city capable of providing an acceptable standard of living without causing considerable damage to the ecosystem or to the biogeochemical cycles on which it depends (ACSELRAD, 2009).

It is noteworthy that the urbanization model adopted for years by developed countries has always considered natural resources as inexhaustible and free. Thus, these countries believe, to this day, that their economic growth is the most important element, and fail to consider the limits of resources. Due to this view, one of the biggest problems facing humanity is related to the consumption pattern adopted in urban centers.

The concept of sustainable cities requires the creation of a new logic of operation, management, and growth, to the detriment of those practiced mainly in the 20th century, following the idea of "expansion with depletion". Every sustainable city develops from an adequate, respectable, and thoughtful link between the built environment and natural geography. Therefore, planning all stages of urbanization is essential so that the city can be well taken care of. Therefore, contemporary models suitable for sustainable development are needed, jointly reformulated by public and private actions.

According to Costa (2000), there is pessimism on the part of scholars regarding the possibility of sustainable development in the city. They see it as a utopia, a purpose that seeks to reconcile the irreconcilable: the growth of the city and its environmental qualification from the unification of fields of analysis of urban development with the field of environmental analysis. These difficulties are attributed to the very notion of sustainability, believing in the

impossibility of its intersection with the urban: "The construction of the city is not done by the convergence of economic, social and environmental interests, but by the constant conflict between them" (PRADO, 2015, p. 92).

Adapting cities to become more sustainable is a long-term process that also requires an effort from the population. When considering that the population, while causing problems that affect cities, is also the one who suffers the consequences. It can be said that sustainable cities are characterized using alternative forms of energy, prioritize public transport, recycle waste and other materials, limit waste, prevent pollution, maximize conservation and promote efficiency.

Despite these questions, urban sustainability, a key factor in thinking about sustainable cities, has to do with the idea of rescuing or ensuring better living conditions in cities and can be defined as the capacity of urban policies to adapt to the provision of services, to the quality and quantity of social demands, seeking a balance between the demands of urban services and investments in structure (ACSELRAD, 2009). A "sustainable" city is one that, for "[...] the same offer of services, minimizes the consumption of fossil energy and other material resources, making the most of local flows, meeting the criterion of conservation of stocks and reduction in the volume of tailings" (ACSELRAD, 2009, p. 54).

From this conceptualization of urban sustainability, derives, therefore, the rational use of natural resources, the good shape of the urban environment, based on the interaction with the climate and natural resources, in addition to the responses to urban needs with minimal transfer of waste and tailings to other current and future ecosystems. Thus, “[...] the hegemonic conception would consist in making the city last in its technical materiality of stocks and flows of matter and energy necessary for urban accumulation” (ACSELRAD, 2009, p. 24).

In projects to achieve the goal of urban sustainability, future horizons are evoked and, to make them viable in the material aspect, the purposes to be achieved for the realities of the present are established. Thus, everything believed to make the desirable duration of the city unfeasible is discriminated: pollution, urban congestion, violence and insecurity, housing deficit and social segregation, income concentration and economic inequalities, poverty pockets, lack of environmental sanitation, presence of settlements at-risk areas, degradation of built and natural environments, mobility and accessibility problems, among others. The list is endless, and, in this debate, different discourses on urban sustainability emerge dedicating themselves to developing the constitutive attributes of what would be the notion of a sustainable city.

According to Dias (2009), without prejudice to any new proposal to solve urban problems, the trinomial consisting of urban planning, effective urban and environmental legislation, and agile action, in addition to an efficient and integrated action of the municipal administration within the scope of urban control and environmental, it is indispensable. This perception leads to the conviction that “Urban planning emerges as an essential process to provide adequate conditions for life and human health and to protect the natural environment from degradation” (DIAS, 2009, p. 230), and “[.. .] be prepared in a multidisciplinary and democratic way, considering the environmental, social and economic issues of the city” (DIAS, 2009, p. 233).

This perspective of urban planning refers to the definition of the sustainable city contained in the City Statute, in which article 2, item I, is recommended as a guideline the "guarantee of the right to sustainable cities, understood as the right to urban land, housing, environmental sanitation, urban infrastructure, transport, and public services, work and leisure,

for the present and future generations" (BRASIL, 2001, art. 2). From the express provision, comes the concept of urban sustainability and the conviction that planning the urban to promote development implies the adoption of mechanisms that contemplate the listed aspects. This means improvements in social indicators materially carried out with actions such as the increase in sanitation infrastructure and public services offered, in addition to the recovery of environmentally fragile areas subject to risks such as floods and flooding.

3.3 SUSTAINABLE CITY, CHALLENGES, AND SOLUTIONS: MOSSORÓ (RN)

In the research, civil servants, undergraduate and graduate students from a higher education institution in the city of Mossoró (RN) were heard. Most respondents are undergraduate students between the fourth and eighth period of the course, 45% of the total. These students have already developed research or extension actions related to environmental issues. They come from the Environmental Management, Biology, Chemistry and Geography courses; 15% are graduates and work as technical servants; 20% are graduate students (incomplete masters); 15% graduate (Masters), and 5% are doctors who act as professors.

When asked about the applicability of the concept of sustainable cities, 74% of respondents considered it utopian and not in line with the reality of Brazilian cities, while 26% believe that the concept is partially implemented through actions taken in some cities in Brazil, more specifically in the Southeast and South regions. 26% of the participants mentioned actions aimed at building sustainable cities, with incremental responses to actions that can contribute to the sustainability of cities.

When asked about the main elements that can be considered when thinking about sustainable cities, 24% said they were quality of life and housing; 20% highlighted access to health, education, and work; 17% considered the improvement of the urban transport service and accessibility; 18% thermal comfort and green areas; 17% mentioned the improvement of solid waste management and sanitation; 4% pointed to access to culture and leisure.

It is observed in the responses of the participants that points that visibly presented themselves as deficits in the city of Mossoró stand out, such as, for example, the green areas, considering that the city is in the Brazilian seminar, with hot weather and high temperatures, and it has only one regulated green area, the Mauricio de Oliveira Municipal's Park. The city lacks afforestation and green areas, despite the existence of a Municipal Afforestation Plan, according to Law n. 2702, of December 10, 2010, which provides for afforestation in the municipality of Mossoró (PREFEITURA..., 2010).

In 2019, the Municipality of Mossoró, through the Department of Parks and Gardens, resumed the afforestation work and announced the signing of an agreement with the Federal Rural University of the Semiarid (UFERSA), intending to plant 10,000 seedlings in two years, with a preference for native species. The agreement established the conditions for technical, scientific, and cultural cooperation, seeking to enable the implementation of Project Meu Bairro Arborizado by the University.

The problem of public transport is also a point that deserves to be highlighted. It is pointed out by research participants as being one of the biggest problems in the city since Mossoró has deficient public transport. As a result, part of the population needs to adopt motorcycle taxis, taxis, and UBERS as means of transport. Bus lines do not serve all neighborhoods and there are delays in getting around. This is a constant complaint of students

in the city, which has two public universities, UERN and UFERSA, in addition to a Federal Institute(IFRN-Campus Mossoró).

Furthermore, there are large private universities in the city and elementary and high schools that require transport to move students. In part, these students are served by transport such as motorcycle taxis, which increases the rates of traffic accidents. In this item, it is important to highlight that those students who live closer to their places of study choose to travel on foot, by hitchhiking (free driving in any vehicle), or by bicycle. However, the high-temperature indices in the city discourage the use of bicycles, which becomes physically exhausting, also considering that the city does not have bicycle paths that can help students safely travel to their educational institutions. In addition to meeting the needs of students, people who need to travel to their jobs end up submitting to using taxis, an illegal practice adopted in the city.

Authors such as Honorato et al. (2015), in their studies, highlighted that the city of Mossoró, like other cities in Brazil, suffers from old problems of urban mobility. In addition to the lack of options for public transport, with the bus being the only one, the service is unsatisfactory and insufficient. There are not enough buses to meet the demand of the entire city and the current urban bus fleet is in a poor state of repair. In addition, City Hall faces difficulties in finding companies that are interested in operating in Mossoró, especially due to the high number of alternative transports circulating in the city. Taxis, for example, act with the illegal practice of filling, which is preferred by the user because it is faster. In addition, the city has many motorcycle taxi drivers, many of whom do not have the authorization to exercise the profession.

The generation and disposal of solid waste in the city of Mossoró was also highlighted by research participants as an issue that deserves concern. The city has a regular solid waste collection, has a landfill and there are associations of recyclable material collectors. However, the number of recycled materials is still low, and few neighborhoods are covered by the selective collection, and it is necessary to expand this essential service for urban sustainability. It is noteworthy that poor management of urban solid waste can cause public health problems, such as arboviruses.

In this direction, Queiroz et al. (2020), in their research on the spatialization of arboviruses in Mossoró, concluded that there is an area greater occurrence of the disease in vulnerable neighborhoods, with an accumulation of solid waste and poor sanitation. The study pointed out that fighting chikungunya fever and other arboviruses caused by Aedes aegypti requires the development of intersectoral actions involving health, environment, sanitation and education, management of urban solids, as well as effective strategies in the short, medium, and long term, not restricted.

When asked about which elements should be considered to build sustainable cities, the following elements were mentioned: economic development and care for the environment, participation, citizenship, politics, inclusion, and culture. It is observed that, in the answers, the main dimensions of sustainability are found economic, social, environmental, cultural, political, and spatial. This understanding is of paramount importance to build sustainable cities beyond the concern with economic growth. It is urgent to think about justice and inclusive social development, environmental viability, and respect for life, now and in the future, based on long-term and non-partisan planning and management, aiming to overcome the urban/rural dichotomy. In this sense,

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Regarding the main challenges and possible solutions for the promotion of sustainable cities, Table 1 presents the responses of research participants about the challenges, followed by a synthesis of possible solutions, as indicated in the literature in the area.

Table 1: Challenges and solutions for promoting sustainable cities, Mossoró (RN), 2021.

Sustainable Cities, according to the proposals of the research participants	
Challenges	**Solutions**
Employment, income generation and distribution, migration flows, socioeconomic and spatial inequalities, low education and poorly qualified labor, poorly trained managers and technicians, lack of planning and public management combined with global environmental agendas, less sprawl, and real estate speculation and policies continued public	Carrying out agrarian reform; investment in tourism, management of local entrepreneurship, family farming and use of biodiversity; promoting the creative, shared, green and low-carbon economy; appreciation of culture and local traditions; universalization of digital access; access to knowledge and social technologies, education, qualification and continuing education, laws and licenses (urban and environmental); application of the City Statute, urban land use planning, and orderly vocational growth.
Law, access to resources and services, mobility and logistics, clean energy, energy self-sufficiency, safety and resilience, water, universal sanitation, housing and management of solid waste and effluents (water and soil contamination), air pollution.	Inclusive and participatory policies and management of the territory (context); public transport, walking and cycling, decentralized and distributed solar and wind energy, technology in integrated management and monitoring of cities, infrastructure, urban equipment, mapping of territorial weaknesses, carbon sequestration, and adaptation to climate change; knowledge and social technologies and low cost and environmental impact (use and reuse water).
Dependence on food and health, sustainable habits and consumption, citizenship, quality, and meritocratic education, evasion of qualified labor, and quality of life and services.	Agroecological (peri)urban agriculture, preventive family health, 5Rs: reduce, reuse, recycle; rethink and refuse; life cycle analysis, positive ecological footprint promotion, civic literacy, local vocations, transforming local knowledge into entrepreneurial activities, encouraging communities to conserve the environment, promoting local networks/partnerships/arrangements (productive/cooperation).
Strong institutions, urban territorial planning, implementation of parks and green spaces, spaces for coexistence and inclusion, mixed-use of land, rural-city integration, and cities to share solutions and resources.	Efficient e-government, transparency, indicators, and monitoring and management instruments (ODS), municipal plans, participatory governance, demonstration pilots, nature-based solutions, revitalization, greater autonomy, municipal environmental zoning, decentralization of collection, distribution, and inspection of the application of resources, encourage local products and jobs, integrate major players with regional organizations, sustainable flow of resources and people.

Source: Field Research (2019).

In Table 1, it is possible to infer that the challenges faced for the promotion of sustainable cities are reflections of a model of spatial organization that was inherited from uneven development, thus presenting challenges such as the universalization of sanitation, adequate housing, vacancy of degraded areas and subject to environmental risks. In overcoming poverty and inequality in access to urban land and associated with old challenges, there are contemporary challenges, the need to reduce the population's impacts on natural environments and resources, climate change and resilience, urban expansion, and the disorderly use and

occupation of the land, the promotion of the exercise of citizenship and participation, the quality of life and the access to services.

The city of Mossoró reflects the reality of other Brazilian municipalities, as its growth took place without the proper applicability of urban planning mechanisms and, consequently, caused socio-environmental problems for the city as, for example, deforestation, irregular constructions, and occupations, increase in the vehicle fleet, emission of pollutants, real estate speculation, lack of basic infrastructure, the deficit of environmental sanitation, social inequalities, vulnerability and deterioration of natural systems, socio-economic conflicts, among others (SALLES; GRIGIO; SILVA, 2013).

The consequences of environmental degradation are most intensely observed in cities, because of an accelerated trend in urban population growth. Cities cause profound changes and problems increase when there is no concern to plan urban spaces with a "look" at the environment, that is, considering social, economic, and environmental aspects.

Urban sustainable development involves a set of public policies that complement each other urban policy, how the city is structured and grows, considering the use and occupation of urban land. It also involves environmental sanitation, concerning public services that guarantee the health of the urban space (water, sewage, solid waste, and rainwater), housing policy, to guarantee the primary function of the city, living with quality and policies of transport to guarantee different accesses to different urban spaces. In addition, work, access to education, health, culture, and leisure must be considered.

According to the study carried out in Mossoró, it is possible to see how the challenges for the promotion of sustainable cities are present in the conception of students and professionals who work in the environmental area. However, the steps to build a local agenda aligned with the 2030 Agenda are a challenge for all Brazilian cities. For Goal 11 of the Sustainable Development Goals to be established, it is necessary to adopt public policies in the different spheres: municipal, state, and federal.

The construction of this agenda must be a constant demand from society. Only through policies aligned or integrated to the urban problems, such as erosion, siltation of watercourses, the constitution of heat islands, lack of green areas, air, noise and water pollution, use of areas for waste disposal, among others, are problems arising from the lack of awareness of the part of the population. Furthermore, inadequate planning or even the lack of it is observable in Brazilian cities. These and other aspects may make the development and adoption of technologies for sustainable cities.

When asked about how to ensure safety and energy efficiency in the urban environment and, at the same time, reduce greenhouse gas emissions, participants mentioned that the possible solution is policies to encourage clean energy production and energy efficiency. Renewable energies, such as solar and wind, were the most mentioned. Participants emphasize that the city of Mossoró, to think about urban sustainability, initially needs to consolidate a base for wind and solar energy production, considering the wide availability of these natural resources in the region. The construction of biodigesters aimed at generating energy from biomass was also pointed out as another possibility for a renewable energy source.

Onshore oil extraction was, for more than 30 years, the most important economic activity in Mossoró. With the decline in the exploration of this fossil fuel, from the second half of the 2010s onwards, there were significant impacts on the local economic dynamics. Over the three decades of oil exploration, numerous environmental impacts were caused, and many are

still present in a significant way in the urban environment. Nascimento et al. (2020), in their research, highlight that inactive oil and gas wells in the urban area of the city of Mossoró demonstrate that the locations of these structures present conditions for the proliferation of the arbovirus vector (Aedes aegypti). The accumulation of rainwater in containment basins and bases of existing or removed equipment within the location of the wells was observed at the sites. In addition, the columns of the inactive well tubes have openings to the environment, which also causes the accumulation of water within the structure of the abandoned exploration well in the urban fabric of the city of Mossoró.

In this sense, as the future is just a possibility, public policies that have sustainability as a guide for development must be produced based on permanent social participation, as this is a path that brings the interests of different social segments to the public scene. In these terms, sustainability is seen as a process linked to democracy, as the only way to respect and recognize the social diversity that is part of urban systems, according to Bezerra, Silva, and Grigio (2020).

4 FINAL CONSIDERATIONS

Taking as an analysis the reflection presented in this article, it is possible to affirm that, regardless of the controversies surrounding the concept of sustainable development, the merits of “sustainable development” as a widely used expression are undeniable. nowadays, especially two issues: in engendering a debate on a global scale on issues inherent to the environment, linked to the development and production of urban space, and in influencing the elaboration of the normative matrix, both in Brazil and in the world.

Promoting sustainability, especially in Brazilian cities, means facing up to several challenging issues, such as the concentration of income and the enormous economic and social inequality, the difficult access to good quality education and environmental sanitation, the housing deficit, and the situation of risk of large settlements, in addition to the degradation of the built and natural environments and the accentuated problems of mobility and accessibility.

Thinking about sustainable cities is to think systemically and consider different lines of approach in understanding the concept, highlighting governance, use, and conservation of natural resources, equity, socio-environmental justice, culture of peace, sustainable urban planning and management, quality of life, culture for sustainability, education for sustainability, creative and sustainable local economic dynamics, responsible consumption, mobility, urban transport, health action, among other factors, as essential for the construction of sustainable cities.

Thus, to think about sustainable cities and communities, as indicated in the UN's 2030 Agenda, in its Objective 11, urban planning is necessary and, among the variables to be weighed, are the urban green areas throughout Brazil and, particularly, in the Brazilian semiarid region, such as Mossoró (RN).

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