
URBAN GREEN SPACES AND HUMAN WELLBEING: ASSESSING THE CARRYING CAPACITY OF URBAN PARKS AND RECREATION AREAS IN DANAOCITY

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Abstract

Urban green spaces enhance human well-being, offer ecosystem services, and support sustainable urban development. This study evaluated the carrying capacity of urban parks and recreation areas in Danao City, specifically the Boardwalk, Rizal Plaza, Children's Paradise, and Sands Gateway, focusing on their impact on residents' physical and mental health. The study revealed that Boardwalk has the highest carrying capacity with 909 visitors, followed by Children's Paradise, Rizal Park, and Sands Gateway, with 291, 256, and 131 visitors on average per day. Through surveys and observational data, the research examines the usage, satisfaction, level of overcrowding, most bothersome aspects, and capacity of these parks. The study shows that the parks' cleanliness and maintenance received the highest customer satisfaction rating, while restroom facilities scored lower. The findings underscore the significant role of green spaces in reducing stress, promoting physical activity, and enhancing mental health. The study emphasized the need to maintain and improve these spaces to cater to the increasing urban population. Recommendations include enhancing cleanliness, expanding parking facilities, improving safety measures, and increasing amenities like benches and shaded areas. Understanding the carrying capacity is crucial to ensuring these parks can accommodate visitors without environmental degradation, thus preserving their benefits for residents. This research highlights the importance of urban green spaces in creating livable, sustainable cities and calls for strategic planning and management to optimize their use and conservation.

Keywords: Park usage, boardwalk, overcrowding, park facilities, visitor satisfaction.

1. INTRODUCTION

Cities are rapidly urbanizing, leading to a concerning decline in green spaces. Rapid urbanization is a global phenomenon, with the world's urban population projected to reach 68% by 2050.^[1] This rapid growth poses significant challenges, including losing green spaces within cities (Barber *et al.*, 2021).^[2] Studies have shown that decreasing urban green spaces can harm human health and wellbeing (Dillon, 2023).^[3] Green spaces, defined as areas with natural elements such as trees, grass, and water bodies, are crucial for human wellbeing (Beyer *et al.*, 2014).^[4] Green spaces have become essential to urban development due to the numerous benefits ecosystem services they provide (Siddique & Uddin, 2022).^[5]

Numerous studies highlight the positive impact of green spaces on human wellbeing. Studies have shown that individual's exposure to green spaces can reduce stress levels, improve cognitive function, and promote physical activity (Zhang *et al.*,

2020).^[6] (Kuo *et al.*, 2019)^[7] further asserts that access to nature reduces stress, improves mental health, and promotes cognitive function, while exposure to green spaces is linked to increased physical activity (Rogerson *et al.*, 2020).^[8] Urban green spaces play a vital role in enhancing the quality of life for urban residents by providing opportunities for recreation, relaxation, and relationship with nature.

Urban green spaces like parks emphasize various benefits to human wellbeing. There is broad consensus within the green space sector that urban parks are vital for creating livable and sustainable cities and towns (Konijnendijk *et al.*, 2013).^[9] Urban parks are specific open space areas primarily characterized by vegetation and water and generally designated for public use. Urban parks are designated areas within cities that provide residents access to green space (Gradinaru, 2023).^[10] These spaces can vary in size and function, from pocket parks in dense urban areas to prominent regional parks on the outskirts of a city (Konijnendijk *et al.*, 2013).^[9] Despite these variations, they all serve a similar purpose: to offer a respite from the built environment and a place to connect with nature. This connection to nature is a key reason why many people visit urban parks, as it allows residents to improve their physical and mental wellbeing.

However, maximizing these benefits requires understanding a concept called carrying capacity. Carrying capacity refers to the maximum number of resource users accommodated without causing degradation or long-term environmental damage. In urban parks, exceeding carrying capacity can lead to overcrowded spaces, degraded amenities, and, ultimately, a diminished positive experience for visitors (Lee & Maheswaran, 2011).^[11] Understanding the carrying capacity of urban parks and recreation areas is essential for ensuring their long-term sustainability and their ability to provide benefits for human wellbeing.

Danao City, with its growing population and ongoing urbanization, necessitates a study to assess the carrying capacity of its urban green spaces. This is crucial to ensure these spaces can continue to meet residents' physical and mental wellbeing needs as the city expands. The research study, "*Urban Green Spaces and Human Wellbeing: Assessing the Carrying Capacity of Urban Parks and Recreation Areas in Danao City*," focused on evaluating the current state of Danao City's green spaces, precisely the carrying capacity of four essential parks: Danao Boardwalk, Rizal Plaza, Children's Paradise, and Sands Gateway. By assessing carrying capacity, the study aimed to determine the maximum number of visitors these parks can accommodate without compromising resident wellbeing or the parks' functionality.

2. MATERIALS AND METHODS

This study used a quantitative method to collect data from individuals with experience in various urban spaces in Danao City. The target sample size for this study was 384 respondents, based on the Krejcie and Morgan method for calculating sample size. Data collection was conducted through a combination of online survey platforms

and face-to-face surveys, both employing a structured, ready-made questionnaire (Moore *et al.*, 2009).^[12]

The questionnaire comprised four sections: demographics, park and recreation area usage, visitor satisfaction, and perceptions of overcrowdedness. The demographics section gathered essential background information about the respondents, such as age, gender, and name (optional). The park and recreation area usage section assessed the frequency and type of activities participants engaged in within these urban spaces. The visitor's satisfaction section evaluated the participants' satisfaction with the facilities and services provided. Lastly, the overcrowdedness section explored respondents' perceptions of crowd levels and their impact on the quality of their experience.

The survey aimed to identify areas in need of improvement within Danao City's urban spaces based on the perceptions and suggestions provided by the respondents. By gathering detailed feedback through the structured questionnaire, the study sought to capture the experiences and opinions of individuals who frequently use these spaces. Respondents were encouraged to share their insights on various aspects, such as the quality and availability of facilities, the overall satisfaction with park and recreation areas, and any issues related to overcrowdedness. Their suggestions for enhancements were also solicited, providing valuable input for city planners and policymakers. This comprehensive approach ensured that the collected data would not only highlight existing problems but also offer actionable recommendations for enhancing the urban environment to meet the needs and expectations of the community better.



Figure 1. Location of Danao City Boardwalk, Children's Paradise, Rizal Plaza, and Sands Gateway.

Figure 1 shows the locations of four critical areas in Danao City that the research focused on: Danao City Boardwalk, Children's Paradise, Rizal Plaza, and Sands Gateway. These locations represent various urban green spaces within Danao City that the study will examine regarding their impact on human wellbeing and carrying capacity. By studying these diverse parks, the research can comprehensively understand how different park designs and functionalities influence human wellbeing and how many visitors each space can accommodate without compromising the park's functionality or the visitor experience.

Scoring Procedures

Table 1

Scoring Procedure for visitor satisfaction in the usage of urban recreation parks using the 5-point Likert scale

Rate	Category	Ranges	Interpretation
5	Very Satisfied	4.21-5.00	The respondents gave a completely acceptable rating for urban parks
4	Somewhat Satisfied	3.41-4.20	The respondents gave a somewhat acceptable rating for urban parks
3	Neutral	2.61-3.40	The respondents gave neither acceptable nor unacceptable rating for urban parks
2	Somewhat Dissatisfied	1.81-2.60	The respondents gave a somewhat unacceptable rating for urban parks
1	Very Dissatisfied	1.00-1.80	The respondents gave a completely unacceptable rating for urban parks

Table 1 highlighted the scoring procedure for visitor satisfaction in the urban recreation parks, using a 5-point Likert scale. The table indicated that a score of 5, ranging from 4.21 to 5.00, signifies that respondents are completely satisfied with their usage of urban parks in Danao City. A score of 4, ranging from 3.41 to 4.20, shows respondents are somewhat satisfied with their usage. A score of 3, ranging from 2.61 to 3.40, indicates that respondents are neither satisfied nor dissatisfied with their usage of urban parks. A score of 2, ranging from 1.81 to 2.60, indicates that respondents are somewhat dissatisfied with their usage of the urban parks.

Finally, a score of 1, ranging from 1.00 to 1.80, indicates that respondents are entirely dissatisfied with their usage of the urban parks.

Table 2

Scoring Procedure for the level of overcrowdedness in urban recreation parks using the 5-point Likert scale

Rate	Category	Ranges	Interpretation
5	Very Crowded	4.21-5.00	The respondents gave a rating agreeing that the urban park is overpopulated
4	Crowded	3.41-4.20	The respondents gave a rating agreeing that the urban park is populated
3	Moderately Crowded	2.61-3.40	The respondents gave a rating agreeing that the urban park is moderately populated
2	Somewhat Crowded	1.81-2.60	The respondents gave a rating agreeing that the urban park is not so populated
1	Not Crowded at All	1.00-1.80	The respondents gave a rating agreeing that the urban park is not populated at all

Table 2 highlighted the scoring procedure for visitor satisfaction regarding the urban recreation parks, using a 5-point Likert scale. The table indicated that a score of 5, ranging from 4.21 to 5.00, signifies that the urban parks in Danao City are overcrowded. A score of 4, ranging from 3.41 to 4.20, indicates that the urban parks are crowded. A score of 3, ranging from 2.61 to 3.40, indicates that the urban parks are moderately crowded. A score of 2, ranging from 1.81 to 2.60, indicates that the urban parks are somewhat crowded. Finally, a score of 1, ranging from 1.00 to 1.80, indicated that the urban parks in Danao City are not crowded at all.

3. RESULTS

This chapter presented the results, analysis, and interpretation of the data gathered on Danao City's urban parks. The analysis focused on various parks, including Boardwalk, Rizal Plaza, Children's Paradise, and Sands Gateway. The data collected provided insights into the respondents' profiles, activities performed, satisfaction levels, perceived overcrowding, and carrying capacity in the urban parks of Danao City.

Table 3

The frequency and percentage of the demographic profile of respondents in terms of age

Age	Frequency	Percentage
13-19	191	49.74%
20-29	173	45.052%
30-39	7	2%
40-49	6	1.56%
50-59	4	1.04%
60-69	2	0.52%
70-79	1	0.26%
Total	384	100.00%

Table 3 presented a distribution of 384 individuals across various age groups, revealing a predominant concentration of younger individuals. The 13-19 age group is the largest, with 191 individuals (49.74%), followed by the 20-29 age group with 173 individuals (45.052%). These two groups comprise over 94% of the total population.

In contrast, older age groups are significantly underrepresented: the 30-39 group has seven individuals (2%), the 40-49 group has 6 (1.56%), the 50-59 group has 4 (1.04%), the 60-69 group has 2 (0.52%), and the 70-79 group has just one individual (0.26%). This distribution suggests a strong skew towards younger respondents, which should be considered when interpreting the survey results. Saleem and Kamboh (2013) ^[13] agreed that the teenage group was the most significant proportion of urban park visitors.

Table 4

The percentage frequency of the demographic profile of respondents in terms of gender

Gender	Frequency	Percentage
Male	217	56.51%
Female	165	42.97%
Prefer not to say	2	0.52%
Total	384	100%

Table 4 displayed the gender distribution of 384 individuals, with a higher representation of males and females. Males constitute the largest group, with 217 individuals making up 56.51%. Females follow, with 165 individuals representing 42.97%. A small fraction, two individuals, or 0.52%, chose not to disclose their gender. This data indicates a notable majority of male respondents compared to female respondents, with a minimal number opting not to specify their gender. The slight gender imbalance should be considered when analyzing the survey results, as it reflects a higher male participation rate. Pham *et al.* (2019)^[14] agreed that gender differences were significant after controlling for other variables: women go to the park less frequently and stay for shorter periods than men.

Table 5

The percentage frequency of the respondents in terms of visits in urban parks

Gender	Frequency	Percentage
Daily	22	5.73%
Several times a week	141	36.72%
Once a Week	95	24.74%
A few times a month	88	22.92%
Less that once a month	38	9.90%
Others	0	0%
Total	384	100.00%

Table 5 shows the urban park usage frequency among a sample population. The most frequent usage pattern is several times a week, with 141 people (36.72%) responding to this category. Daily usage is followed by 22 people (5.73%) and once a week by 95 people (24.74%). Less frequent usage categories include a few times a month (88 people; 22.92%) and less than once a month (38 people; 9.90%). A category is listed as "Others" with a frequency of zero.

While some visitors visit urban parks several times a week, some studies indicate that other visitors visit less frequently (Mak, 2019)^[39], with the lowest frequency of visits being less than once a month (Veitch, 2013).^[40] This suggests that while some visitors are regular, others are more sporadic in their park visitation.

Table 6

The frequency and percentage of respondents most visited specific urban parks in Danao City

Urban Parks	Frequency	Percentage
Danao City Boardwalk	233	60.68%
Rizal Plaza	83	21.61%
Children’s Paradise	18	4.69%
Sands Gateway	49	12.76%
Others	1	0.26%
Total	384	100.00%

Table 6 revealed that Danao City Boardwalk is the most visited urban park, with a frequency of 233 (60.68%), followed by Rizal Plaza at 83 (21.61%). Children's Paradise is the third most visited park, with a frequency of 18 (4.69%), while Sands Gateway is the fourth most visited at 49 (12.76%). Lastly, only one respondent (0.26%) visited other parks besides those mentioned in the table. The Danao City Boardwalk is the most popular park among the respondents.

Table 7

The frequency and percentage of respondents’ activities usually done in urban parks in Danao City

Activities	Frequency	Percentage Frequency
Walking/jogging/running	69	8.47%
Relaxing/meditating	201	24.66%
Sports/exercise	27	3.31%
Picnics	43	5.28%
Eating	209	25.64%
Social Gatherings/Socializing with Friends	147	18.04%
Playing with Children	7	0.86%
Dog Walking	10	1.23%
Nature Observation	90	11.04%
Others: Dating	12	1.47%
Total	815	100%

Table 7 shows that eating is the most frequent activity done in urban parks in Danao City, with a frequency of 209 (25.64%). This is followed by relaxing/meditating (201, 24.66%) and social gathering/socializing with friends (147, 18.04%). Walking/jogging/running is another popular activity, with a frequency of 69 (8.47%). Nature observation (90, 11.04%) is a relatively common activity. Less popular activities listed in the table include picnics (43, 5.28%), sports/exercise (27, 3.31%), dog walking (10, 1.23%), and playing with children (7, 0.86%). The category "Others: Dating" has a frequency of 12 (1.47%). The table suggests that Danao City residents frequent urban parks for relaxation, social activities, and eating. Research by Nordh et al. (2013) ^[15] on urban park use suggests that while various activities occur in these spaces, eating is common and significant. The results suggested that Danao City residents frequent urban parks for relaxation and social activities.

Table 8

The frequency and percentage of respondents' time spent in urban parks in Danao City

Urban Parks	Frequency	Percentage Frequency
Less than 30 minutes	50	13.02%
30 minutes to 1 hour	163	42.45%
1-2 hours	115	29.95%
More than 2 hours	54	14.06%
Others	2	0.52%
Total	384	100.00%

Table 8 shows the frequency and percentage of respondents' time spent in urban parks in Danao City. Based on the data, a significant portion of respondents spend considerable time in urban parks. The most significant percentage is 42.45%, with 163 respondents spending between 30 minutes to 1 hour in Danao City's urban parks. Nearly a third, 29.95%, with 115 respondents, visit urban parks for 1 to 2 hours.

Fourteen percent (14.06%) of 54 respondents spend more than 2 hours in the parks. Moreover, only a small percentage, 13.02%, of respondents visit for less than 30 minutes in Danao City urban's park. The results agreed with Yan *et al.* (2022) ^[16] that the duration of leisure travel to urban parks is influenced by various factors, with the average duration falling within the 30-minute to one-hour range.

Table 9

Respondents' level of visitor satisfaction in the Danao City Boardwalk

Statement	Mean	Interpretation
Cleanliness and Maintenance	4.28	The respondents gave a completely acceptable rating for urban parks
Benches/seating areas	3.73	The respondents gave a somewhat acceptable rating for urban parks
Walking paths/trails/open spaces	4.28	The respondents gave a completely acceptable rating for urban parks
Restroom and sanitation facilities	3.54	The respondents gave a somewhat acceptable rating for urban parks
Safety and Security	4.16	The respondents gave a somewhat acceptable rating for urban parks
Parking area/bike racks	3.93	The respondents gave a somewhat acceptable rating for urban parks
Relaxation and stress reduction	4.26	The respondents gave a completely acceptable rating for urban parks
Overall Danao Boardwalks' Satisfaction	4.20	The respondents gave a completely acceptable rating for urban parks

Table 9 shows the respondents' level of visitor satisfaction at Danao City Boardwalk. The results indicated that cleanliness and maintenance received the highest mean score of 4.28, suggesting that respondents gave a completely acceptable rating. Similarly, walking paths/trails/open spaces also received the highest rating of 4.28. Relaxation and stress reduction had the second-highest mean score of 4.26, indicating a completely acceptable rating for these aspects of the boardwalk. This means that respondents are satisfied with the cleanliness and maintenance, the condition of the walking paths and trails, and the relaxation and stress reduction opportunities the boardwalk provides.

The mean score for safety and security at the Danao City Boardwalk is 4.16, which is somewhat acceptable to respondents. The mean score for the parking area/bike racks is 3.93, also considered somewhat acceptable. Benches/seating areas

received a mean score of 3.73, indicating that respondents found them adequate but not ideal. The mean score for restrooms and sanitary facilities is 3.54, which is also rated as somewhat acceptable.

Respondents were satisfied with their experience at the Danao City Boardwalk, with an overall mean score of 4.20, indicating a "completely acceptable" rating.

Wu *et al.* (2020) ^[17] found that park usage, rather than just access, significantly impacts visitors' satisfaction, with the association varying based on local amenities. Jung *et al.* (2014) ^[18] found that park users were particularly satisfied with safety and park facilities, while Byeong-Hwa *et al.* (2006) ^[19] identified safety and convenience as critical variables in user satisfaction. Gholipour *et al.* (2021) ^[20] further emphasized the importance of security in urban parks, with factors such as control and surveillance, physical accessibility, and space size and extent significantly influencing user satisfaction. Kang *et al.* (2016) ^[21] highlighted the need for flat-typed walking passages and sufficient parking areas. Krüger *et al.* (2019) ^[22] found that visitors' preference for resting areas in an urban square was closely related to thermal comfort, with shaded areas being particularly popular. This is supported by Hsieh and Lee (2010) ^[23], who found that the presence of shade and seating positively influenced subjects' psychological perception of open spaces. Furthermore, Kabisch *et al.* (2021) ^[24] emphasized the need for adequate infrastructure, such as drinking fountains and public toilets, to ensure equal park use opportunities, particularly during heat waves.

Table 10

Respondents' level of visitor satisfaction in the Danao City Rizal Plaza

Statement	Mean	Interpretation
Cleanliness and Maintenance	3.86	The respondents gave a somewhat acceptable rating for urban parks
Benches/seating areas	3.82	The respondents gave a somewhat acceptable rating for urban parks
Walking paths/trails/open spaces	3.73	The respondents gave a somewhat acceptable rating for urban parks
Restroom and sanitation facilities	2.77	The respondents gave a neither acceptable nor unacceptable rating for urban parks
Safety and security	3.65	The respondents gave a somewhat acceptable rating for urban parks
Parking area/bike racks	3.09	The respondents gave a neither acceptable nor unacceptable rating for urban parks
Relaxation and stress reduction	3.73	The respondents gave a somewhat acceptable rating for urban parks
Overall Rizal Parks' Satisfaction	3.75	The respondents gave a somewhat acceptable rating for urban parks

Table 10 evaluated various aspects of Rizal Park based on respondents' ratings, arranged from highest to lowest mean score. The cleanliness and maintenance of the park received the highest mean score of 3.86, indicating that respondents find these aspects somewhat acceptable. Following closely, benches and seating areas were rated with a mean score of 3.82, reflecting a somewhat acceptable perception.

Overall satisfaction with Rizal Plaza garnered a mean score of 3.75, showing respondents' general sense of contentment. Walking paths, trails, and open spaces in the park were rated similarly, with a mean score of 3.73, maintaining the trend of somewhat acceptable ratings. The park's relaxation and stress reduction facilities also received a mean score of 3.73, indicating that respondents find these aspects somewhat acceptable. Safety and security in the park received a mean score of 3.65, suggesting that respondents feel somewhat secure and safe within the park. Parking areas and bike racks received a more neutral mean score of 3.09, indicating mixed feelings or a perception of adequacy without strong positive or negative leanings. Finally, restroom and sanitation facilities received the lowest mean score of 2.77, suggesting that respondents view these facilities as neither acceptable nor unacceptable, highlighting a potential area for improvement.

Mohamed and Othman (2012) and Liu and Xiao (2020) [26] both found that well-maintained and organized natural elements, including cleanliness, significantly impact visitor satisfaction. Liu and Xiao (2020) [26] also identified the importance of benches and sitting areas, while Yang et al. (2023) [27] highlighted the role of walking paths and open spaces in influencing visitors' landscape preferences. These findings are further supported by Rai et al. (2022) [28], who emphasized the significance of quality and social benefits, which can be linked to the presence of amenities such as benches and walking paths. Safety and cleanliness are also crucial, as highlighted by Liu and Xiao (2020) [26] and Mohamed and Othman (2012). [25] Restroom and sanitation facilities are also crucial in influencing visitors' satisfaction, according to Çevik (2020). [29]

In addition, the availability of parking areas and bike racks can significantly enhance visitor satisfaction as they contribute to convenience and accessibility. [25] [26] Muslim et al. (2017) [30] and Zhang et al. (2021) [31] both emphasize the importance of peaceful surroundings, stress reduction, and the presence of natural and rest environments.

Table 11

Respondents level of visitor satisfaction in the Danao City Children's Paradise

Statement	Mean	Interpretation
Cleanliness and Maintenance	3.49	The respondents gave a somewhat acceptable rating for urban parks
Benches/seating areas	3.53	The respondents gave a somewhat acceptable rating for urban parks
Walking paths/trails/open spaces	3.59	The respondents gave a somewhat acceptable rating for urban parks
Restroom and sanitation facilities	2.97	The respondents gave a neither acceptable nor unacceptable rating for urban parks
Safety and security	3.77	The respondents gave a somewhat acceptable rating for urban parks
Parking area/bike racks	3.43	The respondents gave a somewhat acceptable rating for urban parks
Relaxation and stress reduction	3.57	The respondents gave a somewhat acceptable rating for urban parks
Overall Customer Satisfaction	3.65	The respondents gave a somewhat acceptable rating for urban parks

Table 11 shows the respondents' level of visitor satisfaction at Danao City Children's Paradise. The results indicate that safety and security received the highest mean score of 4.28, which indicates that respondents gave a somewhat acceptable rating. This means the respondents felt somewhat safe and secure at Children's Paradise.

The next highest rating is for walking paths/trails/open spaces, with a mean of 3.59, indicating a somewhat acceptable rating from respondents. Relaxation and stress reduction received a mean of 3.57, benches/seating areas a mean score of 3.53, cleanliness and maintenance a mean score of 3.49, and parking area/bike racks a mean of 3.43, all indicating somewhat acceptable ratings. The lowest-rated category is restrooms and sanitary facilities, with a mean of 2.97, indicating a somewhat unacceptable rating, meaning respondents found the restrooms and sanitary facilities inadequate, highlighting a significant area for improvement.

Overall, the respondent's level of satisfaction with Danao City Children's Paradise was somewhat acceptable, with an overall mean of 3.65.

Morgan (2018) ^[32] emphasized the role of safety and security and the availability of sitting areas and shade in shaping visitors' perceptions of parks. Mohamed (2012) ^[25] highlights the importance of natural elements and well-maintained spaces in enhancing the visitor experience. Muslim et al. (2017) ^[30] found that peaceful surroundings and outdoor activities in urban parks reduced stress and increased happiness. Mohamed (2012) ^[25] and Yang *et al.* (2023) ^[27] both highlight the importance of well-maintained and organized natural elements, which can include seating and accessibility in the parking area in enhancing visitor satisfaction. Furthermore, cleanliness and maintenance significantly influence visitor satisfaction in urban parks, according to Mohamed (2012) ^[25] and Liu (2020). ^[26]

Table 12

Respondents' level of visitor satisfaction in the Sands Gateway

Statement	Mean	Interpretation
Cleanliness and Maintenance	4.03	The respondents gave a somewhat acceptable rating for urban parks
Benches/seating areas	3.63	The respondents gave a somewhat acceptable rating for urban parks
Walking paths/trails/open spaces	3.97	The respondents gave a somewhat acceptable rating for urban parks
Restroom and sanitation facilities	3.58	The respondents gave a somewhat acceptable rating for urban parks
Safety and security	3.81	The respondents gave a somewhat acceptable rating for urban parks
Parking area/bike racks	3.97	The respondents gave a somewhat acceptable rating for urban parks
Relaxation and stress reduction	4.06	The respondents gave a somewhat acceptable rating for urban parks
Overall Sands Gateway' Satisfaction	3.92	The respondents gave a somewhat acceptable rating for urban parks

Table 12 evaluated various aspects of Sands Gateway based on respondents' ratings, arranged from highest to lowest mean score. The highest rating was given to relaxation and stress reduction, with a mean score of 4.06, indicating that respondents find this aspect somewhat acceptable. Close behind, cleanliness and maintenance received a mean score of 4.03, reflecting a somewhat acceptable perception.

Walking paths, trails, open spaces, parking areas, and bike racks received a mean score of 3.97, showing that respondents view these areas as somewhat acceptable. Overall satisfaction with Sands Gateway was rated at 3.92, indicating general contentment with the park's amenities and facilities.

Safety and security in the park received a mean score of 3.81, suggesting that respondents feel somewhat secure within the park. Benches and seating areas were rated with a mean score of 3.63, maintaining the trend of somewhat acceptable ratings. Restroom and sanitation facilities received the lowest mean score of 3.58, suggesting that respondents view these facilities as somewhat acceptable, though they are rated slightly lower than other aspects of the park.

In summary, Sands Gateway received generally positive ratings, with the highest satisfaction in relaxation, stress reduction, cleanliness, and maintenance. At the same time, all aspects were rated somewhat.

Liu (2020)^[26] identified factors such as park size, vegetation, and cleanliness as key to satisfaction, all contributing to a relaxing environment. Quagraine et al. (2023)^[32] also emphasized the role of comfort and image, which can be influenced by the cleanliness and maintenance of park facilities, including the restroom and sanitation areas. Yang (2023)^[27] emphasizes the role of environmental factors, particularly accessibility and greenery, in shaping visitors' landscape preferences. Safety and security significantly influence visitor satisfaction in urban parks. Schroeder (1984)^[33] found that high visibility and developed park features enhance perceived security, while Hami and Emami (2015)^[34] highlighted the importance of landscape design in creating a safe environment. Furthermore, Rai et al. (2022)^[28] also emphasize the role of quality and social benefits in influencing visitor satisfaction, which the presence of comfortable seating can enhance.

The lot area of Danao City's urban parks ranges from 2,300 square meters to 8,174.29 square meters. The Danao City Boardwalk has the biggest lot area, at 8,174.29 square meters. Children's Paradise comes in second at 2,625 square meters, followed by Rizal Plaza at 2,300 square meters. Sands Gateway is the smallest park in the table, measuring 1,175.55 square meters. The table shows a variation in the lot sizes of Danao City's urban parks.

Table 13

The Lot Area of each urban park in Danao City

Urban Parks	Lot Area
Danao City Boardwalk	8,174.29 square meters
Rizal Plaza	2,300 square meters
Children's Paradise	2,625 square meters
Sands Gateway	1,175.55 square meters

The lot area of Danao City's urban parks ranges from 2,300 square meters to 8,174.29 square meters. The Danao City Boardwalk has the biggest lot area, at 8,174.29 square meters. Children's Paradise comes in second at 2,625 square meters,

followed by Rizal Plaza at 2,300 square meters. Sands Gateway is the smallest park in the table, measuring 1,175.55 square meters. The table shows a variation in the lot sizes of Danao City's urban parks.

Table 14

The exponential growth population for the years 2021 to 2024

Year	Exponential Growth Population	Growth Rate
2015	105 598	4.20 %
2020	110 028	4.20 %
2021	114 649.18	4.20 %
2022	119 464.44	4.20 %
2023	124 481.95	4.20 %
2024	129 710. 19	4.20 %

Table 14 shows the exponential growth of the population from 2021 to 2024 for residents aged 13 to 70 years old, as the census data available is only for the year 2020, which cannot be used for computing the sample size. Additionally, the researchers can now determine the current population of Danao City residents aged 13 to 70 years old.

Table 15

The number of benches, seating areas, and shade in the Urban parks of Danao City

Urban Parks	Benches	Seating Area	Shade
Danao City Boardwalk	0	30	0
Rizal Plaza	7	242	15
Children’s Paradise	15	20	14
Sands Gateway	0	6	1

Table 15 summarizes the number of benches, seating areas, and shaded spots in four urban parks in Danao City. Rizal Plaza stands out with the highest numbers, featuring seven benches, 242 seating areas, and 15 shaded spots, making it the best-equipped park for seating and shade. Following this is Children's Paradise, which offers 15 benches, 20 seating areas, and 14 shaded spots, showing a good balance of amenities despite having fewer seating areas than Rizal Plaza. The Danao City Boardwalk comes next with no benches but 30 seating areas and no shaded spots, highlighting a significant lack of basic seating infrastructure. Lastly, Sands Gateway is the least equipped, with no benches, six seating areas, and only one shaded spot. This data indicates that while Rizal Plaza is well-furnished to accommodate visitors comfortably, Sands Gateway and Danao City Boardwalk require significant improvements, especially in providing benches and shaded areas.

Sagrero (2018) ^[41] emphasizes the role of benches in promoting social interaction and public space utilization, and Cherian (2022) ^[42] underscores the need for integrated shading strategies to protect against UV radiation, as green ground cover and enclosed green niches are crucial for rest and restitution in urban parks.

Table 16

Average Visitors for a Day in Danao City Urban Parks

Urban Parks	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Average visitors for a day
Danao City Boardwalk	235	97	300	223	201	143	388	227
Rizal Park	226	165	292	211	216	119	179	201
Children’s Paradise	125	46	151	110	93	89	104	103
Sands Gateway	67	92	94	79	89	77	30	75

The table shows the average number of visitors per day over a week in four urban parks in Danao City. Danao City Boardwalk has the highest average daily visitors at 227. Rizal Park follows with an average of 201 visitors per day. Children's Paradise sees an average of 103 visitors daily. Lastly, Sands Gateway has the lowest average at 75 visitors per day. This data suggests that Danao City Boardwalk is the most popular park. Sands Gateway is the least frequented, indicating a potential need for improvements or increased promotion to attract more visitors.

Table 17

Carrying Capacity of Urban Parks of Danao City

Urban Parks	Carrying Capacity
Danao City Boardwalk	909 visitors
Rizal Plaza	256 visitors
Children’s Paradise	291 visitors
Sands Gateway	131 visitors

Table 17 illustrated the carrying capacity of Danao City's urban parks. To measure this, the lot area of each urban park is divided by the standard moderate acceptable density area of a park. The recommended minimum carrying capacity based on green open space is 9 square meters per person. (WHO, 2010).^[35]

The results showed that the carrying capacity of visitors that the urban parks can handle ranges from 131 to 909 visitors. Danao City Boardwalk has the highest carrying capacity at 909 visitors. Children's Paradise comes in second at 291 visitors, followed by Rizal Plaza at 256. Sands Gateway, the smallest park listed in the table, has a capacity of 131 visitors.

Overall, the table shows a variation in the carrying capacities of Danao City's urban parks. This information can help park planners understand how many visitors each park can accommodate comfortably.

Table 18

Level of overcrowdedness in the Urban Parks of Danao City

Urban Parks	Mean	Interpretation
Danao City Boardwalk	3.57	The respondents gave a rating agreeing that the urban park is populated
Rizal Plaza	3.23	The respondents gave a rating agreeing that the urban park is moderately populated
Children’s Paradise	2.89	The respondents gave a rating agreeing that the urban park is moderately populated
Sands Gateway	3.32	The respondents gave a rating agreeing that the urban park is moderately populated

Table 18 shows the level of overcrowding in Danao City's urban parks, namely Boardwalk, Rizal Plaza, Children's Paradise, and Sands Gateway. The Danao City Boardwalk has the highest mean score of 3.57, indicating that respondents agree that the urban park is crowded. Sands Gateway, Rizal Plaza, and Children's Paradise have mean scores of 3.32, 3.23, and 2.89, respectively, indicating that respondents agree that these urban parks are moderately crowded. Westover (1987) further emphasizes the impact of the actual number of visitors on perceived crowding, particularly in more developed and urban parks.

Table 19

The most bothersome aspect of overcrowding in the urban park in Danao City

Urban Parks	Frequency	Percentage
Difficulty in Parking Spot	122	15.06%
Limited Space for Activities	168	20.74%
Noise and disruption	219	27.04%
Litter and waste overflowing bins	145	17.90%
Damage to park facilities	61	7.53%
Feeling unsafe	95	11.73%
Others	0	0.00%
Total	810	100.00%

The table on overcrowding in Danao City's urban parks showed that the most common issues are noise and disruption, with a frequency of 219 (27.04%), limited space for activities, with a frequency of 168 (20.74%), and litter and waste management with a frequency of 145 (17.90%). Other notable concerns include parking difficulties with a frequency of 122 (15.06%), feeling unsafe with a frequency of 95 (11.73%), and damage to park facilities with a frequency of 61 (7.53%).

These findings suggest that interventions are necessary to enhance waste management, expand park areas, improve facilities, and significantly reduce noise to improve the overall park experience because noise pollution influences the quality of life of the people, as manifested by several psychosocial complaints that could hurt the health and wellbeing of populations (De Lacerda *et al.*, 2005).^[37]

Table 20

The frequency and percentage of respondents' suggestions to improve the recreation park to optimize the experience of all visitors.

Themes	Frequency	Percentage
Accessible Chairs	17	4.27%
Additional Comfort Room	7	1.76%
Additional Shade	8	2.01%
Charging Station	1	0.25%
Maintain Cleanliness	44	11.06%
Crowd control	2	0.50%
Expansion	5	1.26%
Implement Rules	11	2.76%
More Facility	2	0.50%
No service fee in facilities	9	2.26%
Parking Spot	20	5.03%
Renovation	5	1.26%
Safety and Security	19	4.77%
Signages and labels	8	2.01%
Tour Guides	1	0.25%
Vendors	1	0.25%
Water Station	2	0.50%
No Suggestions	236	59.30%
Total	398	100.00%

The table outlined respondents' suggestions to improve the recreation park, organized by themes, with frequencies and corresponding percentages. The most common suggestion is to "Maintain Cleanliness," with a frequency of 44 and a percentage of 11.06%. Cleanliness was a highly recommended suggestion by the people, and the most famous quality of the park was that it improved physical and mental health. The findings help plan, design, and manage urban parks to fulfill people's needs and improve the quality of citizens' lives (Hanif et al., 2020).^[38] "No Suggestions" is the next highest category, noted by 236 respondents, making up 59.30%. This is followed by "Parking Spot" (20, 5.03%), "Safety and Security" (19, 4.77%), "Accessible Chairs" (17, 4.27%), and "Implement Rules" (11, 2.76%). Other notable suggestions include "No service fee in facilities" (9, 2.26%), "Additional Shade" and "Signages and labels" (both 8, 2.01%), "Additional Comfort Room" (7, 1.76%), "Expansion" and "Renovation" (both 5, 1.26%), "Crowd control" and "More Facility" (both 2, 0.50%), and finally, "Charging Station," "Tour Guides," and "Vendors" each with a frequency of 1 and a percentage of 0.25%. This data indicates that while a significant majority did not offer suggestions, the top concerns among those who did include cleanliness, parking, and safety/security measures.

According to Mohamed (2012),^[25] the presence of parking spaces and bike racks can significantly increase visitor satisfaction since they improve accessibility and convenience. Gholipour *et al.* (2021)^[21] underscored the significance of security measures in urban parks, noting that elements like physical accessibility, control and surveillance, and space size and extent heavily impact user satisfaction.

While Liu and Xiao ^[26] noted the significance of benches and resting areas, Yuehua (2009) ^[43] emphasized the need for clear communication in park planning and management, with signage and labels playing a crucial role in guiding visitors and conveying important information. Signage and labels play a significant role in orienting visitors and providing critical information. Furthermore, Çevik (2020) ^[29] asserted that providing free restrooms and sanitation facilities plays a critical role in determining the contentment of tourists.

4. Conclusion

The study revealed that the most frequently visited urban parks in Danao City are Boardwalk, Rizal Park, Sands, and Children's Paradise, respectively, with activities ranging from eating, relaxing, and social gatherings to nature observation and physical exercises. Boardwalk emerged as the most crowded park, followed by Sands, Rizal Plaza, and Children's Paradise. Visitors cited noise, limited space, litter, parking difficulties, feelings of unsafety, and damage to park facilities as significant concerns. Recommended improvements include maintaining cleanliness, better parking access, enhancing safety, adding benches and shades, and increasing restroom facilities. Despite challenges, all parks can accommodate average visitors, highlighting adequate carrying capacity. Addressing these issues is crucial for enhancing visitor experience and well-being.

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