

## **Design of green infrastructure to promote the cultural development of the residents of the district of El Agustino.**

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**Abstract.** This research aims to design green infrastructure to promote the cultural development of the neighbors in the "Boulevard de la Cultura." The analysis is quantitative descriptive; a bioclimatic architecture was applied that allows the reduction of greenhouse effects and the use of clean energy that addresses a green infrastructure. This project is a place for young people to carry out cultural activities throughout the year and thus encourage more people to go there. The value lies in sustainably guaranteeing cultural development by using clean energies such as solar panels and awareness talks.

**Keywords.** Green infrastructure, development, greenhouse, bioclimatic architecture, cultural activities.

### **1. Introduction**

There is a great and growing concern for citizen security in Latin America, Central America, and the Caribbean region. Peru is no stranger to this trend, but its security situation is different from that of the countries with the most significant security problems in the area. Many of these problems involve the participation of young people, thus creating an image of them linked to risk [1]. Peru today has, along with Ecuador, the highest personal victimization rate in the Americas, which means that it has the highest percentage of victims of crimes committed in the last year among all countries in the Western Hemisphere [2]. This is according to the 2012 AmericasBarometer survey [3].

Despite economic and social improvement, the region's countries remain profoundly unequal, social mobility remains low, and employment continues to be most precarious. Under these conditions, it is difficult for prominent young people to meet their growing consumer expectations. Crime, therefore, appears for many as a complement to underemployment, which allows them to access levels of consumption that they would not otherwise have. [4] Reports of crime recorded by the Peruvian National Police (PNP) have been rising since 2000 [5].

The district of El Agustino is in third place with the highest victimization with 36.3%, after the community of ATE and Puente Piedra. This study was conducted from November 2018 to October 2019 [6]. The percentage of that year is much higher than the data taken from November 2017 - October 2018, where the district of El Agustino was ranked fifth in

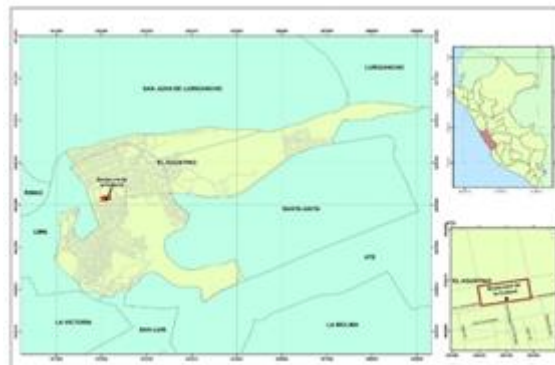
Metropolitan Lima.

In 2018, 1495 young people between the ages of 14 to 21 committed crimes in the province of Lima alone [7]; this problem causes significant discomfort among neighbors, who constantly report in nearby police stations [8]. Hence, unemployment, the idea of lack of expectations and possibilities for a better future. The lack of opportunities leads people to fall into short-termism, which seeks to solve the present without having primary goals or projects, which is why cultural activities [9], which take a significant place in the formation of children and neighbors of the district, are taken as an alternative to reduce crime rates and juvenile drug addiction. This article will propose the design of green infrastructure to promote the cultural development of the neighbors in the "Boulevard de la Cultura."

## 2. Method

### 2.1 Study area

This study focuses on the territory of the Republic of Peru, located in the central and western regions of South America. Its political organization is organized into 24 departments and one constitutional province. The study area corresponded to the "Boulevard de la Cultura," located at Avenida Áncash 23, El Agustino, a section of Lima. [10]



**Figure 1:** District Map of El Agustino and Location of the Boulevard de la Cultura.

The site is surrounded by a commercial area, as two supermarkets can be found to the north, and to the east, a shopping center in the west. To the northeast is the condominiums "Los Ficus," and to the south, we will find housing and small commercial areas, as shown in Figure 2 (a). [11]





**Figure 2:** It can be observed: (a) Delimitation of the Boulevard de la Cultura. (b) Current reference map of the Boulevard de la Cultura

### 3.1. Characteristics of the study area

The local development plan for the district of El Agustino mentions the following characteristics. [12]

**Table 1.** Characteristics of the district of El Agustino

Surface	The total area of the district of El Agustino is 12.54 km <sup>2</sup> , which represents 0.45% of the province of Metropolitan Lima, making it one of the smallest districts in the ca
Altitude and Climate	El Agustino is made up of two geographic zones, a flat zone at 180 m above sea level and a high location (hills) that reaches 450 m above sea level. The average temperature ranges from 17° C. to 19° C.
Topography	El Agustino is characterized by poor soils, with eroded and weathered material that has been deposited in the lower elevations, not only because of the dry climate but also because of human activity. On the other hand, the relief of its soil is not very rugged, which has allowed the development of the urban nucleus longitudinally from

	the riverbank to the higher elevations of the high zone.
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### 3. Results

As a result of the research: an architectural proposal, which has a recreation center, an interpretation center to explain environmental issues didactically and the history of the district, a multifunctional space for the final presentations of the workshops carried out, the implementation of solar panels to promote the use of solar energy, the performance of vertical gardens throughout the recreation area, and the implementation of a new building for the benefit of solar energy. [13]



**Figure 3:** the halls and interpretation center located on the second floor of the "Boulevard de la Culture".



**Figure 4:** Entrance to the "Boulevard de la Cultura". (a) Halls located at the main entrance. (b) Entrance to the recreation area. (c) View to the entrance number one of the "Boulevard de la Cultura". (d)

Figure 4 shows the perspective of the entrance of the "Boulevard de la Cultura". (a) Halls located at the main entrance. (b) Entrance to the recreation area. (c) View to the entrance number one of the "Boulevard de la Cultura". (d) The light poles that are powered by solar panels can be seen. [14]

The solar panels in "figure d" have a capacity to capture 1500 W or 1.5 KW for 5 hours of solar radiation per day [15], which will be used to provide 12 hours of lighting during the night, as well as the capacity to charge mobile devices. These light poles use LED light that needs 44 W/h, that is to say that it will need 528 W or 528 KW per day [16,17].



**Figure 9:** Recreation center within the "Boulevard de la Cultura." Figure 9 shows (a) View from above of the recreation center. (b) Benches, lighting, and umbrellas, with solar panels and switch; capable of capturing up to 3 KW per day. (c) Decoration with a fountain. (d) Recreation area for children. (e) Vertical gardens are located throughout the recreation center.



**Figure 10:** View of the entrance to the multifunctional space decorated with latticework. Figure 10: View of the entrance of the multifunctional room decorated with latticework. Figure 10 shows: (a) View to the "Boulevard de la Cultura" sign. (b) Entrance to the multifunctional space.



**Figure 11:** Multifunctional space inside. Figure 11 shows: (a) View from above to the multifunctional space. (b) View from the stage towards the public (c) Views from the second level of the multifunctional space towards the stage.



**Figure 12:** View of the Boulevard de la Cultura from Ancash Street. Figure 12 shows: (a) Mural of the "Boulevard de la Cultura" sign (b) View to the brick wall of the former barracks "La Pólvara," which has been respected due to the history it offers.

#### 4. Conclusion

The proposal of this study aims to promote the development of cultural activities among the youth and to rescue many of them from delinquency and other vices such as drug addiction, and to provide better conditions for children and young people in which they would have a better place to carry out their cultural activities over time.

In the proposed design of the green infrastructure of the "Boulevard de la Cultura," we can observe a bioclimatic strategy in which clean technologies such as solar panels have been implemented. Likewise, ecological spaces have been generated with vertical gardens along the route of the recreation center[18].

The proposal also includes an interpretation center, which helps young people become more interested in environmental education. Furthermore, multifunctional space is necessary for the final presentations of the courses carried out since previously, the representations were made on the track of the surrounding streets.

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