

CHALLENGES IN IMPLEMENTING GREEN SPACE REQUIREMENTS IN DAVAO CITY

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ABSTRACT

Despite Davao City's existing green spaces, challenges hinder the implementation of the green space requirement mandated by its zoning ordinance. The goal of the study is to recognize and examine these obstacles. Utilizing a quantitative method, a structured questionnaire was administered to 150 participants and their responses were subjected to exploratory factor analysis (EFA) using Statistical Package for the Social Sciences (SPSS) software. Key findings include six main factors influencing the implementation of green spaces such as urban green integration, governance, promotion of awareness and compliance, sustainability through maintenance and public awareness, public perception, and enforcement challenges.

The study concludes that addressing these challenges necessitates a comprehensive approach. It recommends setting up strong monitoring systems, developing clear guidelines and penalties, conducting educational programs, and launching public awareness campaigns. By adopting these strategies, Davao City can overcome barriers to green space implementation, promoting a sustainable and healthy urban environment for present and future generations.

Keywords: Green Spaces, Implementation challenges, Urban Planning, Sustainability, Public Perception, Regulations

1. INTRODUCTION

Urbanization is a global phenomenon with significant environmental consequences. As cities sprawl, green spaces – areas with vegetation and natural elements – dwindle. This loss has a cascading effect, impacting air and water quality, increasing heat island effect, reducing biodiversity, and limiting recreational opportunities [Kowarik, 2011]. Green spaces, however, offer numerous benefits, acting as the lungs of our cities. They provide cleaner air by filtering pollutants, regulate water flow by absorbing rainwater, mitigate the urban heat island effect by providing shade and evapotranspiration, and offer vital habitat for urban wildlife [Miller, 2008]. They also enhance the overall aesthetic of a city and provide recreational opportunities for residents, promoting physical and mental well-being [Fuller et al., 2007]. Cities like Davao City in the Philippines have recognized the significance of green spaces and incorporated requirements for their inclusion in urban planning strategies. Despite such initiatives, challenges persist in effectively implementing these policies. This research focused on identifying and analyzing obstacles faced in implementing Davao City's green space requirement, including issues related to policy enforcement, integration of green spaces into urban development plans, governance and sustainability of green spaces, promotion of green space awareness and compliance, enhancement of green space sustainability through maintenance and public awareness, and improvement of public perception and appreciation of green space initiatives. By addressing these challenges, the study aimed to contribute to the enhancement of Davao City's green space policy and its successful implementation on the ground, ultimately fostering a more sustainable and livable urban environment.

2. METHODOLOGY

This study employed a quantitative approach using a structured questionnaire. The questionnaire was designed to gather data on the challenges faced in implementing the green space requirement in Davao City. The target population included random government employees from City Planning and Development Office (CPDO) and other relevant government agencies, environmental planners, officers of Homeowners' Associations, subdivision developers, practicing engineers, and other private individuals. A total of 150 questionnaires consisting 30 items each were distributed, with a mix of online and manual administration methods. Torrentira (2020) defines an online survey as the process of utilizing online platforms such as Google Forms to distribute an instrument or questionnaire to the intended respondents. The data were analyzed using exploratory factor analysis (EFA) to identify underlying factors contributing to the challenges and the Statistical Package for the Social Sciences (SPSS) software to perform descriptive and inferential statistical analyses. This produced results for the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The KMO assesses whether the data is suitable for factor analysis, while Bartlett's Test of Sphericity examines the null hypothesis (Noora Shrestha, 2021).

3. RESULTS AND DISCUSSIONS

Table 1: KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.876
Bartlett's Test of Sphericity	Approx. Chi-Square	2953.494
	df	435
	Sig.	.000

Results from Table 1 are from two statistical tests used to assess the suitability of the data for factor analysis: the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The KMO value of .876 falls into the meritorious range, suggesting that adequacy is high and factor analysis is appropriate for the data. A Chi-square value of 2953.494 indicates that the correlation matrix significantly differs from an identity matrix. Degrees of Freedom (df) which is 435 corresponds to the number of variables and their correlations. A p-value (Significance) of 0.000 indicates that the test is highly significant ($p < 0.05$), meaning the null hypothesis can be rejected and that the variables are sufficiently correlated to provide reliable factors. The high KMO value combined with the significant Bartlett's Test result validates the adequacy of dataset for factor analysis. This means that the data is well-suited for uncovering and understanding the main obstacles in the implementation of green space requirements in Davao City, thus providing a solid foundation for this research.

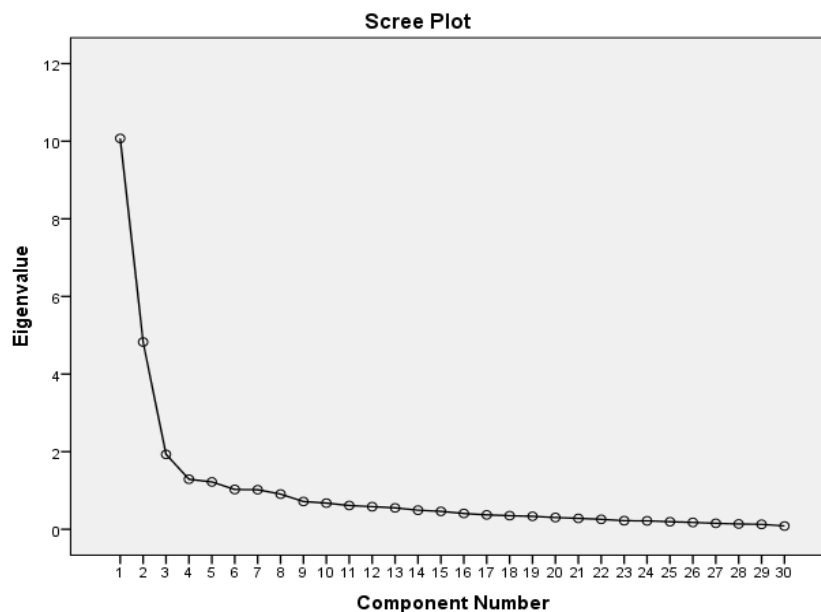


Figure 1: Scree Plot

The scree plot shows the eigenvalues against the component numbers derived from a principal component analysis (PCA). The plot indicates a steep decline in the eigenvalues after the first component, which suggests that the first component explains a significant amount of the variance in the data. This is followed by a more gradual decline, with the eigenvalues leveling off after the third component, indicating that these initial components capture the most substantial information regarding the challenges faced in the implementation of green space requirements. It further suggests that the primary challenges in implementing green space requirements in Davao City can be effectively summarized by the first few components. This could imply that there are a few dominant factors or issues that heavily influence the implementation process. These factors should be the focus of deeper analysis and targeted interventions. Identifying and addressing these key components can lead to more effective strategies for overcoming barriers and promoting the successful implementation of green spaces in the city. The plot thus aids in prioritizing the most significant challenges and guides the allocation of resources and efforts in tackling the most impactful issues first.

Rotated Component Matrix

The components collectively explain 71.283% of the total variance in the data, indicating that the six factors extracted capture a significant proportion of the variability in the dataset. The high loadings within each component suggest that the items within each group are closely related and likely measure similar constructs, while the low cross-loadings indicate minimal overlap between different components, enhancing the interpretability of these factors.

Table 2: Comprehensive Strategy for Integrating Green Spaces into Urban Development (Urban Green Integration)

Item	Attributes	Loading
18	Community involvement should be encouraged in the planning, design, and maintenance of green spaces.	0.842
30	Sustainability principles such as water conservation and use of native plants should be prioritized in green spaces.	0.841
20	Green spaces are a vital component of a sustainable and healthy environment for Davao City.	0.822
18	Educational programs can promote a culture of environmental stewardship among Davao City residents.	0.819
26	The role of barangays in promoting green space initiatives within their communities should be explored.	0.809
25	Different types of green spaces (e.g., parks, pocket gardens, green roofs) should be considered to suit diverse needs.	0.802
16	Green spaces play a vital role in mitigating the effects of “urban heat islands”.	0.799
17	The green space requirements in Davao City should be strengthened to ensure greater environmental benefits.	0.796
24	The city government should conduct regular assessments of the effectiveness of green space requirements.	0.778
29	Green spaces should be designed to be inclusive and accessible for people of all abilities.	0.773
27	Public participation in the development of green space master plans for Davao City is crucial.	0.762
15	The presence of green spaces contributes to a more comfortable and aesthetically pleasing urban environment.	0.754
28	Davao City can learn from best practices in green space implementation from other cities in the Philippines and abroad.	0.749

This factor represents the integration of green spaces into urban development, emphasizing the importance of community involvement, sustainability principles, and the vital role of green spaces in creating a healthy and sustainable environment. It highlights the need for educational programs, the involvement of barangays, and the consideration of diverse green space types to meet different needs. The factor also underscores the importance of green spaces in mitigating urban heat island effects and the need for strengthened green space requirements and regular assessments.

Table 3: Governance and Sustainability of Green Spaces in Davao City (Regulation)

Item	Attributes	Loading
7	There is a monitoring system for green space implementation in Davao City.	0.858
8	There are penalties for violating green space regulations in Davao City.	0.836
6	There are clear guidelines for evaluating the quality and quantity of green spaces implemented by developers.	0.753
9	Property owners and residents adequately maintain green spaces within their communities/subdivision.	0.641
4	The current green space requirements in Davao City are sufficient to meet the needs of a growing population.	0.583

This factor reflects the governance and sustainability aspects of green space implementation in Davao City. It emphasizes the importance of having a monitoring system, penalties for violations, clear guidelines for evaluating green spaces, and adequate maintenance by property owners and residents. It also raises concerns about the sufficiency of the current green space requirements to meet the needs of the growing population.

Table 4: Promotion of Green Space Awareness and Compliance in Urban Planning (Environmental Engagement)

Item	Attributes	Loading
1	Developers in Davao City are fully aware of the city's green space requirements.	0.856
2	The public in Davao City understands the importance of green spaces in their communities.	0.724
3	Homeowners' associations in Davao City are knowledgeable about maintaining green spaces within their communities.	0.638
5	The city's zoning ordinance effectively promotes the integration of green spaces into new developments.	0.522

This factor focuses on the promotion of green space awareness and compliance in urban planning. It highlights the need for developers, the public, and homeowners' associations to be fully aware of and knowledgeable about the city's green space requirements. It also suggests the importance of the city's zoning ordinance in effectively promoting the integration of green spaces into new developments.

Table 5: Enhancement of Green Space Sustainability through Maintenance, Public Awareness, and Environmental Benefits (Stewardship and Conservation)

Item	Attributes	Loading
12	The lack of long-term maintenance plans for green spaces leads to their deterioration over time.	0.668
13	Public awareness campaigns are needed to educate citizens about the value of green spaces.	0.587
14	Green spaces in Davao City effectively improve air quality and reduce pollution.	0.571

This factor addresses the issues surrounding the long-term maintenance, public awareness, and environmental benefits of green spaces. It suggests that the lack of maintenance plans leads to the deterioration of green spaces over time and that public awareness campaigns are needed to educate citizens about the value of green spaces. Additionally, it indicates that green spaces in Davao City should effectively improve air quality and reduce pollution.

Table 6: Improving Public Perception and Appreciation of Green Space Initiatives (Green Space Perception)

Item	Attributes	Loading
22	The public feels that the city government is not doing enough to ensure green space compliance.	0.776
23	There is a lack of appreciation for the value of green spaces among some residents of Davao City.	0.736

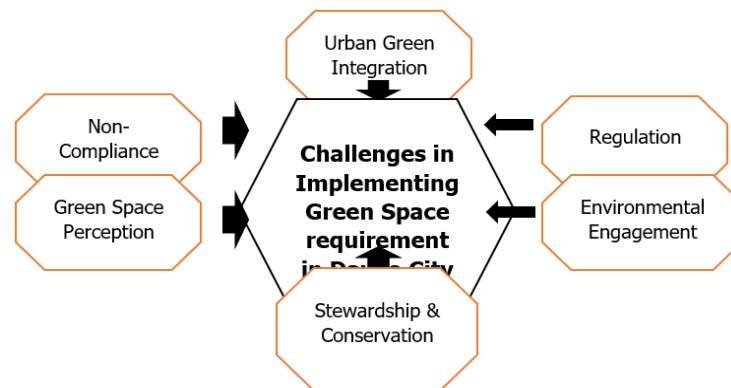
This factor captures the public's perception and appreciation of green space initiatives in Davao City. It highlights the public's perception that the city government is not doing enough to ensure green space compliance and the lack of appreciation for the value of green spaces among some residents.

Table 7: Addressing Challenges in Enforcing Green Space Regulations (Non-compliance)

Item	Attributes	Loading
21	Developers view green space requirements as an unnecessary burden on their projects.	0.718
11	Limited enforcement of green space requirements allows developers to disregard regulations.	0.522

This factor addresses the challenges in enforcing green space regulations, indicating that developers view green space requirements as an unnecessary burden and that limited enforcement allows developers to disregard the regulations.

4. STUDY FRAMEWORK



5. CONCLUSION AND RECOMMENDATIONS

Addressing the challenges in the implementation of green space requirements in Davao City requires a comprehensive approach that involves enhancing community involvement, prioritizing sustainability, improving governance and enforcement mechanisms, promoting awareness, and improving public perception.

Based on the findings of this research, several recommendations can be made to address the challenges in the implementation of green space requirements in Davao City. These recommendations are aligned with the identified factors and aim to enhance the effective integration of green spaces within the city's urban fabric:

1. **Enhance Urban Green Integration- Community Involvement:** Encourage more active community participation in the planning, design, and maintenance of green spaces. Establish forums and outreach programs to engage residents and solicit their input. **Sustainability Principles:** Prioritize sustainability principles such as water conservation and the use of native plants in the development of green spaces. Provide guidelines and resources to developers to facilitate this integration. **Education Programs:** Implement educational programs to promote environmental stewardship among residents. Schools, community centers, and local organizations can play a pivotal role in these initiatives. **Diverse Green Spaces:** Promote the development of various types of green spaces (e.g., parks, pocket gardens, green roofs) to meet diverse community needs and enhance urban biodiversity.
2. **Strengthen Governance and Sustainability- Monitoring Systems:** Establish robust monitoring systems to ensure compliance with green space regulations. Regular inspections and audits should be conducted to evaluate the quality and quantity of green spaces. **Clear Guidelines and Penalties:** Develop clear guidelines for green space implementation and maintenance, and enforce penalties for non-compliance. This will ensure that developers adhere to the regulations. **Maintenance Plans:** Encourage property owners and residents to develop and adhere to long-term maintenance plans for green spaces. Provide support and resources to facilitate proper upkeep.
3. **Promote Awareness and Compliance- Developer Awareness:** Conduct training and workshops for developers to ensure they are fully aware of the city's green space requirements and the benefits of integrating green spaces into their projects. **Public Awareness Campaigns:** Launch public awareness campaigns to educate citizens about the importance of green spaces. Use various media channels to reach a broad audience. **Homeowners' Associations:** Engage with homeowners' associations to enhance their understanding and capacity to maintain green spaces within their communities.
4. **Improve Public Perception and Appreciation - Government Initiatives:** Increase transparency and communication regarding the city's efforts to ensure green space compliance. Highlight successful projects and initiatives to build public trust and appreciation. **Recognition Programs:** Introduce recognition programs for communities and developers who excel in green space implementation and maintenance. This can incentivize positive behavior and foster a culture of appreciation for green spaces.
5. **Address Enforcement Challenges- Strengthen Enforcement:** Improve the enforcement of green space regulations by increasing the capacity of regulatory bodies. This includes training for enforcement personnel and increasing the frequency of inspections. **Facilitate Compliance:** Provide support and incentives for developers to comply with green space requirements. This can include financial subsidies, technical assistance, and streamlined approval processes for compliant projects. These efforts will not only contribute to the aesthetic and environmental quality of the city but will also promote social well-being and resilience against urban challenges. Through collaborative efforts and targeted interventions, Davao City can successfully integrate green spaces into its urban fabric, benefiting both present and future generations.

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