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URBAN PLANNING TOOLS TO ACHIEVE SUSTAINABLE DEVELOPMENT GOAL (SDG) 11: STUDY CASE IN BRAZIL

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ABSTRACT

Brazilian urban policy offers the possibility of several urban planning tools, which are responsibility by local governments. Among these urban planning and tax tools is the urban property tax (IPTU). This article aims to analyze the application of urban planning tools with an environmental bias to achieve the Sustainable Development Goals (SDG), with emphasis on SDG 11. The 2030 Agenda has a time horizon of achievement until 2030. Few Brazilian municipalities have implemented urban planning tools with an environmental bias, which motivated our study. The methodology used was Sustainability SWOT as an instrument to support planning, because it allows assessing strengths, opportunities, weaknesses and threats of a specific problem. This study focused on two IPTU legislation with an environmental bias, called Green IPTU, from two cities, Cruz das Almas and Salvador, both in the State of Bahia/Brazil. Results show that environmental features used as criteria for granting a discount on the Green IPTU have an interface with the national goals of SDG 11, such as the improvement of participatory, integrated and sustainable management (SDG11.3) and prioritization of local resources (SDG 11.c). This study contributes to the perception that urban planning tools can promote sustainable and resilient cities.

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INTRODUCTION

The right to an environment of a quality is a constitutional guarantee, in Brazil, the duty to watch over and inspect is regarding collectivity and the public power (Brazil, 1988). The Federal Constitution accepted Federal Law nº 6,938, of August 31, 1981, which instituted the National Environment Policy. Concerning design and territorial autonomy, Brazil is a federative unit composed of States and these by municipalities. The municipalities are the smallest administrative territory, with responsibility for legislating about land use and for environmental matters, as appropriate (Brazil, 1988). Cities are the places with the highest concentration of population, which can potentially have consequences for the environment. Therefore, properly managing human settlements considering the environmental bias meets sustainable local development. Urban policy, established in Articles 182 and 183 of the Brazilian Federal Constitution, was regulated by Federal Law nº 10,257, of June 10, 2001, called the City Statute (Brazil, 2001).

The City Statute brings a series of urban planning tools that allow the fulfillment of social function of cities and property, with a view to making cities more fair and inclusive. Some urban tools have an interface with the Sustainable Development Goals (SDGs), which are part of the 2030 Agenda for Sustainable Development. Concerning cities, there is the SDG11, which aims to "make cities and human settlements inclusive, safe, resilient and sustainable" (UN, 2015; Brazil, 2017). In Brazil, the Institute for Applied Economic Research - IPEA published, in 2018, a paper about readjustment of international goals and national goals related to the SDGs (IPEA, 2018). The national goals of SDG 11 until 2030, according to IPEA (2018) are:

- ensure everyone access to adequate, safe and affordable housing; basic services and urbanizing precarious settlements;
- provide road safety and access to the city through urban mobility systems that are more environmentally sustainable;

- enhance inclusive and sustainable urbanization, enhance capacities for planning, social control and participatory, integrated and sustainable management of human settlements;
- strengthen efforts to protect and safeguard Brazil's cultural and natural heritage;
- significantly reduce the number of deaths and the number of people affected by natural disasters;
- Reduce the adverse per capita environmental impact of cities and to improve air quality and solid waste management indices;
- Provide universal access to safe, inclusive, accessible and green public spaces;
- Support economic, social and environmental integration in metropolitan areas and between urban, peri-urban, rural and twin cities;
- Significantly increase the number of cities that have policies and plans developed and implemented for mitigation, adaptation and resilience to climate change;
- Support least developed countries, including through technical and financial assistance, in building sustainable and resilient buildings utilizing local materials.

In Brazil, the Rural Land Tax (ITR in portuguese) falls within the competence of the Union. The tax on urban land is called Urban Building and Land Tax (IPTU in portuguese), whose tax collection competence lies with the municipality. A municipal law determines what is urban and what is rural regarding territorial area of the municipality. This has consequences for territorial management (restrictions on the use of property) and over land tax. The property must have an effective and socially appropriate use, taking into account the principle of social function limited by the public interest, as it requires compatibility with the socio-economic destination of the property coupled with its use that respects the environment, labor relations, social well-being and the utility of exploiting environmental resources. It is necessary to introduce an environmental bias in the instruments available in environmental, economic and urban policy for achieving sustainable development. Some countries of the Organization for Economic Cooperation and Development (OECD), which had an environmental policy in 2010, have in their legal framework taxes over property, such as the IPTU in Brazil. These countries, in addition to taxing lands and buildings, adopted environmental criteria in their calculation, called ecotaxes, as well as granting benefits on agricultural land, demonstrating environmental benefits. There is the adoption of land tax with environmental bias in countries like Germany, Ireland, Finland, Colombia, Portugal, Italy, Sweden, Austria (European Communities, 2000; EEA, 2002; European Communities, 2009; Pereira, 2010; Sales-Maciel, 2020). Concerning Brazilian scenario, the tax over urban land, the IPTU with an environmental bias, called Green IPTU, is already a reality in about 154 of the 5,570 Brazilian cities, such as Araraquara, São Vicente, Guarulhos, São Bernardo do Campo, Sorocaba, Curitiba, Salvador, Cruz das Almas, Manaus, Caxias do Sul, Maceió, Queluz, among others (Lima e Oliveira, 2017; Meyer, 2018; IBGE, 2019; Maciel et al, 2020). To create the Green IPTU tool, the municipality must design a specific municipal law. The urban instrument called Green IPTU is not a new tax. The only change concerns the inclusion of environmental features in the criteria of possible discounts allowed by municipal legislation, which may result in a more approach result with the 2030 Agenda for Sustainable Development. There are still few Brazilian initiatives regarding urban tools with an environmental bias. This was one of the reasons for conducting this research. Therefore, the objective of this paper is to analyze the application of urban planning instruments with an environmental bias to achieve the Sustainable Development Goals, with emphasis on SDG 11, which deals with sustainable and resilient cities.

MATERIALS AND METHODS

This paper is classified as exploratory research, due the bibliographic survey carried out and the analysis of experiences. The analysis method used was the Sustainability SWOT analysis to compare and identify the strengths and difficulties of the experiences of specifically an urban tool, the tax on urban land, with an environmental bias, comparing its interface with the Development Sustainable Goal 11's targets. Two Brazilian cases were studied, both in the State of Bahia/Brazil: Green IPTU of Salvador and Green IPTU of Cruz das Almas. We chose two studies for the following reasons: both have municipal legislation that has regulated the instrument for more than 5 years, there are results measured by academic studies and both have similar methodologies for discounting the tax on urban property. The World Resources Institute (WRI) created the Sustainability SWOT (S-SWOT) methodology as a support tool for strategic planning to assist organizations in making decisions facing environmental challenges, achieving in the concept of sustainability a broader scope for resolving issues variables involving environmental issues (Metzger *et al*, 2012). The results must be understood considering the adoption of the Green IPTU tool and how the variables identified in the S-SWOT analysis as strength or as potential, can induce behaviors aimed at achieving the targets of SDG 11. The results also include environmental impacts variables of both urban planning instruments (Salvador/BA and Cruz das Almas/BA) whose S-SWOT analysis results in opportunities, as these variables can add benefits to populations and, consequently, with an effect on sustainable environmental management and the achievement of SDG 11.

RESULTS AND DISCUSSION

Urban land must be used considering its social function, as well as meeting the legal parameters of land use, through activities defined in municipal legislation. It means that the concept of property rights submitted to social and collective interest, which promotes local sustainable development. As previously stated, the urban tool called Green IPTU allows environmental variables to grant discounts to urban property owners, and is not a new tax. For this, municipalities, or local governments, need to design municipal legislation to promote this urban instrument. The Cruz das Almas/Bahia Green IPTU, designed through Municipal Law N^{o}. 2361, of November 29, 2013, adopts the following environmental criteria for granting discounts on this urban planning tool, identified as strengths and opportunities, after analysis S -SWOT:

- Adoption of public green areas;
- Gather and reuse of rainwater;
- Elements that benefit the quality of life surrounding the properties;
- Elements to benefit the climate, such as green walls and roofs;
- Use of photovoltaic energy, hydraulic solar heating or wind energy;
- Recognition of waste pickers' cooperatives work;
- Use of sludge from wastewater and reuse of water for non-potable purposes;
- Buildings that promote the saving of resources for energy generation;
- Income generation with the use of undeveloped areas of the property for agricultural and/or urban beekeeping practices;
- Adoption of construction materials made from recycled waste;
- Environmental technologies accessible to property owners with less purchasing power.

Regarding municipality of Salvador/Bahia, Municipal Law nº 8,474, of October 2, 2013, created the Green IPTU. Decree nº 29,100, of November 6, 2017, revoked the previous Decree nº 25,899, of March 24, 2015, which regulated the Green IPTU. The current Municipal Decree nº 31,437, of September 5, 2019, adopt the following criteria in its evaluation system for granting discounts to property owners, identified as strengths and opportunities, after S-SWOT analysis:

- Adoption of environmental and cultural value areas;
- Urban qualification of surroundings;
- Environmental criteria according to international certifications;
- Use of sustainable materials in the building;
- Energy efficiency in buildings;
- Water management and reuse.

Maciel *et al* (2020) analyzed the legislation of Green IPTU in Salvador/BA and in Portugal, the Municipal Property Tax (IMI), concluding that "both legislations was the encouragement of energy efficiency measures, in addition to contributing to the saving of natural resources in energy generation, it also relieves the payment of energy taxes to taxpayers, another economic sector that may be influenced by the adoption an ecological patrimonial tax". Table 1 summarizes the linked between the urban planning tools of two cities, Cruz das Almas and Salvador, in relation to the national (Brazilian) SDG 11's targets.

Table 1. Linking between environmental criteria and Brazilian SDG 11's targets

Environmental criteria from urban planning tools		**SDG11(Targets)**
Salvador Green IPTU	**Cruz das Almas Green IPTU**	
Urban qualification of surroundings	Elements that benefit the quality of life surrounding the properties	11.3 and 11.4
Adoption of environmental and cultural value areas	Adoption of public green areas	
Use of sustainable materials in the building	Buildings that promote the saving of resources for energy generation	11.6
	Use of sludge from wastewater	
	Green walls and roofs	
	Construction materials made from recycled waste	
	Use of photovoltaic energy, hydraulic solar heating or wind energy	
Energy efficiency in buildings	Elements to benefit the climate	11.b
Environmental criteria according to international certifications	Buildings that promote the saving of resources for energy generation	
Water management and reuse	Environmental technologies accessible to property owners with less purchasing power.	11. c
	Recognition of waste pickers' cooperatives work	

Table 1 shows that the urban tools that adopt the environmental bias as a discount on the urban property tax have an interface with several national SDG 11 targets, once they can link factors that help in reaching sustainable cities, such as: enhance participatory, integrated and sustainable management (SDG11.3); utilize local materials(SDG 11.c); protect and safeguard Brazil's cultural and natural heritage (SDG 11.4); reduce the adverse environmental impact of cities (SDG 11.6); enhance waste solid management (SDG 11.6); assistance in improving air quality through renewable energy use (SDG 11.6), by discount criteria that involve climate change mitigation (SDG 11.b).

Local governments have the constitutional prerogative to design municipal legislation about IPTU, so it is a responsibility to local governments for adapting this urban tool with sustainability premises, in order to give conformity to more just, resilient and sustainable cities. Despite few Brazilian initiatives (154 out of a total of 5,570 municipalities), the results presented here show that Green IPTU can be a powerful instrument with a potential interface on achievement 2030 development Agenda, since the environmental variables used as discount criteria can meet certain targets.

In conclusion, we can say Green IPTU can promote environmental protection of several sectors of a city, once it is a strategy that link with other urban management tools, such as the Master Plan and Land Use Law. Some way Green IPTU influence change in resident's behavior, through an environmental fiscal policy that in addition to granting discounts on this mandatory tax (urban land tax), adds revenue to the municipality when investing in society well-being in harmony with the environment.

Finally, this study contributes to the perception that urban planning instruments can promote cities with greater concern for urban environment, with participation of citizens in planning and managing process their cities. In the specific case of this paper, social participation has a strong contribution because it is up to the owner the initiative and the burden of implementing individual measures in their properties, which will be the object of granting a discount in Green IPTU.

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