# METHODOLOGICAL PROPOSAL TO EVALUATE PUBLIC URBAN GREEN SPACES

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## INTRODUCTION

Cities must be pleasant and healthy spaces able to contribute to ecosystems regeneration and to bring closer Humans and Nature. However, cities are unequal spaces regarding the distribution of environmental resources, resulting in environmental injustice: socioeconomic vulnerable areas are, simultaneously, those where is identified the bigger environmental vulnerability (1,2), in part due to the poor quality of public green spaces - resulting in poor air quality and the increase of noise level – and the social segregation. Therefore, the present work aim to present a methodological proposal to evaluate urban green spaces quality.

## MATERIAL AND METHODS

A grid to evaluate urban green spaces was elaborated with the main objective to characterize them according to the elements considered essential (3) in terms of performed activities, environment quality, infrastructure / facilities and safety level (Table 1).

### TABLE 1 - EVALUATION GRID

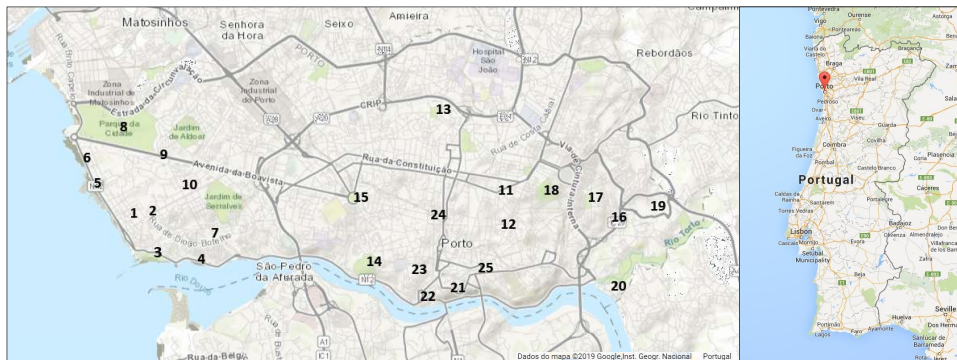| DIMENSIONS | |
|---|---|
| **GREEN SPACE** | Name, Location, Opening Year, Size And Typology. |
| **OBSERVATION** | Generic Description Of The Activities That Are Happening In The Green Space. |
| **PERFORMED ACTIVITIES** | Sports, Table Games, Theatres, Civic Participation Meetings, Festivals, Concerts, Religion And New Spiritualities, Environmental Education Or Others. |
| **ENVIRONMENTAL QUALITY** | Assessment Of Surrounding Area Quality, Trees Density, Air Quality, Noise Level, Cycle Lanes, Paths, Maintenance And Typology Adopted, Cleaning Routine, Art And Heritage Elements, Vandalism, Water Elements And Shadow Spaces. |
| **INFRASTRUCTURES/FACILITIES** | Existence Of Environmental Education Centre, Children Playground, Proximity To Car Park In The Surrounding Areas, Proximity To Public Transport, Resting Spaces (Benches), Containers With Bags For Animal Manure, Fountains, Sources Of Water For Animals ... With Reduced Mobility. |
| **SAFETY** | Visibility Level Of The Streets That Surround The Park (Exterior-indoor/Interior-exterior); Identification Of: Areas Of Difficult Visualization, Adequate Infrastructures For Sports Activities, Lighting And Security/Vigilant/ Surveillance Existence. |

The city of Porto is divided into 7 parishes that differs in social and environmental vulnerability. In a recent study (4) 74 public parks and gardens and 21 squares were identified, totalling 95 public green spaces. In order to create a representative sample of green spaces, the Socioeconomic and Environmental Deprivation Index (5) was applied, dividing the city into five clusters that oscillate between "Very low vulnerability" and "Very high vulnerability". The grid was applied in five gardens and urban parks selected from each cluster and validated by (Table 2).

## STUDY AREA



### TABLE 2 – URBAN GREEN SPACES SAMPLE

| LEG. | SOCIOECONOMIC VULNERABILITY | URBAN GREEN SPACE | TYPOLOGY |
|---|---|---|---|
| 1 | Very Low | Jardim Da Praça Do Liège | Garden |
| 2 | Very Low | Jardim Da Praça Do Império | Garden |
| 3 | Very Low | Jardim Passeio Alegre | Garden |
| 4 | Very Low | Jardim Do Cálem | Garden |
| 5 | Very Low | Jardim Do Homem Do Leme | Garden |
| 6 | Low | Jardim Na Avenida De Montevideu | Garden |
| 7 | Low | Parque Da Pasteleira | Park |
| 8 | Low | Parque Da Cidade | Garden |
| 9 | Low | Jardim Na Avenida Da Boavista/Rua Pinho Leal | Garden |
| 10 | Low | Praça D. Afonso V | Square |
| 11 | Moderate | Jardim Da Praça Rainha D. Amélia | Garden |
| 12 | Moderate | Jardim Paulo Vallada | Garden |
| 13 | Moderate | Jardim Arca D'água | Garden |
| 14 | Moderate | Jardim Palácio De Cristal | Garden |
| 15 | Moderate | Rotunda Da Boavista | Square |
| 16 | High | Jardim Na Rua Do Falcão | Garden |
| 17 | High | Jardim Da Praça Da Corujeira | Garden |
| 18 | High | Parque De S. Roque | Park |
| 19 | High | Parque Oriental | Park |
| 20 | High | Jardim Da Praça Das Flores (Avenida 25 De Abril) | Garden |
| 21 | Very High | Jardim Na Rua Duque De Loulé | Garden |
| 22 | Very High | Jardim Na Praça Do Infante D. Henrique | Garden |
| 23 | Very High | Jardim Da Cordoaria | Garden |
| 24 | Very High | Jardim Da Praça Da República | Garden |
| 25 | Very High | Jardim S. Lázaro | Garden |

## Results

Reliability measures (Table 3) were performed in order to measures reliability, namely how well the grid measure the quality of public ... = 0.837) (6). In all items domains α = 0.8, suggesting that the grid is a consistent tool to evaluate the quality of public urban green spaces. Intraclass correlation coefficient (ICC) was used to measures the reliability of ratings or measurements for clusters reliability analyses. A high ICC close to 1 indicates high similarity between values from the same group. In this context, our results are excellent (ICC= 0.837).

### TABLE 3 – RELIABILITY MEASURES RESULTS

| Global Cronbach's Alpha | Strength | ICC |
|---|---|---|
| 0.837 | Good | |
| **Cronbach's Alpha By Domains** | **Strength** | |
| Performed activities — 0.825 | Good | 0.837 (Excellent) |
| Environmental quality — 0.841 | Good | |
| Infrastructures/Facilities — 0.833 | Good | |
| Safety — 0.827 | Good | |

## Conclusions

The elaboration and validation of this grid to evaluate the quality of public urban green spaces tool shown to be a valid and reliable tool ... died. The main expectancy of this work is the ... onitoring quality urban green spaces in order to adjust them to citizens social and environmental needs.

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