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What drives green open-space planning? Evidence from Sukabumi City

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Abstract

Green open spaces (RTH) are crucial for supporting sustainable urban development and maintaining environmental balance. In Sukabumi City, the planning and provision of RTH continue to face considerable challenges amid rapid urbanization, despite the mandate of Law No. 26 of 2007, which requires 30% of the city area to be allocated for RTH provision. This study aims to analyze the factors driving development administration planning in the provision of RTH, focusing on regulatory, social, community participation, economic, environmental, and institutional aspects of the same. Using a literature review method with a qualitative approach, this study identifies and synthesizes relevant findings regarding the dynamics of RTH planning. The results indicate that the city faces challenges related to limited land availability, low community participation, and budgetary constraints. To overcome these limitations, this study recommends strengthening regulatory frameworks, enhancing stakeholder collaboration, developing environmental education programs, and encouraging innovation in RTH management and funding. Overall, this analysis is expected to serve as a reference for policymakers in designing effective and sustainable strategies for RTH provision in Sukabumi.

Keywords

Green Open Space, Sustainable Development, Environment, Governance, Urban Development

1 | INTRODUCTION

The provision of Green Open Space (RTH) in Sukabumi City has become a strategic concern for sustainable urban development in Indonesia. Although national regulations require a minimum of 30% urban green coverage according to Law No. 26/2007, the actual proportion in Sukabumi remains below this standard due to continuous spatial pressures and land conversion for physical development (Brondízio et al., 2016). This has contributed to rising urban temperatures, shrinking water infiltration areas, and a decline in overall environmental quality, which directly affects residents' well-being. The core challenge is not merely regulatory compliance but the lack of development administration planning that sufficiently integrates ecological priorities into spatial policy implementation.

Previous studies have emphasized the importance of RTH for urban resilience, ranging from air quality improvement to social and recreational benefits. Recent research has highlighted that green spaces in Indonesian cities significantly reduce flood risk and enhance urban microclimates, especially when developed along rivers and watersheds (Yumna et al., 2024). In Sukabumi, the expansion of green areas, reported at approximately 96.8 hectares between 2016 and 2021, has not been followed by an improvement in the Environmental Quality Index, particularly the Land Cover Quality Index (BPS-Statistics, 2025). This disparity suggests that the issue is not merely about increasing RTH quantity but ensuring that planning, governance transparency, and public engagement effectively support ecological outcomes.

This literature gap reveals that studies on Sukabumi largely focus on physical expansion, while the administrative and governance factors driving policy implementation remain understudied. These include government commitment, participatory planning, cross-sectoral collaboration, and innovation in financing and monitoring. To better understand this issue, this study explores how these driving factors shape the implementation of the RTH policy in Sukabumi City and to what extent they determine the success of sustainable green space management. The novelty of this study lies in its integrated governance-based analysis that links administrative planning capacity, participatory support, regulatory enforcement, and policy innovation to the effectiveness of RTH implementation at the city level—an approach that has not been systematically applied in previous studies on Sukabumi.

Therefore, an integrated approach is required not only to expand green areas but also to ensure that their ecological functions are protected. Strengthening regulatory enforcement, fostering participatory collaboration among the government, communities, private actors, and academia, and utilizing digital tools such as Geographic Information Systems (GIS) and mobile-based monitoring are essential strategies (Akbari, 2025). Recent governance frameworks in Indonesia highlight the importance of adaptive and collaborative policy instruments that are responsive to environmental change and budgetary limitations (Herizal et al., 2024). Innovation in financing, including Corporate Social Responsibility (CSR) contributions and public–private partnerships, can further support the sustainable maintenance and development of RTH.

Understanding the role of these driving governance factors is crucial for formulating realistic strategies for more livable and sustainable cities (Bibri & Krogstie, 2019). This study focuses on how administrative planning interacts with participatory support, regulation, and innovation to strengthen RTH policy implementation as a fundamental pillar of urban sustainability.

2 | LITERATURE REVIEW

2.1 | Drivers of Development Administration Planning

Development administration planning is a strategic process through which governments allocate resources to achieve their developmental goals. Its success is shaped by multiple interconnected drivers, rather than standalone variables. Recent scholarship emphasizes that political commitment, economic capacity, sociocultural

support, technological adaptation, and institutional strength are mutually reinforcing components that shape effective policy outcomes (Yusuf et al., 2023). Table 1 presents a comparative overview of the key driving factors influencing the provision of green open spaces (RTH) across selected Indonesian cities.

Politically, development administration depends on elite commitment, transparency, and the enforcement of regulations. Strong political support not only ensures adequate budgeting but also improves enforcement and public legitimacy (Soeparno, 2022). In the context of the RTH policy, regional leaders influence how environmental priorities compete with economic development pressures. Unlike earlier conceptual definitions of political stability introduced in the older development administration theory, contemporary scholarship has shifted toward political responsiveness and environmental accountability in local governance.

Economic conditions also shape how resources are mobilized for green space provision. While earlier literature emphasized macroeconomic stability as the main determinant of successful development programs, recent studies have shown that budget innovations, such as environmental incentives, corporate partnerships, and eco-tax allocations, play a crucial role in advancing urban green infrastructure (Putri et al., 2023). Thus, the economic driver today is not merely the availability of funding but the flexibility and creativity of financing mechanisms.

Sociocultural dynamics influence the degree to which communities support or resist environmental planning processes. Cultural values concerning land ownership, local traditions, and public environmental literacy determine the legitimacy of green space initiatives. Studies across Indonesian cities, including Bandung, Yogyakarta, and Surakarta, suggest that public participation is essential not only during implementation but also during planning and monitoring (Martin et al., 2024). This implies that development planning should incorporate local norms and knowledge rather than solely imposing technocratic policies.

Technological innovation reinforces development administration through tools such as Geographic Information Systems (GIS), mobile environmental reporting applications, and remote sensing for urban monitoring (Rachmawati et al., 2024). Unlike previous perspectives that viewed technology only as a support tool, contemporary research positions it as a governance mechanism that enables transparency and public accountability (Noviantoro & Jaeni, 2024). Technology-driven urban planning enhances the accuracy of spatial designations and enables community monitoring of RTH misuse or degradation.

Institutional capacity remains central, particularly in coordinating political actors, technical units, and community organizations (Nurlinah et al., 2025). Institutional success increasingly depends on collaborative arrangements rather than hierarchical bureaucracies. The theory of collaborative governance provides a relevant analytical framework, emphasizing shared responsibilities among government agencies, private actors, NGOs, and citizens in planning and managing environmental assets (Agustina et al., 2024). Within RTH development, this includes joint land acquisition, participatory planning, and co-management of green spaces. Thus, the institutional factor is no longer limited to the creation of agencies, but to the creation of networks.

To illustrate the relevance of these factors, comparative research in Indonesian cities shows that cities with lower land availability, such as Jakarta, successfully expand RTH through collaborative financing and community-driven greening efforts (Fitri & Sari, 2025; Muttaqijn et al., 2025). Meanwhile, cities with large administrative budgets but weak public participation often fail to maintain environmental quality despite expanding RTH area (Ansar, 2022). This comparison highlights that political will, community collaboration, and innovative financing are more decisive than land availability. Such insights are essential to understanding Sukabumi's case.

Furthermore, integrating these driving factors into a unified development administration framework requires an adaptive planning model capable of responding to dynamic urban challenges. Recent studies emphasize that effective planning for green space provision must go beyond sectoral approaches by embedding

environmental considerations into broader urban development agendas, such as climate resilience, disaster mitigation, and public health improvement (Fuady et al., 2025). This integration ensures that the RTH is not treated as an isolated environmental requirement but as a strategic asset with cross-sectoral impacts. In cities like Sukabumi, where urbanization pressures intensify competition for land, such an adaptive and integrated model allows policymakers to balance ecological goals with economic development needs. By aligning political, economic, sociocultural, technological, and institutional elements within a coherent planning framework, local governments can strengthen the legitimacy, feasibility, and sustainability of RTH policies.

Table 1. Comparison of RTH-driving factors in Indonesian cities.

Driving Factors	Surakarta	Bogor	Relevance to Sukabumi
Political Commitment	High mayoral initiative for green corridors and river parks; strict enforcement of illegal land use	Strong local regulations on green planning; incentives for private green areas	Sukabumi requires consistent leadership commitment, not only project-based initiatives
Budget & Financing Innovation	Collaborative financing through CSR & community funds	Green tax and partnership with private housing developers	Need to diversify funding: CSR, eco-levies, PPP
Community Participation	Kampung Iklim program drives neighborhood-level greening	Strong environmental NGOs & citizen movements	Requires strengthening awareness + co-management with local groups
Technological Integration	GIS-based green mapping and citizen monitoring apps	Remote sensing for air quality & vegetation cover	Need GIS + public reporting apps for monitoring and misuse prevention
Institutional Collaboration (Collaborative Governance)	Government–NGO–private sector collaboration in park management	Multi-stakeholder council for sustainable development	Must build multi-stakeholder network, not rely solely on local government
Land Availability & Spatial Pressure	Limited land → creative vertical & river-based parks	Moderate land → expansion through private space requirements	Sukabumi should mix revitalization + river-based and social-use RTH models

2.2 | Green Open Space (RTH)

Green open spaces (RTH) are open areas that are mostly planted with vegetation and have important ecological and social functions in the urban environment. Based on national regulations, RTH is divided into two main types: Protected Green Open Space (RTHL) and Beneficial Green Open Space (RTHP). Public RTH act as the lungs of the city, providing oxygen, reducing air pollution, and maintaining the balance of urban ecosystems. The arrangement and utilization of RTH are regulated by Law No. 26 of 2007 concerning Spatial Planning and Minister of Public Works Regulation No. 5/PRT/M/2008, which regulates the guidelines for the provision and utilization of RTH in urban areas. The ideal area of RTH in urban areas is at least 30% of the total area of the city, with 10% as private RTH and 20% as public RTH (BPS-Statistics, 2025). RTH serves various ecological, aesthetic, and social functions. Ecologically, RTH function as oxygen producers, carbon sinks, environmental temperature regulators, and habitats for urban flora and fauna. Socially, RTH provides open spaces for recreation and social interaction and supports the mental health of urban communities. In terms of aesthetics, the existence of RTH improves the visual quality and aesthetic value of cities.

Studies have shown that many major cities in Indonesia, including Jakarta and Sukabumi, do not meet the ideal RTH provision standards. For example, in Jakarta, the currently available RTH area is approximately 2.7% to

3%, well below the target of 30% and the projected future needs that increase as the population increases (Rachman et al., 2024). The need for Green Open Space is estimated to be around 20 m² per person; therefore, RTH planning must consider projected population growth in the next 20-30 years. The development of RTH includes the provision of urban parks, environmental parks, urban forests, retention ponds, and playgrounds that are evenly distributed throughout the urban area. In the development of residential areas, RTH plays an important role in supporting the quality of residential environments, lowering environmental temperatures, and improving the quality of life of residents. Government and city planners are expected to optimize potential land for RTH and revitalize damaged RTH so that its ecological and social functions can be met. The main challenges in RTH development are limited land in urban areas, lack of community understanding and participation, and damage to RTH due to inappropriate land use. The suggested strategies include the enforcement of regulations related to the provision of RTH, active participation of the community in the management of RTH, and integration of RTH into comprehensive urban spatial planning (Salem et al., 2025).

3 | METHODS

This study applies a qualitative literature review approach, conducted systematically to identify, interpret, and synthesize previous research related to development administration planning for the provision of Green Open Space (RTH) in Sukabumi City. A literature review was selected because it enables researchers to analyze institutional dynamics, policy implementation, and environmental planning strategies using the existing scientific evidence. Unlike a simple narrative review, this approach emphasizes the critical assessment of published research to produce contextual policy recommendations (Yuan et al., 2022).

To ensure methodological rigor, the review process followed the basic elements adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, including identification, screening, eligibility assessment, and synthesis (Tarczyńska et al., 2023). Academic sources were obtained from databases such as Scopus, SINTA, Garuda, Google Scholar, and ScienceDirect, using keywords such as *"development administration planning," "green open space," "urban environmental governance," and "Sukabumi City."*

The initial search included publications from 2015 to 2025, focusing on studies relevant to urban RTH governance, community participation, spatial planning, financing mechanisms, and remote sensing applications in RTH mapping, particularly studies from Indonesian cities (Liu et al., 2023). The inclusion criteria comprised peer-reviewed articles, government documents, and policy reports that discussed urban planning or green space provision. The exclusion criteria included articles lacking methodological clarity, opinion-based essays, and publications that did not address governance factors or urban environmental planning.

Data were analyzed using content analysis and thematic synthesis, and the findings were categorized into political-regulatory aspects, budgetary and economic mechanisms, sociocultural participation, technological integration, and institutional collaboration. This thematic approach enables a comparison of governance practices across different cities to derive insights applicable to Sukabumi (Salahudin et al., 2025). To strengthen validity, source triangulation was applied by comparing the arguments of multiple authors, identifying methodological limitations, and contrasting findings from different urban contexts. Triangulation also included a review of remote-sensing-based studies that examined RTH spatial changes and environmental quality indicators in Indonesian cities.

The primary limitation of this review is the limited availability of Sukabumi-specific studies on the governance of RTH. To address this, a comparative analysis of similar urban contexts was incorporated to reduce generalization bias. Despite this constraint, the method provides a comprehensive, evidence-based understanding

of the driving factors influencing RTH planning in Sukabumi City and supports the development of context-appropriate policy strategies (Listyono et al., 2025).

4 | RESULTS AND DISCUSSION

This section presents the findings from the literature review on the driving factors of development administration planning in the provision of Green Open Space (RTH) in Sukabumi City, followed by a critical discussion of the same. Based on Law No. 26/2007 on Spatial Planning, public green spaces must be owned and managed by local governments, serving as a strong legal basis for RTH provision (Ferizko, 2025). The analysis identified five driving factors: *political, economic, socio-cultural, technological–environmental, and institutional*.

To provide a more analytical perspective, these findings are interpreted using a policy implementation and network viewpoint, highlighting how actors, resources, and regulations shape the success of RTH planning.

4.1 | Political Factors

Politics plays a strategic role in the planning of Green Open Space (RTH) in Sukabumi City, especially in terms of policies and regulations (Mabon & Shih, 2021). The local government already has Regional Regulation (Perda) Number 2 of 2015, which specifically regulates the provision and utilization of the RTH. This Regional Regulation provides a strong legal basis for the implementation of RTH development in the city. However, even though the policy foundation already exists, its implementation still faces significant obstacles. One of the main challenges is the limited available land and individual land ownership conflicts that are difficult to transfer to public RTH. This is often a major obstacle because the land acquisition process can be complex and time-consuming (Widyasari & Iskandar, 2025). Interestingly, the relaxation of cooperation between the government and private landowners is also part of a political strategy to overcome these obstacles.

This suggests an effort to find more flexible solutions, perhaps through incentive schemes or through partnerships. Thus, the success of RTH planning in Sukabumi City is highly dependent on the political will of the regional leaders. In addition, close coordination between the central and local governments and various related stakeholders is crucial (Ezeh et al., 2024). National (Law No. 26/2007 on Spatial Planning) and regional (Sukabumi City Regulation) regulations are the main drivers of RTH provision. This is strengthened by the commitment of regional heads and active supervision from the responsible technical offices. Overall, the stability and commitment of local governments are key factors in determining the effectiveness of RTH policy formulation and implementation. This includes ensuring the availability of an adequate budget and a sustainable RTH program so that the goal of providing RTH in Sukabumi City can be optimally achieved (Amri & Delphia, 2020).

4.2 | Economic Factors

The provision, maintenance, and monitoring of the RTH require sustainable and diversified financing. Effective management of the regional budget (APBD), complemented by alternative funding sources such as CSR, public–private partnerships, and community-based funding initiatives, strengthens financial resilience for long-term RTH planning (UNICEF, 2023).

Incentive mechanisms for private developers and communities play an increasingly central role, as highlighted in studies from other Indonesian cities, where incentives have successfully expanded community-managed green spaces. Therefore, economic strategies must be designed not only to finance physical development but also to promote local participation and long-term stewardship (ETP, 2025).

4.3 | Socio-Cultural Factors and Community Participation

Public participation plays an important role in the sustainability of RTH, from education and the active involvement of residents in maintaining the cleanliness and safety of parks to community initiatives in the development of environmental-scale RTH (Prihatini & Sutikno, 2023). Low public awareness of the environment and a lack of educational activities are challenges that are often faced, as found by. However, the low public

understanding of the ecological and social functions of RTH remains a challenge. The arrangement of RTH is not only about the provision of physical land but also socializes the importance of RTH for quality of life and environmental sustainability. Therefore, socio-cultural factors play a role in the success of the management and preservation of RTH, so that it is managed jointly between the government and the community (Gocer et al., 2024).

4.4 | Technology and Environment

The Role of Technology and Regulation in Optimizing the RTH in Sukabumi City. The use of information technology and spatial-based spatial planning is the key in the planning of Green Open Space (RTH) in Sukabumi City (Nahib et al., 2021). The spatial approach allows for a more accurate and effective analysis of the RTH needs and potential. In line with this, the development of environmental regulations, such as the Ministerial Regulation of ATR No. 14 of 2022, further supports the provision of RTH with better ecological and social quality standards. The adoption of the Indonesian Green Blue Index (IHBI) as a measure of RTH quality has also shown technological advances in the objective evaluation of RTH function. However, the decline in the Environmental Quality Index (IKLH) of Sukabumi City indicates that technological improvements are still needed in environmental and pollution management (Mulyana & Pratiwi, 2020).

This is important for the optimal functioning of RTH in improving the quality of the urban environment. Geographic Information Systems (GIS), for example, are very helpful in planning, monitoring, and supervising RTH accurately and transparently (Robin et al., 2019). Deteriorating urban environmental conditions, such as declining air quality and urban microclimate change, strongly argue for the government to be more serious in managing RTH. Existing technologies and regulations must be optimized to address these challenges and ensure that RTH provides maximum environmental benefits for the people of Sukabumi.

4.5 | Institutional Factors

A clear institutional structure and inter-agency coordination are needed for the planning and implementation of RTH development. The Sukabumi City Government has established a regional apparatus related to the management of RTH; however, this institution sometimes faces overlapping tasks and limited human resource capacity and funding (Person, 2020). Cooperation between the government, developers, communities, and non-governmental organizations is the key to overcoming these limitations. Institutional regulation and standardization provide a legal umbrella for the implementation of the RTH program; however, implementation in the field requires responsive and adaptive institutional management.

The increase in the area of RTH in Sukabumi (2016–2021, approximately 96.8 hectares) has not been linear with the progress of environmental quality (IKLH and IKTL have actually decreased), indicating the need to improve the quality of RTH management, not just quantity (ASEAN, 2022). The implementation of innovations, such as data digitization (GIS), diversification of funding sources, strengthening multi-stakeholder collaboration, and public education, are the keys to accelerating the achievement of RTH targets. Efforts to strengthen supervision, community involvement, and the digitalization of management have proven to strengthen the administration of RTH development in Sukabumi. The literature summary proves that the combination of regulatory, economic, social participation, technology utilization, and institutional factors determines the effectiveness of RTH administrative planning. Suboptimal factors will be crucial obstacles. Therefore, the RTH development policy must integrate these five aspects simultaneously, with a quantitative target (30% RTH) that must be accompanied by strengthening ecological, social, and governance quality (Bappenas, 2025).

The success of institutional arrangements in RTH planning in Sukabumi City also depends on the continuity of monitoring and evaluation mechanisms that can measure the performance of each implemented program (Ferdilan, 2024). Periodic assessments supported by transparent data allow the government to identify gaps, adjust strategies, and strengthen accountability in the development of RTH. The integration of RTH planning into

broader urban development documents such as RTRW, RPJMD, and sectoral action plansalso ensures that RTH is not treated merely as a complementary element but as a priority component of environmental governance. Strengthening institutional capacity through training, inter-agency coordination forums, and community-based monitoring can further increase the effectiveness of the RTH administration. With these improvements, institutional governance will become more adaptive, evidence-based, and capable of overcoming the complex challenges of providing sustainable RTH in Sukabumi City (Hasibuan & Pulungan, 2024). Table 2 synthesizes the identified driving factors and highlights their implications for the planning and governance of urban green open spaces.

Table 2. Synthesis of the driving factors and implications.

Factors	Key Drivers Identified	Policy/Actor Implications (Analytical Insight)	Relevance to RTH Goal (30% Target)
Political	Perda No. 2/2015; land constraints; partnerships	Requires multi-actor negotiation and political consistency	Determines authority, land access, and regulatory enforcement
Economic	APBD funding; CSR; incentives	Financing must shift toward mixed funding and stewardship	Ensures sustainable development and maintenance
Socio-Cultural	Low awareness; education needed	RTH sustainability depends on social learning and co-management	Community acts as long-term guardian
Technology–Environment	GIS; IHBI; declining IKLH	Digital tools must be integrated with ecological monitoring	Aligns quantity with quality outcomes
Institutional	Overlapping duties; limited HR	Needs clearer role allocation and network collaboration	Enables coherent planning and enforcement

5 | CONCLUSION AND RECOMMENDATIONS

5.1 | Conclusion

The provision of RTH is not just a normative demand but a real need to create a comfortable, healthy, and sustainable urban area. The reality in Sukabumi shows that increasing the area of RTH does not guarantee an improved quality of the environment; therefore, the focus should be directed to planning effectiveness, collaborative governance, and policy innovation. The government must be able to embrace all elements from the central and regional governments, the business world, academics, and the community to jointly overcome limited resources and foster a sense of collective ownership of the sustainability of the city. In addition, the implementation of information technology and digitalization in RTH management can be a game changer that encourages effectiveness, efficiency, and transparency. Future strategic steps must be based on comprehensive data analysis and responsiveness to environmental and social changes. Financing innovation, strengthening regulations, and increasing the role of the community are key so that efforts to preserve and develop RTH are not only ceremonial but also have an impact on the quality of life and the urban environment.

Based on the literature review, it can be concluded that the provision of Green Open Space (RTH) in Sukabumi City continues to face substantial challenges, particularly with regard to limited land availability, low levels of community participation, and budget constraints. Although the area of RTH increased by approximately 96.8 hectares between 2016 and 2021, this quantitative expansion was not accompanied by improvements in environmental quality, as reflected in declining Environmental Quality Index (IKLH) and Land Cover Quality Index

(IKTL) scores, indicating a gap between RTH growth and its contribution to environmental sustainability and community welfare. The review identifies several key enabling factors for effective RTH development, including strong commitment and regulatory support from the local government, cross-sector collaboration among the government, private sector, academia, and communities, active public participation in RTH management and conservation, the application of information technologies such as GIS for monitoring and planning, and funding innovations through mechanisms such as CSR and public–private partnerships. To achieve the statutory target of 30% RTH as mandated by Law No. 26 of 2007, Sukabumi City requires a more integrated development administration that holistically addresses the political, economic, sociocultural, technological, and institutional dimensions.

5.2 | Recommendations

To enhance the effectiveness and sustainability of green open space (RTH) provision in Sukabumi City, a set of integrated strategic measures must be pursued. First, regulatory frameworks and law enforcement must be strengthened to prevent uncontrolled land conversion and ensure that spatial plans prioritizing RTH are implemented consistently. Simultaneously, broader collaboration and public participation should be encouraged through environmental education programs, community-based initiatives such as farmer and green groups, and partnerships with the private sector. Innovation in financing and management is also essential, including the diversification of funding sources through corporate social responsibility schemes, crowdfunding mechanisms, and public–private partnerships to support the development and long-term maintenance of RTH. In addition, the optimization of technology and data, particularly through the expanded use of digital applications and Geographic Information Systems (GIS), can improve the real-time monitoring, planning, and transparent evaluation of RTH management. Finally, institutional innovation must be driven by strengthening RTH management bodies, enhancing human resource capacity, and fostering cross-sector collaboration among local government agencies (OPDs), academics, and community actors to ensure the coordinated and sustainable governance of urban green spaces.

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Data Availability Statement

Additional information or reference details can be provided by the authors upon reasonable request.

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