




# Sustainable neighborhoods in Brazil: a comparison of concepts and applications

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Received: 19 August 2018 / Accepted: 2 August 2019 / Published online: 12 August 2019  
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## Abstract

Contemporary socioeconomic and environmental situation leads to a depletion of the natural resources and social disparities. This condition is even more dramatic in the developing countries. So, human society becomes dependent on urban planning to make cities and neighborhoods more sustainable. Thinking about the sustainable urban planning in the context of the human society dependency, this study compares three Brazilian neighborhoods, planned as sustainable urban units: Pedra Branca (Santa Catarina), Ilha Pura (Rio de Janeiro) and Jardim das Perdizes (São Paulo). To achieve this purpose, we are performing an analysis, which shows the establishment of common principles to conceptual guidelines of these neighborhoods, as follows: New Urbanism (NU) concepts, which guide Pedra Branca project; Leadership in Energy and Environmental Design—Neighborhood Development Rating System (LEED ND), applied to Ilha Pura; and “Alta Qualidade Ambiental—Bairros e Loteamentos” (AQUA B&L), applied to Ilha Pura and Jardim das Perdizes. We are using a conceptual framework to group five common principles of urban sustainability: local interaction, mobility, mixed use, natural resources and innovation, and socioeconomic participation. These principles are used as a common base to proceed to a comparison between the neighborhoods. Findings are showing that the NU concepts are wider in applications and imprecise, concerning social aspects, while LEED is more detailed and comprehensive, but more focused on the environmental aspects, as for AQUA—it is more equalized and adapted to the Brazilian context, even though it is narrowed in performance. About Brazilian neighborhood, Pedra Branca, it is more comprehensive in socioeconomic and environmental aspects, but less technological than Ilha Pura and Jardim das Perdizes. Nevertheless, this study suggests that sustainable neighborhoods could encourage Brazilian eco-friendly cities’ development by incorporating active participation from the public stakeholders, ensuring to cover all social and economic segments to mitigate social disparities.

**Keywords** Sustainable neighborhoods · Sustainable labeling system · Inducing development · Sustainable framework

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## 1 Introduction

Sustainability has many definitions, including the ability to long-term “self” sustenance (Geraldino and Mendonça 2006) to encompass interactions between economic factors, political, environmental and social (Nunes 2009). Therefore, we can say that the sustainability is searching balance and harmonious relationship between environment and human settlements.

Following this idea for a balanced development and harmonious relationship between the nature and the cities, the United Nations (UN) had developed several common goals for sustainable development. They had focused the goal 11 in sustainable cities and communities (Griggs et al. 2013). Rural–urban migration and the transformation of rural settlements into towns and cities have been important determinants of rapid urban growth, but there has also been a general convergence in lifestyles between urban and rural areas as advances in transportation and telecommunication have caused distance and time to collapse (Cohen 2006). In developing countries, this happens dramatically.

The operational complexity of the sustainability appliance in the concept of urban planning makes it necessary to choose an optimum scale, which simultaneously facilitates and influences other similar initiatives, to become a transformative element (Nunes 2009). Planning in the scale of the neighborhood is recognized as essential for achieving sustainable development (Sharifi 2016).

The development of the suburban areas has brought to disconnection and fragmentation of the cities in multiple ways. The neighborhood, as a unit disintegrates, and the social ties begin to fray: families are leaving, neighbors are becoming increasingly hesitant to congregate on the streets, and economic activities are eroding; economic opportunities for individuals and families are becoming minimal, placing a huge burden back on the community (Duhl and Sanchez 1999).

Rescuing the sense of community through a sustainable neighborhood cannot only contribute to the mitigation and effects of urban sprawl and its fragmentation, but also to the anthropic impact, it causes on the environment. Consequently, a neighborhood might represent an ideal scale, able to gather various functions and integrate its residents, forming a functional unit within a city. In this regard, certification systems for sustainable neighborhoods began to emerge in the wake of Agenda 21 and as a continuation of certification systems for buildings (Wangel et al. 2016).

In the Southern Hemisphere, a certain delay in the development and application of the new technologies and urban improvements motivates their copying and direct appliance. According to Watson (2016), approaches to urban planning originated in the global North, often based on assumptions regarding specific urban contexts, are reproduced in southern cities, whereby their growth dynamics are now the dominant urban reality. In this sense, these actions are resulting in marginalization of the population, techno-managerial and marketized systems of government, generating conflict (between governing and administration), survival (poor and marginalized people).

This way of implementing is offering one way of understanding why, so often, sophisticated and “best practice” planning and policy interventions have unintended outcomes (which is not to deny that other less explicit intentions are may be driving these interventions). Therefore, the usage of global policies leading to sustainability can be successful only if they are adopted for a local context, depending on the case of appliance. In the case of the South American cities, such practices require an extra attention on issues such as, those mentioned above, marginalization, social injustice, territorial and social balance.

An expressive increase of the real estate market (housing) affected Brazilian cities in the recent years—especially between 2009 and 2015. This is known as the urban sprawl, which expanded radically in these years (Maricato et al. 2018). Urbanization in Brazil occurred under unemployment, underemployment and low-paid employment, and the presence of leaflets in medium and small cities (Santos 1993).

According to Couto (2003), Brazil has imported a programmatic and technical standardization in mobility, solutions on construction and segregation of land use. In addition, as a promise, the modernity has been represented by the access to advances in technology. The urban sprawl and the attempt of its autonomy before the urban fabric regress have been naturalized. Part of the imported promises can be connected with the implementation of the city-nature utopia, and the creation of the “unique” character of a place. As a result, the land use (rural and urban) in Brazil has remained at the center of social conflict in the country for 500 years, with many interests at stake, strong and well-organized lobbies economic and political, including international (Maricato et al. 2018).

Instead of a healthy use of the public space, a characteristic of previous Brazilian urbanization, closed condominiums emerged in Brazil in recent urban history, a practice established since the 1960s (Couto 2003). This scenario of social disparities aggravates environmental conditions, urban and rural included.

Brazil is adopting urban concepts and strategies from Europe and North America with their instruments, methods, tools and labeling systems on sustainable neighborhoods projects. Contrary to the condominiums, these sustainable neighborhoods are planned to be inclusive and integrated in the urban spaces. In this sense, it is imperative to observe how these leading criteria are working in Brazilian reality. This is a topic, which requires a deeper research and a wider critical review.

In the case of this work, the text is showing the investigation on three Brazilian sustainable neighborhoods (built) and their sustainable approaches. For the purpose of the investigation, we have blended common criteria adopted in the three districts. Using these criteria, the research is comparing their sustainable concepts: New Urbanism, LEED ND and AQUA B&L, to facilitate the comparison between these districts and carrying out a pilot critical analysis.

## 2 Background

Worldwide governors, researchers, politicians, specialists are noticing the need of change in the way we humans create, maintain and develop our settlements. The resources (food, water, land, gas, oil, etc.) are disappearing little by little, but the population is growing faster and faster, the scale of urbanization is rapid, and the climate change is more than obvious. In a global scale, the plans and policies are getting oriented into a direction ensuring the creation of “sustainable cities and communities.” This issue is highlighted as a GOAL 11 in the 2030 Agenda for Sustainable Development of The United Nations. The goal is focused on sustainable development, including sustainable urbanization and capacity for participation, integrated and sustainable human settlements planning and management in all countries to make cities more inclusive, safe, resilient and sustainable (UN 2015). The Agenda has been adopted by several governments in September 2015 at UN Summit (BMZ 2017).

Sustainability, resilience of cities and the concerns about the implementation of the sustainability tools are not a novelty. Campbell (1996) has already observed a

antagonism and conflicts in dynamics of cities: economic growth, fairly distribution and ecosystem maintenance. Karol and Brunner (2009) studied the main differences between various initiatives, where the focus is placed on one or other category of sustainability, such as environmental care, natural resource depletion, societal well-being and economic viability. The researchers are also putting extra attention on the particular themes and sub-themes, which are being measured in their work.

Another approach on achieving sustainability has been shown in Kenworthy's work (2006). For him, thinking about sustainability, it is important to consider urban dimensions, such as land use, environmental protection, non-polluting transport, technologies for natural resources, waste and water management and employment creation. The European Union pioneered a debate on a "sustainable city" and on new approaches of urban planning, and so far, three tools have been considered as a way to achieve sustainable urban development: Local Agenda 21, neighborhoods planning and environmental assessment methods (Allemand 2009). Since then, a number of tools have been developed to assist urban planners in their pursuit of sustainable development, from certifications, methods, modeling and software.

In the methods of assessment, the boundaries between the city and the community are not so visible and strict and make uncertain what is the most appropriate scale in any sustainability assessment: the boundaries of the community, as well as the connections of people with their surroundings, should be adapted case by case (Berardi 2011).

The planning of the neighborhood's is following urban trends such as Garden City, Neighborhood Unit, Modernism, Neo-traditionalism and Eco-urbanism; this latest movement aims to contribute to the solving of the problems associated with the global environmental change, but historical problems such as social equity have not yet been completely addressed (Sharifi 2016). It appears that the literature on sustainable development revives the previous debate about urban form, supports existing approaches and enhances them with environmental rationalization, further precision and with principles of sustainable development and ecological design (Jabareen 2008).

Although neighborhood planning has a relatively long history, it was not until the early years of the twenty-first century that planners and environmentalists began to design tools for Sustainability Assessment (SA) in the neighborhood scale (Sharifi and Murayama 2013). Several labels for sustainable certification to build spaces emerged in the mid-1990s and mid-2000s (Wangel et al. 2016); they provide explicit evaluation criteria to guide projects, including related to sustainable development of a neighborhood. Such labels act as a support instrument to designers, consultants and managers, planners and environmentalists in the search of best solutions, through the establishment of specific processes, criteria and indicators, certification systems for sustainable neighborhoods promise to provide guidance for urban sustainable development (Talen et al. 2013; Wangel et al. 2016).

Aside from all this, it is not clear that certification covers all aspects of sustainability in human settlements. A study about BREEAM-C and LEED ND includes aspects related to ecological and socioeconomic sustainability, but several important features of sustainability are neglected: such as toxic substances and emissions embodied in buildings and infrastructure, as well as environmental and socioeconomic impacts occurring outside the development project's geographic boundary (Wangel et al. 2016). In addition, they don't get enough attention by the neighborhood sustainability assessment systems (Reith and Orova 2015). However, this systems are evolving and stimulating competitiveness, fostering innovations and striving for continuous improvement, developing different certifications over the years: *PIMWAG*, in Finland; *Hqe2R*, in France, Germany and other European

countries; the *LEED neighborhood* in the USA; and the *Leader TO V 2.00*, Portugal (Nunes, 2009).

These certified sustainable neighborhoods might become a mere piece of urban entrepreneurship, which is a transposition of principles and techniques from the scope of business management to urban policy (Harvey 1989). The management of cities is often “guided by criteria such as competitiveness, attractiveness and narrowing the scope for the inclusion of political objectives in the planning, and shortening its time horizon” (Van-nuchi 2017); in this regard, neighborhoods and districts are exposed to this trend.

The main certifications of sustainable construction in Brazil are LEED and AQUA HQE, based on the international labels, which have gained market space and promote the valuation of projects focused on sustainability (Herzer et al. 2016). Sustainable neighborhoods are representing comfort and safety islands, beauty and tranquility oasis: these projects and equipment, which received increasing public support from the cities, undeniably have presented in front of their consumers attractive images and almost idyllic speech (Köhler 2015).

In this sense, this work aims to investigate the case of three Brazilian neighborhoods, created following the adopted sustainable principles, categorizing each labeling systems and sustainable urban guidelines into a simple and understandable framework. New Urbanism, LEED ND and AQUA B&L are presenting sustainable principles and strategies, tackling concrete urban problems.

## 2.1 New urbanism

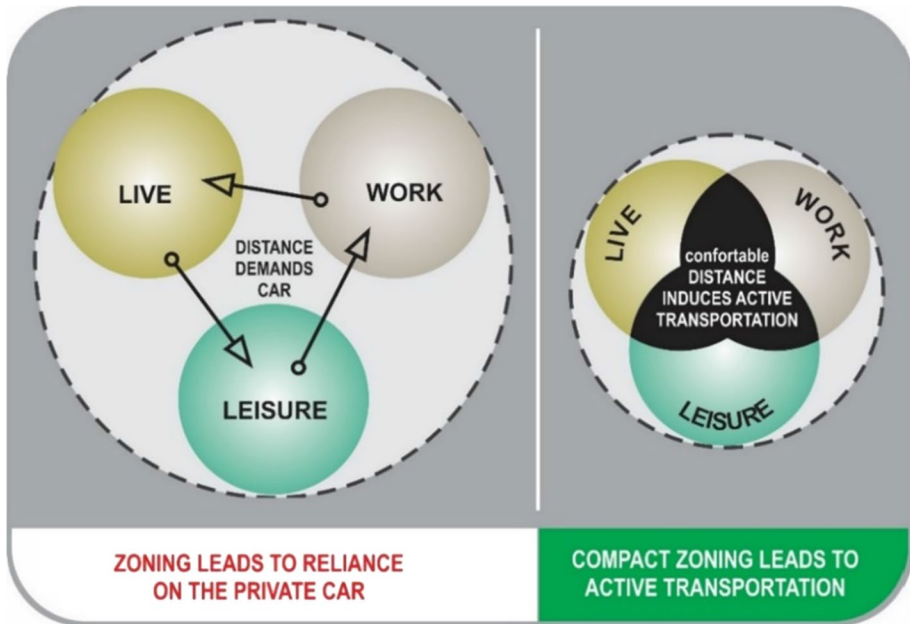
New urbanism is an urbanistic model that emerged in the USA, in the 1980s, evolving from urban concepts such as garden cities, reacting against the American suburban growth pattern to emphasize the importance of dense (Fig. 1), small cities, where the mobility of urban dwellers is done on foot or by bicycle, and the use of cars can be restricted (Ribeiro 2010).

New Urbanism (NU) is a movement, which aims to reduce sprawl and improve social welfare through changes in the built environment that produce compact, socially diverse and pedestrian-oriented settlements (Trudeau 2013). The principles of the new urbanism (Table 1) can be applied progressively to projects at a full range of scales from a single building to an entire community (Plater-Zyberk and Donnelly 2010).

These paradigms are influencing the rating labeling systems for sustainable neighborhoods. All emerging environmental evaluation methods of buildings have emerged in the 1990s. Their aim is to encourage market demand for higher levels of environmental performance, providing both assessments for the diagnosis of possible intervention needs in the built stock. They also aim to guide designers or support the assignment of sustainable construction label (Silva 2003). Although it is not a real labeling system, New Urbanism has been given the grounds of the LEED ND criteria and it also can be found in the Smart Growth principles (Albrecht et al. 2010).

## 2.2 LEED ND and AQUA B&L

Unlike buildings certifications, LEED ND is focusing on the site selection and surroundings relationship. It is designed to certify projects varying in size, ideally around 1.3 km<sup>2</sup> (CNU 2000). To Talen et al. (2013) LEED ND rating system provides a metric to help communities prioritize future development patterns, since the slowed development industry



**Fig. 1** NU recommends a compact city, less dependent on motorized transport. Based on Rodgers (1997)

from 2009 opened a window for an urban growth reflection about the future course of cities across the USA. LEED ND is also divided into macro-criterion (pre-requisites) and criterion (see the summary in Table 2). In addition, it aims to reduce the use of land, improve air quality and the relationship between built space and nature, focusing on people and quality of life.

LEED ND is using a scoring method, giving higher weight to the criterion of macro-pattern and the *design* of the neighborhood, followed by the infrastructure, the green buildings and the smart location and connection. It allows multiple levels of certification: certificate (40–49 points); silver (50–59 points), gold (transitioned) and platinum (79–110), which vary according to the score (CNU 2000).

AQUA B&L certification aims to improve the quality of the territorial planning and to contribute to the change of the development of Brazilian society. The certification includes the elaboration of the quality standard ISO 9001 and the environmental management standard ISO 14,001. In addition to the document, it also includes the Urban Environmental approach of the French Agency ‘*Agence de l’Environnement et de la maîtrise de l’Energie*’ (ADEME), although AQUA is implementing diverse indicators.

Vanzolini (2011) affirms that AQUA HQE was created to adhere to the Brazilian reality, since its certification has adapted certain criteria, such as regulations, standardization and climatic conditions, social and cultural aspects. These criteria are forming two main elements: the Management System of the Neighborhood—from Portuguese “Sistema de Gestão de Bairros”/SGB); and neighborhood environmental quality—from Portuguese “Qualidade Ambiental do Bairro” (QAB) (Mandaji 2014). SGB refers to the project organization and coordination. It is used for the evaluation of the project’s performance criteria in all its phases. Such criteria, according to Vanzolini Foundation (2012), are divided into three major categories: integration and coherence of the neighborhood, natural resources

**Table 1** Summary of new urbanism criteria (2011)

Macro-criterion	Criterion
Walkability	Most services and objects within a 10-min walk of home and work. Pedestrian-friendly street design. Pedestrian streets free of cars in special cases
Connectivity	Interconnected street grid network disperses traffic and eases walking. A hierarchy of narrow streets, boulevards and alleys. High-quality pedestrian network and public realm make walking pleasurable
Mixed use and diversity	A mix of shops, offices, apartments and homes on site. Mixed use within neighborhoods, within blocks and within buildings. Diversity: people, ages, income levels, cultures and races
Mixed housing	A wide range of types, sizes and prices in closer proximity
Quality architecture and urban design	Emphasis on beauty, aesthetics, human comfort and creating a sense of place; Special placement of civic uses and sites within community. Human scale architecture and beautiful surroundings nourish the human spirit
Traditional neighborhood structure	Discernible center with public space at center. Importance of quality public realm; public open space designed as civic art. Contains a range of uses and densities within 10-min walk. Transect planning: Highest densities at town center; progressively less dense toward the edge, to conceptualize mutually reinforcing elements, creating a series of specific natural habitats and/or urban lifestyle settings; integrates environmental methodology for habitat assessment with zoning methodology for community design. The professional boundary between the natural and man-made disappears, enabling environmentalists to assess the design of the human habitat and the urbanists to support the viability of nature. This urban-to-rural transect hierarchy has appropriate building and street types for each area along the continuum
Increased density	Concentration of buildings, residences, shops and services closer together for ease of walking, to enable more efficient use of services and resources and to create more convenient, enjoyable place to live. New Urbanism design principles are applied at the full range of densities from small towns, to large cities
Green transportation	A network of high-quality trains connecting cities, towns and neighborhoods together Pedestrian-friendly design that encourages a greater use of bicycles, rollerblades, scooters and walking as daily transportation
Sustainability	Minimal environmental impact of development and its operations. Eco-friendly technologies, respect for ecology and value of natural systems. Energy efficiency; less use of finite fuels. More local production. More walking, less driving
Quality of life	Taken together these add up to a high quality of life well worth living and create places that enrich, uplift and inspire the human spirit

and environmental quality and health of the neighborhood. (Table 3 shows the sum of the criteria.)

Unlike the LEED system, there is no score involved in the AQUA HQE certification. It is based on the assessment of performance levels: good, superior and excellent. To achieve certification, the minimum is to reach four categories in the excellent level, five in the



**Table 2** Summary of LEED ND criteria. Adapted from USGBC (2016)

Macro-criterion	Criterion
Smart location and linkage	This macro-criterion refers primarily to the adequacy of the environmental variables in the neighborhood specific to the evaluated sites. Conservation and preservation of habitats, water bodies and flooded plains. The evaluation includes also sites with low dependence on cars, requiring less travel between home and work. It is stimulating public transport, walking and cycling. The long-term conservation is also an element to consider
Neighborhood pattern and design	The design of the neighborhoods requires streets, which encourage sidewalks, easy access to public places, private and recreational opportunities. The center zones are supposed to have mixed functions, and the neighborhood should provide local food production. In addition, the Community is expected to engage with the site, actively participating in its construction and maintenance
Green infrastructure and buildings	This criterion requires certifications of buildings, with efficiency and smart use of water; reuse of old buildings; disposal of waste; insolation; efficiency and use of renewable energy; preservation of historical values and reduction of pollution
Innovation	Investment in innovation and performance, as well as stimulating the LEED professionals working in the design and neighborhood's implementation
Regional priority	Set to stimulate strategies based on local characteristics: environment, social, health and others

**Table 3** Summary of criteria AQUA B&L. Adapted from Vanzolini Foundation (2012)

Macro-criteria	Criterion
Integration and neighborhood coherence	Territory and local context Density Mobility and accessibility Heritage, landscape and identity Adaptability and evolutionary potential
Natural resources, environmental quality and health of the neighborhood	Water Climate and energy Materials and urban equipment Waste Ecosystems and biodiversity Natural and technological hazards Health
Social life and economic dynamics	The Project Economy Functions and a plurality Public spaces and environments Insertion and training Economic attractiveness, dynamics and local training structures



superior level and eight in the good level or to show the good as a minimum performance in all categories (Moraes 2013). In this sense, we can talk about levels of certification. For each of the criteria, there are specific indicators, with mandatory requirements, which may fit depending on the scope of the project and if justified to reinforce the character of the adaptability of the certification (Mandaji 2014).

### 2.3 Sustainable neighborhoods in Brazil

Brazil has modest experience in the creation of sustainable neighborhoods. However, there are several examples, which are framing the experience in this matter, created in the past decade. In this text, we will focus our attention on three of them Ilha Pura, Pedra Branca and Jardim das Perdizes.

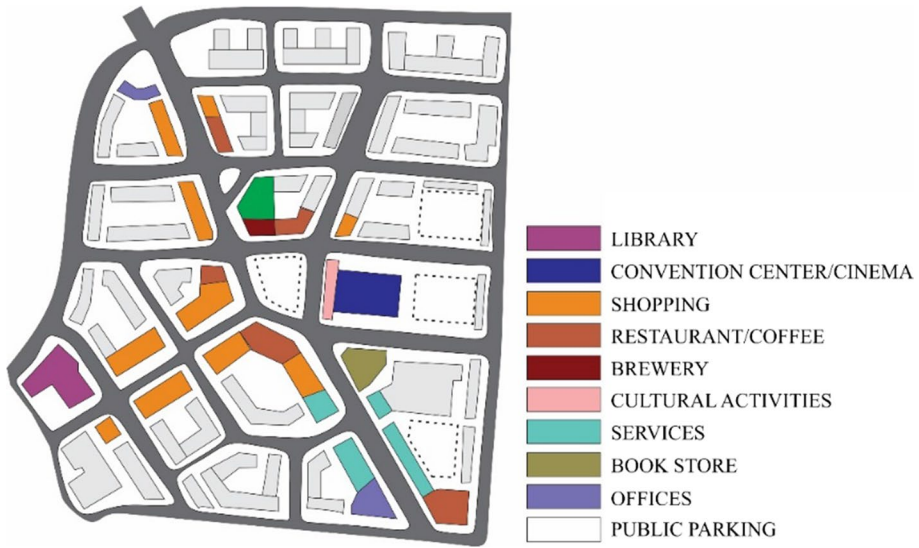
Pedra Branca is a sustainable neighborhood from Palhoça/Santa Catarina (Fig. 2), a municipality formed by German, Portuguese and Italian immigrants, as well as migrants from the interior of Santa Catarina state, attracted by the proximity between the city and the capital of the State, Florianópolis.

Strong migration movement and urbanization caused serious problems to the regional urban infrastructure, demanding a process of urban reconfiguration of the metropolitan area. Later, it was made from a company called “Pedra Branca City” that would name the neighborhood later: the reconfiguration started as a large intervention located in the outskirts, covering an area of approximately 1.500,000 m<sup>2</sup> (Aravecchia 2016). The class disparities in the municipality started growing in the same time when the occupations of irregular houses without basic conditions were turning into a mixture of high-standard and middle-class blends at the downtown vertical areas (Pereira and Ribeiro 2008). This intervention became the start of a long-term project of a sustainable neighborhood, called Pedra Branca.

Although Pedra Branca is not a “certified” neighborhood, it was conceived in New Urbanism mold concepts. It was based on what was later called “Decalogue,” also known as the ten principles: (1) to live–work–study–entertain in one place; (2) pedestrian priority; (3) mixed use and complementarity (Fig. 3); (4) diversity of residents; (5)



**Fig. 2** Neighborhood Pedra Branca. *Source:* (“Pedra Branca Cidade Criativa” 2015)



**Fig. 3** Mixed use plan for Pedra Branca. Adapted from Ribeiro (2009)

sense of community; (6) equalized density; (7) sustainability and high of the built environment; (8) attractive and safe public spaces; (9) harmony between nature and urban amenities; (10) connectivity and regional integration (Ribeiro 2010). Pedra Branca allege to provide complete infrastructure (apartments, shops, offices, university, schools, banks, restaurants, parks, squares, hospital) within reach of all inhabitants (Meira et al. 2013).

High density (compact city) allows the use of public spaces and provides environmental preservation, reducing gas emissions; improving energy performance, public transportation and energy, water, telephony, networks and collecting system (Meira et al. 2013). The architectural and urban planning offices and important national and international consultants (including Jaime Lerner) as well as three laboratories of the Federal University of Santa Catarina entitled itself as a new landmark in urban projects for a public and private initiative (“Pedra Branca Cidade Criativa” 2015).

Regarding certified sustainable neighborhoods, Brazil has both LEED and AQUA enterprises. In quantity, GBC Brazil (2018) registered 10 LEED ND projects, which is a modest value compared to building certification (Figs. 4, 5).

Comparing both certification registries, AQUA showed a high percentage of neighborhood initiatives: 13% of the total of the registered enterprises against 1.3% from LEED (Fig. 6).

Although several initiatives to implement LEED ND registries emerged, still just few projects achieved the certification process (Table 4).

Even though LEED is the most known sustainable certification tool for buildings, AQUA increased certified projects in the last few years. Ilha Pura is the most certified sustainable Brazilian neighborhood: holder of three labels (LEED ND, AQUA Brazil and Casa Azul). Located in the city of Rio de Janeiro, with an approximate area of 870,000 m<sup>2</sup>, build to house the Olympic Games 2016 athlete’s village (accommodation capacity of 18 thousand athletes) (“Ilha Pura” 2016). It has 31 residential buildings divided into seven condominiums (Figs. 7, 8), with apartments for two to four

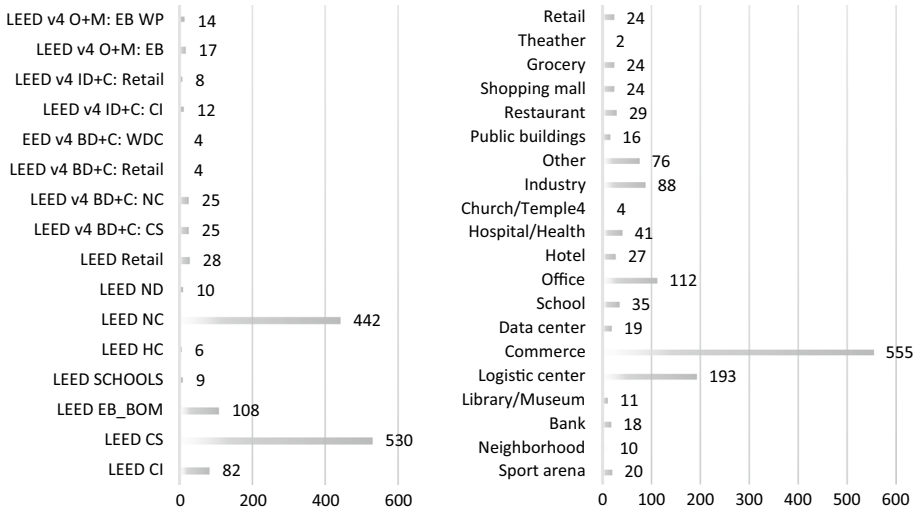


Fig. 4 LEED registries for type and built environment use. Adapted from GBC Brasil (2018)

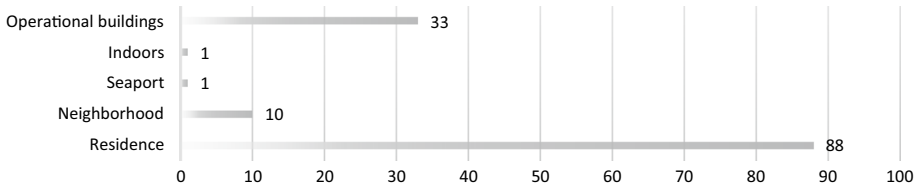


Fig. 5 AQUA HQE registries for built environment use. adapted from Fundação Vanzolini (2018)

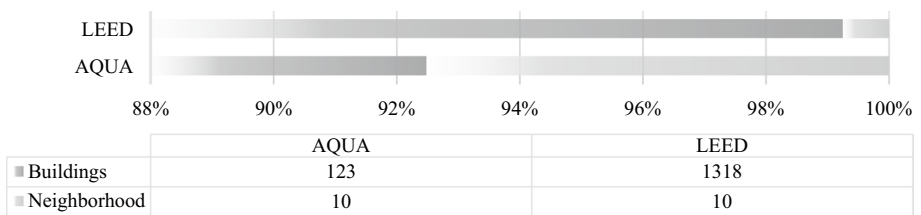


Fig. 6 AQUA and LEED registries of buildings and neighborhoods

bedrooms, with residences, and a public park and recreation areas of 72,000 m<sup>2</sup>, which corresponds to approximately 8% of the area of the same (Rios 2014).

The built space area is covering over than 800 thousand square meters; this condominium is expected to have a park (private) for the dwellers—and exclusive for dwellers only—leisure sidewalks, which is reproducing Copacabana paths, but with controlled access, as well as a small commercial center, serving as a transition zone, so that residents could stay in the neighborhood without having to go out for activities other than living (Köhler 2015).

**Table 4** LEED ND Register and certification of Brazilian neighborhoods. Adapted from GBC Brasil (2018)

Project	City/State	Level	Points	Register date	Certification date
Ilha Pura	Confidential/RJ	Certified	49	14/05/2012	09/04/2014
Ilha Pura	Rio de Janeiro/RJ	Certified	43	29/05/2015	23/05/2016
BMX—Parque da Cidade	São Paulo/SP	Silver	51	04/04/2013	16/12/2014
Confidential	Confidential/DF	—	—	28/05/2012	—
Confidential	Confidential/PE	—	—	23/07/2012	—
Confidential	Confidential/SP	—	—	17/11/2014	—
QUARTIER	Pelotas/RS	—	—	06/01/2014	—
Reserva Bouganville	Parnamirim/RN	—	—	16/06/2016	—
Reserva Camará	Confidential/PE	—	—	18/05/2016	—

**Fig. 7** Ilha Pura Project virtual model. *Source:* “Ilha Pura,” (2016)

AQUA B&L has few certified sustainable neighborhoods, as observed in Table 5, including Ilha Pura and Jardim das Perdizes.

Jardim das Perdizes (Figs. 9 and 10) is the first AQUA certified sustainable neighborhood. It is covering a plot of approximately 250,000 m<sup>2</sup> in the region of Barra Funda/Água Branca, São Paulo. It is predominantly residential; it is supposed to raise 32 towers in an area of 250 thousand meters squares, which is claiming to be “the most modern planned district of São Paulo” (Vannuchi 2017). It is established as a planned neighborhood: 28 towers (25 residential arranged around this central area, with apartments of varying sizes, 1 corporate, 1 commercial, 1 hotel) and a service center (strip mall)—which will provide the neighborhood with basic daily services (Macedo 2014).

The central part is an enormous green area (about 50 thousand m<sup>2</sup> between parks and gardens) for a coexistence and leisure. It has a central bicycle path, a hiking trail,





**Fig. 8** Ilha Pura Project. *Source:* Brasil (2019)

**Table 5** AQUA B&L stages in Brazilian neighborhoods. Adapted from Fundação Vanzolini (2018)

Project	City/State	Pre-project	Project	Execution	Operation
Damha II	Campo Grande/M	✓	✓	–	–
Pq. Residencial Damha I	Campos dos Goyatacazes/RJ	✓	✓	–	–
Residencial Damha Golf I	São Carlos/SP	✓	✓	–	–
Jardim das Perdizes	São Paulo/SP	✓	✓	✓	2013
Bairro Ilha Pura	Rio de Janeiro/RJ	✓	✓	✓	2016

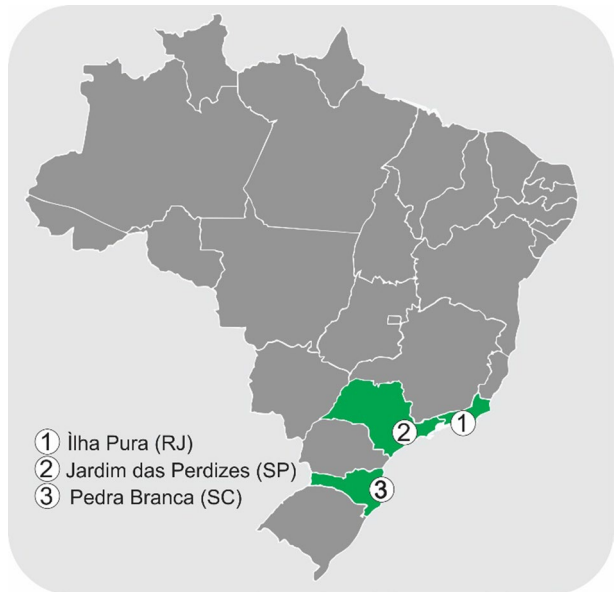


**Fig. 9** Parque das Perdizes model



**Fig. 10** Parque das Perdizes. *Source:* Google Earth

**Fig. 11** Map of Brazil with the location of the sustainable neighborhoods studied



a children's park, a space for a better age, as well as other items focused on well-being, technological differentiation and better environmental presentation, among them: lined streets with wide sidewalks, by wide green stripes, underground wiring, Wi-Fi network, efficient LED lighting (Macedo 2014).

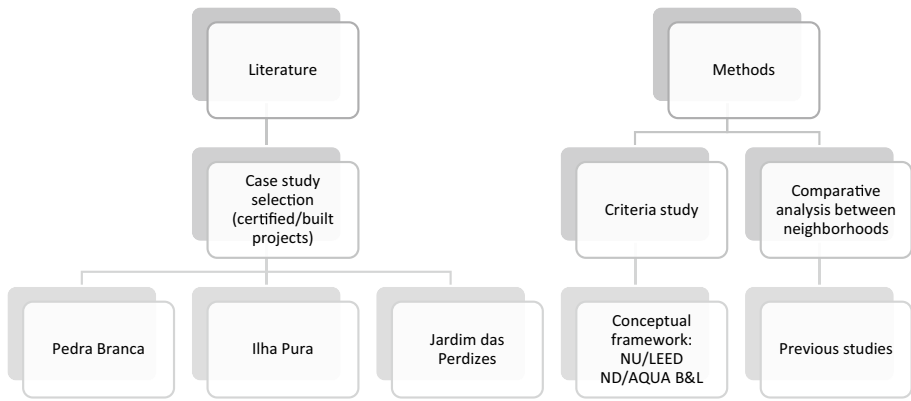


Fig. 12 Stages of this research

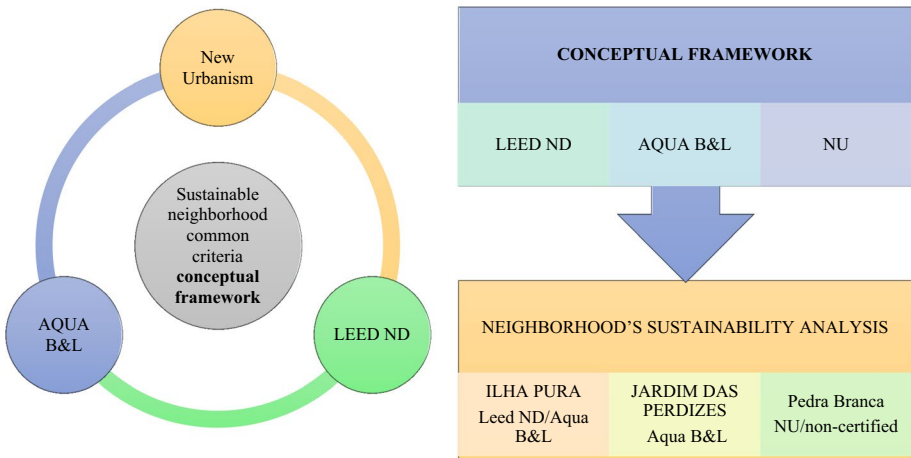


Fig. 13 Conceptual framework analysis: commons principles to NU, AQUA and LEED criteria and application

### 3 Methods

The research is comparing the conceptual guidelines of the Brazilian sustainable neighborhoods Ilha Pura, Pedra Branca and Jardim das Perdizes. (Location for each is shown in Fig. 11.) First, the sustainable neighborhoods were identified (all built); second, the methods of their creation were examined—sustainable projects/labeling systems—New Urbanism, LEED and AQUA; and third, restrictions were set to create a comparable structure, in our case certified neighborhoods, cited in previous studies (Macedo 2014; Mandaji 2014; Rios 2014). This approach is excluding the BMX Parque da Cidade project.

The study has a qualitative approach. It aims to collect the literature from sustainable neighborhoods in Brazil (see the methodological stages in Fig. 12).

To compare the chosen neighborhoods, certified as sustainable, it was initially necessary to form a set of simple guidelines to allow a qualitative examination of these districts.



We are opting to use a conceptual framework as a tool for simplification of common criteria, different precepts of NU, AQUA B&L and LEED ND (Fig. 13). The matrix structure is visually simple and may facilitate recognition of patterns in the data, including drawing attention to contradictory data, deviant cases or empty cells (Gale et al. 2013).

We are proposing a framework as a concise, comprehensible and simplified method to categorize the structures (Fig. 13). It is based on the previous literature (Keeler and Vaidya 2016; Moraes 2013; Murrain 1996). We chose these neighborhoods because they are built environment, labeled as a “sustainable” (certified or non-certified) to perform a comparative study (differences and similarities). Finally, the study is using a critical and qualitative analysis, to highlight the implications and the challenges encountered for the expansion of the sustainable neighborhoods in Brazil.

## 4 Results and discussion

### 4.1 Conceptual framework and comparison between sustainable criteria

The framework is presenting five basic principles: local interaction, mobility, mixed use, natural resources and innovation, and socioeconomic participation (shown in Table 6 and Fig. 12). The idea is to combine and connect them (the same five principles of the framework: local interaction, mobility, mixed use, natural resources and innovation and socioeconomic participation) as it is shown in Table 6.

The grouping in these five criteria (thus organized) is proposed from the authors to carry out the analysis of the research. Nevertheless, they are already well known in the literature and described singly in the previous studies (see Table 7).

All environmental topics are well designed in the three studied conceptual models. Comparing the three sustainable criteria proposals, we noticed that AQUA B&L does not have a topic directed to mixed use; yet, the social and economic participation is more detailed, with a broader range of criterion. The social NU agenda, although often superficially focused on a limited ideal of “community,” embodies a deeper practical struggle with the problem of achieving a richer, more diverse, and more productive understanding of community in terms of an urban and civic ideal (Brain 2005). Yet, NU is wider in applications and vague about social aspects. Regional priority (LEED ND) is too general to fulfill those social demands but intensively focused on the environmental aspects.

### 4.2 Comparative study between sustainable criteria in sustainable Brazilian neighborhoods

Before proposing fundamental criteria, a characterization of sustainable neighborhood project, a qualitative comparative study was performed between the localities, exposed in Tables 8, 9, 10, 11 and 12, to describe which are the requirements observed in these projects.

**Table 6** AQUA B&L, LEED ND and NU concepts grouped into five principles

Criteria	AQUA B&L	LEED ND	New urbanism
Local interaction	Territory and local context Density Heritage, landscape and identity Adaptability and evolutionary potential Mobility and accessibility	Location and intelligent connectivity Regional priority	Increased density
Mobility		Intelligent connectivity	Green transportation Connectivity Walkability
Mixed use	–	Pattern and <i>design</i> of the neighborhood	Traditional neighborhood structure Mixed use and diversity
Natural resources and innovation	Water Climate and energy Materials and urban equipment Waste Ecosystems and biodiversity Natural and technological hazards Health	Infrastructure and green buildings	Quality architecture and urban design
Socioeconomic	The project economy Functions and a plurality Public spaces and environments Insertion and training Economic attractiveness/dynamics/local training structures	Regional priority	Quality of life

**Table 7** Common five sustainable criteria to analyze Brazilian neighborhoods

Criteria	Literature	References
Local interaction	Neighborhood interaction (existing or projected). Surroundings must integrate landscape, urban or not. To achieve this, it is necessary to proceed to a neighborhood impact study, fauna and flora inventory and historical elements for preservation, habitats preservation for landscape interaction	Moraes (2013)
Mobility	Streets attractive to walk, with sidewalks well-structured, ensuring accessibility for disabled people and the elderly	Moraes (2013)
Mixed use	Displacement on foot or by bicycle paths, avoiding individual automobiles. Connection with other neighborhoods and places of the city, preferably by public or collective transportation rather than private cars	MurRAIN (1996)
Natural resources and innovation	Sustainable neighborhoods should provide a mix of features of uses and provide to residents' daily life services without large dislocations	USGBC (2016)
Socioeconomic participation	Preservation of site natural resources (water, permanent preservation areas, habitats etc.), a good water management and efficient placement of buildings in relation to environmental variables (such as wind, solar radiation, rainfall, temperature and humidity as well as the positioning in relation to other buildings, avoiding spent with air conditioning). The waste management must be collective, with active participation of the community, selective garbage collection and proper disposal of residues to create an aseptic environment to the population, concomitant to the correct disposal is fundamental for the preservation of the environment	Moraes (2013)
	Participation of residents in the planning, construction and maintenance of the neighborhood. The involvement and responsibility of the local community, as well as the promotion of issues related to democracy, help to manage the neighborhood in terms of security, cleanliness, traffic, among others. In this sense, it is also important to emphasize that a sustainable neighborhood does not offer any kind of segregation, aiming at the integration of social classes, age, gender, etc.	Keeler and Vaidya (2016)

**Table 8** Neighborhoods' sustainability principle: local interaction

Item	Local interaction
Ilha Pura	The surroundings are composed of natural landscapes and residential places and a convention center. The projects were conceived in six sustainable pillars: environment and society, reduction of greenhouse gas emissions, water use efficiency; materials and waste; and mobility (Rios 2014)
Pedra Branca	Public spaces consist of streets, sidewalks, central square, parks and buildings of common use, such as the amphitheater and the sports center. <i>Visual identity</i> to create an atmosphere of recognition (i.e., street design with x-format standards, emblematic buildings and service establishments with unique identity) as attractive element of people in the whole neighborhood, rescuing characteristics of the traditional city favorable to urbanity, presenting a network of connected and continuous public spaces throughout the so-called neighborhood center (Menezes 2005)
Jardim das Perdizes	The site is a strategic area provided with urban infrastructure, density proposal aligned with public policies and construction of ventilation and sanitation (low densification). Visual permeability of gratings and landscape (absence of shrubs) and underground wiring (Macedo 2014). Wi-Fi to connect users

**Table 9** Neighborhoods' sustainability principle: mobility

Item	Mobility
Ilha Pura	Despite being 35 km from downtown has an public transport infrastructure to facilitate access (Rios 2014). Transolimpica avenue (designed) has 26 km to car tracks and the system <i>Bus Rapid Transit</i> (a corridor integrating Supervia and Transcarioca, linking Barra da Tijuca to Tom Jobim International Airport); mobility within the neighborhood by 4 km of bike trail, connecting the condominiums to neighborhood public spaces and generating non-polluting transport use (lowering cost and emission of greenhouse gases) and the healthy use of bicycle ("Ilha Pura" 2016)
Pedra Branca	It provided a transport network varying according to the population density: it expected about 600-800 inhabitants per hectare, approximately 30 thousand inhabitants in 10 years. Pedestrian mobility allows daily activities without the dependence on the use of private cars; in this sense, to design sidewalks and streets suitable for structuring, as well as an efficient collective transportation corridor (for greater distances), based on the principle of the project—"neighborhood sense" (larger sidewalks in broader streets with average car speed reduced to 30 km/h, and an infrastructure support for pedestrians). However, it does not offer adequate public transport, isolating the neighborhood due to the rest of the city (Ribeiro 2009)
Jardim das Perdizes	Cycle paths, access to public transport, local transit routes around the square, creation of an expressway around the National Club. Wide sidewalks (3 m) and a bicycle sharing system to stimulate ecological transport practices (Macedo 2014). Opportunity to work in the same living neighborhood since it has three commercial towers (Pelosof 2016)

### 4.3 Similarities and differences in the concept of sustainability between Ilha Pura, Pedra Branca and Jardim das Perdizes

The comparison of the sustainable neighborhoods, based on the criteria presented in the framework, part of this paper, shows the following results:

**Table 10** Neighborhoods' sustainability principle: mixed use

Item	Mixed use
Ilha Pura	In addition to residential condos, the project includes a shopping center. In this sense, provide the residents with nearby basic services, avoiding the displacement and increasing the quality of life (Lotti 2015). A public park with elements of entertainment, sports and leisure activities, promoting coexistence between residents and the condos ("Ilha Pura" 2016)
Pedra Branca	It offers options of leisure, study, work and housing in the same place of a mixed zoning. The project has 20 blocks forming a central sector (each block has buildings up to 12 floors, which distribute commercial, residential and office units); the blocks have mainly commercial functions on the ground floor, plus 25% of the total area reserved for internal courtyards to shelter leisure activities; several functions that can retain part of the residents without the need for large displacements, yet a percentage of its population still requires daily long-distance transportation (Ribeiro 2009)
Jardim das Perdizes	Aiming for leisure and environmental performance for the welfare of the residents: a huge green area (central) of squares and gardens (50,000 m <sup>2</sup> ); tree-lined streets with wide sidewalks; residential towers skirting this central green area (different sized apartments), commercial and service to meet local residents (bakery, market, pharmacy) supermarkets, restaurants plus other convenience activities for locals daily demands (Pelosof 2016). To implement the strip mall was necessary to expand almost streets to avoid traffic (Macedo 2014)

- Looking at the criterion of local interaction, it becomes clear that the concerns of the neighborhoods Ilha Pura and Jardim das Perdizes depend on the sustainable landscape and technical issues, while Pedra Branca is focused on the concepts of neighborhood morphology and identity, seeking to emphasize public spaces beyond the landscape.
- As for mobility, all the projects are addressing the issue in a similar way, encouraging bicycles use and walking. However, pedestrians' infrastructure in Pedra Branca is enhanced, since it is a part of an integral urban plan, mixing with the streets and residential areas. On the contrary, a controlled access is provided in Ilha Pura (only for vehicles) which contradicts with the idea of "sustainable city" (Köhler 2015). Although Ilha Pura neighborhood ensures that there is public transportation to the place, it does not enter the condominium. The location itself in the vicinity of Barra da Tijuca does not have a demand for public transportation (within a rich region of the Rio de Janeiro municipality). Comparatively, Pedra Branca provides a transport corridor, without isolating itself from the city and concomitantly focuses on the walkability with wide sidewalks, assuring urban mobility. In Jardim das Perdizes' case, it was set as an obligation to deal with the traffic since it is a megalopolis issue. And Ilha Pura is stimulating the non-polluting transport as bicycle use, even though this should be more restricted to the enterprise, but all the enterprises contemplate cycle paths.
- From mixed use/functionality view: While Ilha Pura shows a shopping mall and a public park, Pedra Branca presents a greater diversification in its land use, so is Jardim das Perdizes full of uses, yet none of the ventures anticipated to mix distinct social classes. In this sense, Pedra Branca tried to contemplate different social classes offering real estate with different costs, although this range was not enough to cover the less favored classes. Ilha Pura and Jardim das Perdizes sought to invest in an environmental education programs with its inhabitants and workers.
- *Natural resources and innovation* Ilha Pura and Jardim das Perdizes are adopting several technological devices, from construction to operation, which economize

**Table 11** Neighborhoods' sustainability principle: natural resources and innovation

Item	Natural resources and innovation
Ilha Pura	Water: monitoring footprint, gray water reuse station (showers, washbasins) in 4 of the 7 condominiums to park irrigation and lake water, domestic water saving equipment (flow regulators, leaks and flow interrupter); efficient energy: solar hot water heating, automated LED lighting and lamps, elevators, photovoltaic panels (about 1000 m <sup>2</sup> of area, part of the public lighting supply) and efficient windows to ensure thermal comfort apartments; to waste: plant and concrete recycling, solid waste management and processing avoided transport costs and greenhouse gas emissions (average of 1200 tons of CO) and cleaning of trucks reuse of water (economy of water of 16,000 m <sup>3</sup> —50% of the total volume). Use of aggregates: shorter washing time and laboratory analysis, lower cost of concrete/m <sup>3</sup> and savings in debris removal and removal. Solid waste management: organic waste receives composting process (fertilizers), separation of types of materials for reuse (Lotti 2015)
Pedra Branca	Harmony between nature and urban amenities and high sustainable performance in the built environment. The project provides for an extensive vegetation of preserved tropical forest (ecological reserve) to be a place of leisure for visitors (Ribeiro 2009). In addition, several certified green buildings (LEEDs), encouraging entrepreneurs to contact international certification organizations: central sector buildings incorporated in their projects, strategies focused on the minimization of environmental impacts and consequent use of architectural technologies of solar orientation, natural ventilation, rational use of resources, rainwater drainage system to retain the largest flow volume possible, allowing the reuse of water. ("Pedra Branca Cidade Criativa" 2015)
Jardim das Perdizes	The park's roads have drainage floors (such as interlocking concrete with high drainage), legalized wood (FSC certified), waste reduction, recycling of construction waste, minimization of consumption of non-renewable resources and impacts to the environment, underground wiring; lighting by LED lamps; natural and technological risks of environmental pollution during construction and phase of operation. Health, concern with air quality toilets and control of exposure to noise at work (Macedo 2014). Intentionally planted Brazilian species, threatened with extinction, such as cedar and Jequitibá: about 2200 trees of 40 native species were planted. (Pelosof 2016)

and optimize natural resources, on a larger scale than in Pedra Branca, although both ventures hit this criterion. All projects are robust in terms of sustainability topics covered, presenting different visions about the same subject. This is a pure example, showing the plurality and variety of the sustainability concepts and their interpretation in the neighborhood's application. While Ilha Pura and Jardim das Perdizes are showing in a deeper depth of environmental sustainability technologies, leaving other important themes without the needed attention, Pedra Branca is equalizing the dealings of themes.

- Comparatively, about socioeconomic aspects, Pedra Branca, clearly envisages mixed functionality, as well as local identity creation, leisure and socializing areas for residents, whereas Ilha Pura and Jardim das Perdizes are more deficient in mixture of functions. This can lead to a mobility and life quality problems. Even in this question, both run the risk of becoming isolated ventures, providing improvements and internal activities without connection with the respective municipalities. This is amplified in Ilha Pura, since it's a private access condominium.

**Table 12** Neighborhoods' sustainability principle: socioeconomic participation

Item	Socioeconomic participation
Ilha Pura	To foster diversity of social participation, apartments has from two to four bedrooms, which meets the LEED ND requirements and AQUA B&L However, this variation does not cover all social classes, leaving the less favored classes without on-site hosting/living options. Another element of social participation is the training of skilled labor through the "Acreditar" Program. This allows residents to be more assertive, forming approximately 170 professionals. In addition, environmental education is discussed at all organizational levels, by both members and partners of the enterprise, covering topics such as selective collection, soil contamination, global warming, water bodies preservation (Lotti 2015)
Pedra Branca	Space use for all ages, budgets and family structure, residential locations vary from approximately 150 thousand to 1 million raise; apartments size vary from one to four bedrooms and different types (Ribeiro 2009). However, residents are from middle/high classes (excluding disadvantaged classes). About life style and sense of community, certain concerns may be lifted: the activities developed foster the local community participation, even if a priori is positive, it can cause a city surroundings isolation (Ribeiro 2009). Residents may be closer to the site activities, however, impairing the interaction with another urban environment (concomitantly causes a positive effect of belonging and care, but can be detrimental to the municipality development as a whole, forming islands between districts and dividing forces instead of sum them)
Jardim das Perdizes	Fully equipped, the central area has bike path, hiking trail, playground, space for the elderly (Macedo 2014). The company maintains social projects: Jardim das Perdizes e "Ler e Construir" for adult literacy and basic education, with classes taught in the works themselves, four times a week, for eight months, run in partnership with educational organizations; company's employees are encouraged to personal development and professional qualification through a program called "Mestre de Obra," an art studio built at the construction site where they produce art pieces with construction waste to aware about the recycling importance and to facilitate the identification of opportunities for improvement in the constructive processes benefiting the company's own business (Pelosof 2016)

#### 4.4 Applicability of sustainable neighborhoods in Brazil

The subjects analyzed are three isolated cases of sustainable neighborhoods in Brazil, and considering these specific results, their application is still in an embryonic and incipient stage. Aside from all made by now, it is necessary to be fulfilled with an interaction between the districts and the municipality and its organizational structure, requiring an analysis of the specific cases in the search of possible local solutions. In general, cities are not ready to relate positively with the sustainable neighborhoods in terms of collective transport and diversity of roles and social classes, not only within the city structure, but the societal structure which social segregation is latent in the distribution of space and its functions. This fact is more obvious in developing countries.

As for the environmental issues, there is a need for neighborhood infrastructure investment, applying technologies and innovations to allow better waste/water/energy management and minimize environmental impact. In addition, it is important to emphasize that the investment in environmental education, to mobilize "sustainable neighbors" for understanding and using properly the mechanisms to harmonize urban organizations and the insertion environments.



Although challenging, the large-scale deployment of sustainable neighborhoods may gain weight with business investment in Brazil, which in return can promote quality of life for the population. It can serve as a source of income for this new mixed model. The challenge is to develop an improvement in processes and performance to create a network of neighborhoods, running the functional units, but connected and complemented, generating value for the municipality. However, these ventures need to consider all social classes to integrate the entire population. The focus should be in the search of a compromise to avoid the turning of the sustainable neighborhoods into segregationist and elitist places, to dodge sustainability becoming a part of a post-political project that sidelines questions of real political inclusion and justice in the name of technocratic, community-based deliberation (Checker 2011).

According to Vannuchi (2017), some districts are advertised as “planned neighborhoods” but managed in a parallel to the general management of the city, designed and built under the logic of profit and consumption. They are neighborhoods simulacrum, allowing only specific forms of interaction.

Brazil has profound social problems and disparities, and urban planning goes along. In this sense, maybe, public policies and education might promote a greater awareness in the more favored classes, helping them understand that sustainable neighborhoods are more than their commercial appeal. This involves the incorporation of the mixed use from both—functional and social perspectives, searching for a better—common—environment, having in mind that the definition of “better environment” varies, in practice, by class and poverty level (Marcuse 1998).

Another problem to be addressed is gentrification: closed condominiums (even sustainable) can generate financial appreciation and do not consider that mixed use expels the poorest population from the neighborhood. In recent years, public policies and entrepreneurial initiatives have been limited to spectacle and consumption and neglected important values of the urban life, such as: notion of public space, coexistence, alterity and citizenship, impaired in this model of city (Köhler 2015). Likewise, New Urbanism is criticized as a component of the neoliberal city, a criticism only amplified by the favorable treatment of gentrification by some New Urbanism promoters, who view it as a benign vehicle for the movement’s realization (Anderson 2017).

In this particular “Ilha Pura” isolated by other condominiums, forming a double barrier called a “condo-condominium,” will offer more security and “quality of life” to the residents of these sustainable neighborhood, making it difficult to infiltrate “impure” elements of the real city (Köhler 2015).

According to Berardi (2011), a greater importance has to be given to the social context before labeling a building or a city as sustainable, by considering the relationships among buildings and neighborhoods limits the possibility of establishing sustainability at the level of a single building, and encourages evaluations at a larger scale. Albino and Dangelico (2012) proposed a set of social indicators based on a review of country-relevant well-being indicators: three main domains of welfare criteria (material well-being, quality of life and social inclusion). In this regard, the ventures might solve their inhabitants needs, but restricted to a comfortable dome without contact with unwanted social classes.

Likewise, it’s imperative investing in urban design to define district/neighborhood appropriate constraints, to improve regulations, as well as in decision-making and administrative processes. And also, investments in the organizational structure, especially municipal and local level, including enabling the specification and control of such parameters, as well as the installation and management of interdependent systems or shared by different sectors or urban enterprises (Marins 2017).

Previously, an elder and pioneer initiative in Brazilian scenario, the municipality of Curitiba, Brazil has thrived by building an efficient intra-urban bus system, expanding urban green space, and meeting the basic needs of all classes. It suggests that economic sustainability requires planning for people, making the city more “green,” and, hence, more livable, for people (Basiago 1999), showing the power or public spaces policies in sustainable built environment. Yet, the growth rates of irregular occupations varied in Curitiba metropolitan region, between 1992 and 1997 expanding to nearby municipalities (Piraquara: rate of 69.81%, São José dos Pinhais and Bocaiúva do Sul) in inappropriate areas of public water supply sources, demonstrating the environmental risk coming from the occupation process (Lima and Mendonça 2001). Therefore, urban planning is a complex process in which cannot rely solely on recognition as a sustainable city or neighborhood: the process must include maintenance policies to support this quality, as problems will invariably arise with local specificities.

The possibility of understanding these interactions stands in the “southern cities.” This understanding sets in the development of new and normative insights for planning, studying the spaces of citizenship, the successes of encroachment, the cracks, spaces and moments of alternative practice. Or also, in the positive hybrids, exploring the balance in between the small initiatives and the wider imperatives of resource depletion, environmental crisis and growing global income inequalities (Watson 2016). It can be shown through the design of these concepts, serving the neighborhoods, which can fit in these small initiatives.

Though the labeling system has its flaws, such as handling regional or social aspects seriously, “a several limits of the available systems, as they lack appropriate assessment of social, economic and environmental sustainability” (Berardi 2013), it might directly benefit cities.

According to Retzlaff (2009), some potential research areas can help green building policies to gain widespread use, including methods to reduce green building development and certification costs, not only in terms of building practices, but also in policy and planning practices and its environmental impacts. Adding the improvement of knowledge about buildings and their environmental impacts in planning. Also, developing methods to add flexibility to green building policies—perhaps by adopting multiple building assessment systems or by developing methods to help cities and regions: (1) develop locally relevant systems; (2) improving knowledge about all of the building assessment systems available; and (3) adopting more green buildings policies for private development.

According to Marins (2017), urban planning at the neighborhood scale can decisively contribute to improving the living conditions of urban communities and help solve the problems inherent to municipal and sectorial administration, such as housing supply, employment opportunities and access and use of resources such as water and energy.

To Brain (2005) with regard to the move from good neighborhoods to sustainable cities, it will hopefully now make sense to point out that the thorniest problem of sustainability is not determining such things as the carrying capacity of a piece of land but the problem of constituting the capacity for collective responsibility necessary to organize social practice in terms of positive choices cumulatively producing a life that is both good and sustainable. Perhaps, it will be a trend in future policies.

In this sense, sustainable neighborhoods can act as drivers of urban development; certifications can function as allies to provide guidelines as they are responsible for maintaining projects quality.

## 5 Conclusions

Sustainable neighborhoods can provide guidelines for urban planners to contemplate sustainability in their expansion models. In this comparative study between three Brazilian projects, Ilha Pura (RJ), Pedra Branca (SC) and Jardim das Perdizes (SP), despite different geographic, climatic and social contexts, all the ventures are presenting great similarities. In this sense, the focus of the quality of life is dominant in all initiatives, with internal mobility and leisure and public spaces as central points.

The examined neighborhoods are facing common difficulties, especially in the challenges regarding issues like—environmental aspects and creation of structure to encompass all social classes. Even with every effort to establish an ideal location within these neighborhoods, the environment is not ready to receive it, reinforcing the idea of a wider problem of social disparities in cities and their organization.

The main differences between the projects are cored in the environmental care, most evidenced technically in Ilha Pura and Jardim das Perdizes, driven by the LEED ND and AQUA B&L certifications. In parallel, Pedra Branca stands out in the mixed functionality aspect, offering employment and study to the its inhabitants and contemplating a wider range of social classes, showing more assertive approach in reducing displacements. Curiously, Pedra Branca is the only non-certified enterprise as a sustainable neighborhood.

Comparing certifications and urban concepts, there are many resemblances, especially district boundaries and approaches: while Ilha Pura and Jardim das Perdizes focused on environmental aspects, driven by LEED ND certification and AQUA B&L, Pedra Branca stands on social aspects.

Finally, the application of sustainable neighborhoods can happen on a larger scale in Brazil, although it is still humble at the moment. All the studied neighborhoods are large enterprises, and although that they constitute a solution of speed for the urban development and the civil construction industry, they imply the maintenance and the union of businessmen and public managers.

It is of utmost importance to avoid turning these initiatives into a mere source of capital accumulation for the benefit of a group of entrepreneurs or real estate speculation, investing in green marketing to be just profitable, incorporating only rich classes and serving as an excluding spatial element. Sustainable certifications/criteria applied to neighborhoods serving simply as marketing tools just drive urban planning to encourage more projects excluding disadvantaged classes. Once the challenges are overcome, maybe the sustainable neighborhood models can lead to a rational and harmonious development, forming additional centers to offer more sustainable cities.

**Acknowledgments** This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

**Funding** The authors declare that no funding was received for this research.

## Compliance with ethical standards

**Conflicts of interest** The authors declare that there is no conflict of interest in this research.

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