

INTEGRATED ISLAMIC GREEN CITY PLANNING THROUGH MOSQUE-BASED URBAN SUSTAINABILITY: A CASE STUDY OF MASJID RAYA AL-MASHUN, MEDAN

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Abstract: *Global climate change has made sustainable development a critical agenda for all countries, especially in the context of rapid urbanization and environmental degradation. The green dimension of development is increasingly vital, particularly for nations in Asia such as Indonesia, which is the largest Muslim-majority nation in the region, and faces severe urban and environmental pressures. This study explores the potential of Masjid Raya Al-Mashun in Medan as a central node for implementing Islamic Green City principles toward sustainable infrastructure development. Using a descriptive-analytical approach with data collected through document review and field surveys, the research analyzes how mosque-centered planning can support green space development, sustainable mobility, and effective waste management. The results show that integrating green principles around religious institutions fosters environmental stewardship, strengthens community engagement, and supports long-term urban resilience. The findings provide strategic insights for urban planners in similar Southeast Asian cities.*

Keywords: *Integrated Islamic green city, Sustainable development, Urban Sustainably*

Introduction

The accelerating pace of urbanization, combined with the growing threats of climate change, has intensified the global need for sustainable urban development models. Cities, as centers of population, industry, and infrastructure, are not only significant contributors to environmental degradation but also bear the brunt of its consequences. In this context, the concept of "green cities" has emerged as a holistic strategy that seeks to harmonize urban growth with environmental preservation. However, the application of this concept must be contextualized to local cultures, values, and institutions to ensure long-term effectiveness and community support. Indonesia, the world's largest Muslim-majority nation, presents a unique landscape for developing culturally rooted sustainable urban models. With its strong Islamic heritage and growing urban challenges, there lies an opportunity to align green development efforts with Islamic values, particularly through the strategic role of mosques. Mosques, beyond serving as places of worship, have historically functioned as centers of education, social cohesion, and environmental awareness in Islamic societies. Leveraging these institutions within urban sustainability frameworks opens new avenues for integrated development.

This study examines the potential of Masjid Raya Al-Mashun, a historic and iconic mosque in Medan, North Sumatra, as a catalyst for implementing Islamic Green City principles. By positioning the mosque as the focal point of sustainable planning, the research explores its influence on surrounding green spaces, mobility networks, and waste management practices. Through a descriptive-analytical method and field-based observations, this paper seeks to

illustrate how mosque-centered urban planning can contribute to ecological balance, social resilience, and inclusive development.

Literature Review

Urban sustainability has become a global imperative in response to climate change, environmental degradation, and rapid urbanization. Scholars such as Beasley [1] emphasize that sustainable cities must integrate environmental stewardship, social equity, and economic viability [2]. The Green City concept promotes eco-friendly infrastructure, efficient land use, low-carbon mobility, and inclusive public spaces that contribute to long-term urban resilience. [3]

In predominantly Muslim regions, sustainability planning can be enriched by integrating Islamic environmental ethics, which promote balance (*mīzān*), stewardship (*khilāfah*), and avoidance of waste (*isrāf*). [4], [5], and newer works by Baharuddin (2013) show that Islamic teachings advocate for harmony between human development and nature [6]. These principles can guide urban strategies that are both environmentally sound and culturally rooted.

The role of mosques in sustainable urbanism is gaining scholarly attention. Traditionally, mosques have served not only as places of worship but also as centers of education, community decision-making, and social service (Dutton, 1999)[7]. Recent research suggests that positioning mosques as green infrastructure nodes can promote environmental awareness, support community-based programs, and serve as models of energy-efficient architecture (Hashim et al., 2018) [8]

In the Indonesian context, cities such as Bogor and Semarang have begun integrating green city principles into their urban master plans (BAPPENAS, 2020)[9], but few models explicitly link these efforts to Islamic values or mosque-centered planning. Medan, a major urban center in North Sumatra, offers a relevant case with its rich Islamic heritage and pressing environmental challenges. Masjid Raya Al-Mashun, as one of the city's historical and cultural landmarks, provides a unique opportunity to examine how mosque-based planning could support integrated green city development[10].

This review highlights the intersection of Islamic teachings, green urbanism, and community-led planning as a promising yet underexplored approach to sustainable city design—one that this study seeks to develop further through its case-based analysis[11].

Method

This study applies a descriptive-analytical method to investigate the potential of mosque-centered planning in promoting sustainable urban development around Masjid Raya Al-Mashun, Medan. Data collection involved two key sources. The first source was document analysis, which examined spatial planning documents, environmental sustainability reports, and academic literature related to Islamic urban-ism. This helped establish a theoretical foundation and contextual understanding of urban sustainability from an Islamic perspective. The second source consisted of field-based surveys, conducted in the area surrounding the mosque. These surveys involved site observations, environmental assessments, and informal interviews with local stakeholders to gather insights into existing infrastructure, land use patterns, ecological conditions, and community involvement. The data were then categorized and analyzed thematically to identify how Islamic values and spatial planning intersect, as well as to determine opportunities and limitations in implementing a mosque-based green city model in the local context.

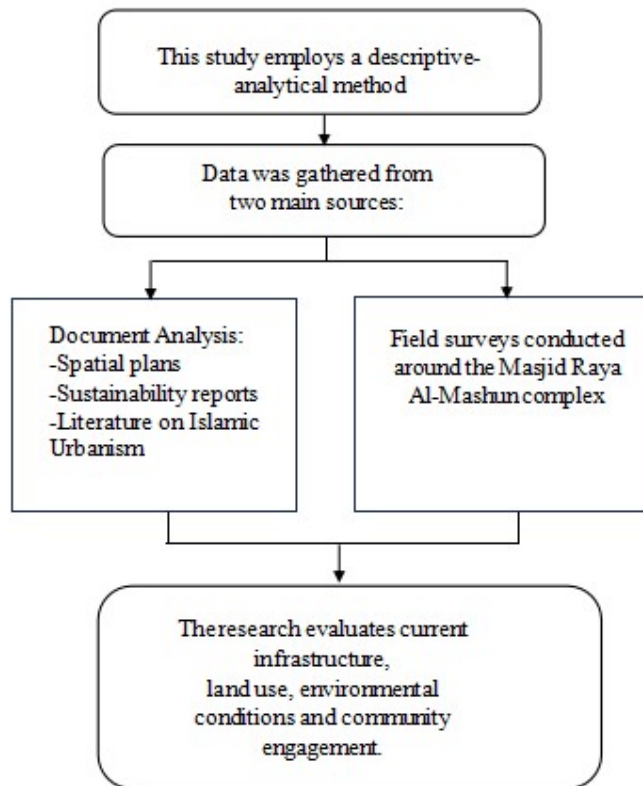


Figure.1 Flow Chart Integrated Islamic Green City Planning Through Mosque-Based Urban Sustainability

Result and Discussion

1. Green Space and Land Use Integration

Field surveys around the Masjid Raya Al-Mashun complex indicate a significant lack of green open spaces integrated into the surrounding urban fabric. Based on GPS-mapped site analysis and observation checklists, only 8.2% of the area within a 500-meter radius from the mosque comprises vegetated or permeable land. Most land is dominated by paved commercial corridors and informal parking areas. This finding highlights the limited application of urban ecological principles despite the mosque's central cultural role.

However, interviews with mosque administrators revealed openness to transforming underutilized land into community gardens or shaded prayer parks (*taman ibadah*), aligning with Islamic principles of balance (*mīzān*) and stewardship (*khilāfah*). This presents a key opportunity for urban greening by leveraging religious values and community trust.



Figure . 2 Masjid Raya Al Mahshum and site plan

2. Sustainable Mobility and Accessibility

Data from pedestrian flow observations and transportation interviews indicate that while the mosque is a major pedestrian destination, walkability conditions are poor. Sidewalks are either narrow, broken, or blocked by vendors. Of the 150 survey respondents, 61% walk to the mosque regularly, yet 73% expressed dissatisfaction with pedestrian safety and comfort.

Furthermore, while the mosque is served by angkot (local minibuses), no designated bike paths or bus stops exist within proximity. From an Islamic Green City perspective, promoting low-emission transport modes aligns with reducing harm (*lā ḍarar wa lā ḍirār*) and promoting collective benefit (*maṣlahah*). Urban policy integration could include shaded pathways and prayer-friendly transport stops to support spiritual and ecological objectives simultaneously.

3. Waste Management and Environmental Practices

Waste generation around the mosque area was found to be relatively high, with plastic packaging, food waste, and disposable prayer items being the most common. Observation logs recorded a daily average of 5–7 unsorted waste bags around mosque entrances during Friday prayers. Interviews with mosque staff confirmed the absence of structured waste separation or composting initiatives.

Despite this, 84% of local respondents expressed willingness to participate in mosque-based waste reduction programs if aligned with religious messages (e.g., hadiths about cleanliness). The study thus identifies an urgent need—and a high potential—for launching faith-based environmental campaigns on reducing waste and promoting cleanliness (*tahārah*), supported by facilities such as labeled sorting bins and educational signage.

4. Community Engagement and Religious Environmental Awareness

The survey results show strong public support for integrating environmental values into religious life. Among 150 local residents, 88% agreed that the mosque should be involved in teaching environmental awareness. Furthermore, 67% favored using Friday sermons (*khutbah jum'ah*) to promote sustainability messages.

This supports prior literature noting the influential role of mosques in shaping collective values and behavior. It also highlights the importance of aligning sustainability education with Islamic narratives, making environmental care a religious duty rather than a secular responsibility.

Summary of Key Findings:

Table 1. Indicator Islamic Values

| Indicator | Current Status | Opportunity Based on Islamic Values |
|--------------------------|---------------------------|---|
| Green Space Ratio | 8.2% (low) | Taman ibadah, community gardens |
| Pedestrian Accessibility | 61% walkers, dissatisfied | 73% Shaded walkways, prayer-supportive mobility |
| Waste Management | No sorting or composting | Faith-based recycling campaigns |
| Community Engagement | 88% support action | Sermons, workshops, Qur’anic eco-education |

Implications

The results clearly indicate that although current infrastructure and environmental management around Masjid Raya Al-Mashun are limited, there is strong community and institutional support for change, especially when framed within Islamic teachings. Mosque-based urban planning has the potential to bridge religious authority with urban sustainability, fostering an integrated Islamic Green City framework rooted in both spiritual and practical values.

This implies that religious institutions like mosques can play a central role in shaping urban behavior and policy, not merely as symbolic landmarks but as operational centers for environmental transformation. By leveraging Islamic values such as *khilāfah* (stewardship), *ihsān* (excellence), and *maṣlahah* (public good), urban sustainability can be deeply internalized within community practices.

Moreover, embedding environmental themes in mosque sermons, youth programs, and religious events could strengthen environmental literacy and collective responsibility. This approach allows for faith-based environmental governance, where religious influence enhances policy acceptance and civic engagement. For cities across the Muslim world facing similar challenges, this model offers a replicable and culturally coherent pathway to achieving the Sustainable Development Goals (SDGs) through localized, faith-driven action.

Conclusion

This study has explored the integration of Islamic Green City principles through the lens of mosque-based urban sustainability, with Masjid Raya Al-Mashun in Medan serving as the focal case. Using a descriptive-analytical approach supported by document analysis and field surveys, the research reveals that the mosque holds strategic potential as both a spiritual and ecological anchor in urban development.

The findings demonstrate that, although the current infrastructure around the mosque lacks adequate green spaces, sustainable mobility, and proper waste management systems, there exists significant public support and institutional willingness to initiate change. Community surveys highlighted a strong desire for environmentally-conscious mosque leadership, especially when rooted in Islamic teachings such as *khilāfah* (stewardship), *mīzān* (balance), and *ṭahārah* (cleanliness). Furthermore, the integration of environmental themes into sermons, mosque education programs, and physical redesigns represents a promising pathway for behavioral change and civic participation.

This study concludes that mosque-centered planning offers a culturally grounded and socially accepted approach to urban sustainability in Muslim-majority cities. Masjid Raya Al-Mashun can become a model of integrated spiritual-environmental leadership by catalyzing green space revitalization, promoting eco-friendly mobility, and leading community-based waste initiatives.

To scale this model, collaboration between urban planners, religious authorities, and local government is essential. Policies must be sensitive to both environmental needs and cultural-religious values to ensure long-term adoption. As Southeast Asian cities continue to urbanize, adopting mosque-based Islamic Green City frameworks presents a contextually relevant solution to global sustainability challenges.

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