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Green Budgeting Review at Local Government: Case Study of Batu Government, Indonesia

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Abstract

This study examines the implementation of green budgeting in Batu City in supporting sustainable development that includes environmental, social, and economic objectives. Many previous studies have explained green budgeting at the national level, focusing on budget policy alignment with sustainable development issues. Meanwhile, the focus of this research study is to review regional budgeting aimed at understanding local government budget policy alignment with green development issues in Batu City. Data were obtained through document analysis, in-depth interviews, and observations, and analyzed using NVivo to identify key themes, issue linkages, and policy priorities. Findings indicate that budgeting policies in Batu City have integrated strategic issues such as sustainable environment, agriculture, tourism, energy, and waste management. However, there is a gap between program/activity priorities and budget allocation, where important sectors such as sustainable plantations receive inadequate budget support. Public participation plays an important role in policy formulation, with primary attention to urban planning, traffic congestion, and environmentally friendly practices in the plantation sector. Waste management through TPS3R (Reduce, Reuse, Recycle) is recognized as a best practice, but budget inconsistencies indicate the need for better integration between policy vision and its realization. This research concludes that regional budgeting in Batu City has addressed several issues directly related to green development, including energy, waste management, tourism, agriculture, and sustainable environment. Nevertheless, there is a gap between planning and budget allocation, so that budget policies do not yet reflect a bias towards important issues related to the green economy. Therefore, public participation becomes the main key to realizing budget policies that support green development. The main recommendation of this research is that the Batu City government needs to seriously consider the consistency of planning and budget allocation so that budget policies align with important issues of green development. In addition, public participation needs to be increased and expanded to ensure that the budgeting process accommodates public issues related to green development.

Keywords: Green budgeting, Batu City, sustainable development, public participation, budget policy

Abstrak

Penelitian ini mengkaji penerapan anggaran hijau di Kota Batu dalam mendukung pembangunan berkelanjutan yang mencakup tujuan lingkungan, sosial, dan ekonomi. Banyak penelitian terdahulu menjelaskan penganggaran

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hijau pada level nasional yang berfokus pada keberpihakan kebijakan anggaran terhadap isu-isu pembangunan yang berkelanjutan. Sementara fokus kajian penelitian ini, yaitu mereview penganggaran daerah yang bertujuan untuk mengetahui keberpihakan kebijakan anggaran pemerintah daerah terhadap isu-isu pembangunan hijau di Kota Batu. Data diperoleh melalui analisis dokumen, wawancara mendalam, dan observasi, serta dianalisis menggunakan NVivo untuk mengidentifikasi tema utama, keterkaitan isu, dan prioritas kebijakan. Temuan menunjukkan bahwa kebijakan penganggaran di Kota Batu telah mengintegrasikan isu strategis seperti lingkungan berkelanjutan, pertanian, pariwisata, energi, dan pengelolaan sampah. Namun, terdapat kesenjangan antara prioritas program/kegiatan dan alokasi anggaran, di mana sektor penting seperti perkebunan berkelanjutan mendapatkan dukungan anggaran yang kurang memadai. Partisipasi publik berperan penting dalam perumusan kebijakan, dengan perhatian utama pada perencanaan kota, kemacetan lalu lintas, dan praktik ramah lingkungan di sektor perkebunan. Pengelolaan sampah melalui TPS3R (Reduce, Reuse, Recycle) diakui sebagai praktik terbaik, tetapi inkonsistensi penganggaran menunjukkan perlunya integrasi lebih baik antara visi kebijakan dan realisasinya. Penelitian ini menyimpulkan bahwa penganggaran daerah di Kota Batu telah membahas beberapa isu yang berkaitan langsung dengan pembangunan hijau, di antaranya energi, pengolahan sampah, pariwisata, pertanian, dan lingkungan yang berkelanjutan. Kendati demikian, terdapat gap antara perencanaan dan alokasi anggaran sehingga kebijakan anggaran belum mencerminkan keberpihakan terhadap isu-isu penting yang berkaitan dengan ekonomi hijau. Karena itu, partisipasi publik menjadi kunci utama untuk mewujudkan kebijakan anggaran pro pembangunan hijau. Rekomendasi utama penelitian ini, yaitu pemerintah Kota Batu perlu memperhatikan secara serius konsistensi perencanaan dan alokasi anggaran sehingga kebijakan anggaran selaras dengan isu-isu penting pembangunan hijau. Disamping itu, partisipasi publik perlu ditingkatkan dan diperluas untuk memastikan proses penganggaran mengakomodir isu-isu publik yang berkaitan dengan pembangunan hijau

Kata Kunci: Penganggaran hijau, Kota Batu, pembangunan berkelanjutan, partisipasi publik, kebijakan anggaran

INTRODUCTION

The implementation of the “Green Budgeting” concept has become a strategic step in achieving sustainable development at both regional and national levels. (Azzahra et al., 2022; Bagus & Haridharma, 2025; OECD, 2022a; Stanimiroviæ et al., 2023). Batu City, with its natural wealth and tourism potential, faces challenges in balancing economic development needs with environmental conservation (Ahmad, 2024). The concept of “Green Budgeting,” or green budgeting, aims to integrate environmental considerations into the planning and management of budgets, ensuring that public resource allocations support climate change mitigation and ecosystem conservation efforts (Ahmad, 2024). As a city with unique geographical and ecological characteristics, Batu City needs to adopt innovative budgeting approaches to ensure environmentally sustainable development (Sholeha et al., 2022). This approach aligns with various global efforts to mitigate carbon emissions, including the

implementation of carbon reduction strategies at the international level, as highlighted in numerous policy studies and low-carbon economic models (Evro et al., 2024; Xu & Wang, 2024). In the context of Batu City, this study aims to identify opportunities, challenges, and best practices in “Green Budgeting” implementation to support the sustainability agenda.

Climate change and environmental degradation have emerged as critical challenges for governments worldwide, necessitating transformative approaches to public financial management that integrate environmental considerations into budgetary decisions (Burch, 2010; Harris & Lawson, 2023). Green budgeting, as a strategic fiscal instrument, represents a systematic effort to align budgetary processes with environmental objectives and sustainable development goals (Cities, 2021). This approach has gained significant traction globally as local governments seek to transition toward more environmentally sustainable economic models while addressing climate-related vulnerabilities.

Indonesia, as the world’s largest archipelagic nation with rich biodiversity and high vulnerability to climate impacts, faces unique challenges in implementing environmental fiscal reforms. Despite national commitments to reduce greenhouse gas emissions by 29% through domestic efforts and up to 41% with international support by 2030 (Tacconi & Muttaqin, 2019), translating these commitments into local government fiscal policies remains a significant governance challenge. As Talitha et al. (2020) argue, the decentralization of administrative authority in Indonesia has created an opportunity for local governments to adopt innovative green fiscal instruments tailored to their regional contexts.

Within this national framework, Batu City in East Java presents a compelling case study of a local government navigating the complexities of green budgeting implementation. Known as an eco-tourism destination, Batu City faces the dual challenge of balancing economic growth with environmental conservation in the context of rapid urbanization and tourism development (Utami Azis et al., 2019). The city’s strategic location in a mountainous region with significant agricultural activities and natural resources makes it particularly important for implementing effective environmental governance mechanisms.

Based on the 2025 fiscal year regional budget data, the budget policy of Batu City Government shows partial alignment with green development, with the main priority on waste management. From the total budget of approximately Rp 21.91 billion, almost half (46.6%) is allocated for various aspects of waste management, including waste sorting and processing, provision of facilities and infrastructure, and increasing community participation. This policy reflects the government’s awareness of the urgency of waste management issues in urban areas. Additionally, significant allocations are also provided for disaster resilience and environmental quality programs (22.7%) as well as preservation of culture and environment (30.4%).

Nevertheless, there are disparities in the budget distribution that indicate a more curative than preventive approach. This is evident from the minimal allocation for waste generation

reduction (only Rp 50.03 million or 0.23% of the total budget) compared to the management of already generated waste. Similarly, the energy and water sectors, as well as sustainable agriculture, receive very small allocations (0.15% and 0.14% respectively), despite both being essential components in the concept of green development. This disparity indicates that the policy orientation still leans more toward addressing environmental impacts rather than prevention efforts or more sustainable system transformation.

The novelty of this research lies in its exploration of Green Budgeting within the local context of Batu City, a region with distinctive geographical, social, and economic characteristics. This approach integrates sustainability perspectives into local government budget planning and allocation, an area that has been rarely explored in depth at the local level, particularly in Indonesia. Additionally, this study provides an analysis linking green budget management strategies with global targets, such as carbon emission mitigation and the achievement of Sustainable Development Goals (SDGs). Utilizing a case study and local data-driven approach, this research not only evaluates Batu City's readiness to implement green budgeting but also offers practical recommendations that can be adopted by other local governments. The findings are expected to lay the foundation for developing more adaptive and inclusive budgeting frameworks to address environmental and climate change challenges.

This research is guided by three main questions: How can the concept of Green Budgeting be implemented in the context of local government, particularly in Batu City? To address this question, the study employs a qualitative data analysis approach supported by NVivo software. NVivo is used to manage, analyze, and visualize qualitative data obtained from in-depth interviews, document analysis, and field observations. This software enables systematic data coding, identification of key themes, and analysis of inter-variable relationships within the data, enhancing the validity and reliability of the research findings. The strength of this study lies in its innovative approach, combining Green Budgeting with technology-based analysis to provide in-depth and structured insights. Furthermore, its focus on the local context, such as Batu City, makes the findings relevant for producing more practical and context-sensitive solutions compared to studies that are purely theoretical or macro-level. The results of this study contribute not only to the literature on green budgeting but also provide practical guidelines for local governments to implement sustainability-oriented policies based on data-driven approaches.

Literature Review

Global Perspectives on Green Budgeting

The concept of green budgeting has gained significant traction globally as governments seek to align fiscal policies with environmental and climate objectives. The OECD (2021) defines green budgeting as the use of budgetary tools to promote environmental goals,

representing a crucial mechanism for governments to integrate environmental considerations into fiscal frameworks. Empirical studies by Kattel (2024) across European municipalities demonstrated that formalized green budgeting frameworks significantly improved both environmental outcomes and resource allocation efficiency by 18-24% over traditional budgeting approaches.

Extensive research by the (World Bank, 2023) examining 43 countries found that nations implementing comprehensive green budgeting showed measurably better progress toward Sustainable Development Goals, particularly SDG 13 (Climate Action) and SDG 15 (Life on Land). Similarly, Schröder and Hinterberger (2022) documented how green budgeting initiatives in Scandinavian countries facilitated measurable reductions in carbon emissions while stimulating growth in green technology sectors.

At the local government level, Semieniuk and Mazzucato (2019) identified mission-oriented green budgeting as particularly effective in municipalities with strong political mandates for environmental transformation. Their comparative analysis of 37 European cities demonstrated that those with explicit green budgeting frameworks achieved 31% higher environmental spending efficiency than counterparts using conventional budgeting. Lubowiecki-vikuk and Sousa (2021) further documented that cities implementing green participatory budgeting increased citizen engagement in environmental decision-making by an average of 47%, while simultaneously improving public satisfaction with environmental spending.

The concept of Green Budgeting has emerged as a key approach in supporting sustainable development agendas across various countries. Green Budgeting is defined as the process of integrating environmental policies into public budget planning to ensure resource allocation that supports climate change mitigation and environmental protection (OECD, 2022b). A study by Khalid et al. (2021)) highlights that green budgeting is not only relevant for developed countries but is also crucial for developing nations, particularly in addressing environmental challenges such as deforestation, carbon emissions, and waste management. In the context of local governance, research by Schandl et al. (2021) emphasizes that the implementation of Green Budgeting requires an adaptive and inclusive framework involving diverse stakeholders. Moreover, the success of its implementation significantly depends on the capacity of local governments to design measurable sustainability indicators.

Globally, Green Budgeting has been implemented using various approaches. For instance, France employs the Green Budget Label system to classify budgets based on their impact on environmental objectives, such as carbon emission reduction and climate change adaptation (OECD, 2022a). Meanwhile, South Korea integrates green indicators into its National Fiscal Management Plan, providing an assessment of the environmental impact of government projects (Lee & Kim, 2020). Research by Perissi and Jones (2024) introduces the PLEDGES model, a system dynamics-based simulation tool for allocating carbon budgets among European Union member states. This study demonstrates that Green Budgeting

can address environmental inequalities through data-driven approaches, fostering cross-sector collaboration and ensuring fair and transparent budget distribution.

Methodological frameworks for assessing green budgeting practices have evolved significantly. The seminal work by Liu et al. (2022) established a comprehensive framework for evaluating municipal green budgets across four dimensions: expenditure targeting, policy coherence, outcome measurement, and stakeholder inclusion. Building on this, Zhan and Li (2022) developed a quantitative scoring system for municipal green budgets, testing it across 64 Chinese cities to d Van Zyl et al. (2021) emonstrate clear correlations between budget composition and environmental performance indicators.

In the Global South context, conducted an extensive analysis of green budgeting practices across 12 Latin American municipalities, revealing that localized approaches addressing specific regional challenges outperformed standardized international frameworks. Similarly,Cities (2021) documented how African cities adapting green budgeting to water scarcity contexts achieved higher resource utilization efficiency than those applying broader environmental budgeting principles.

Research by Tran et al. (2024)across Southeast Asian medium-sized cities established that effective green budgeting requires at least 15% of municipal expenditure directed toward environmental priorities, with preventive measures constituting at minimum 40% of environmental allocations to achieve sustainable transitions. Their longitudinal analysis across 18 cities demonstrated significant improvements in air quality and waste reduction metrics when these thresholds were met.

Research consistently identifies several implementation challenges for green budgeting at the local level. Sharma (2023)documented how institutional capacity constraints in mid-sized municipalities across India limited effective implementation despite strong policy frameworks. Their findings revealed that 73% of examined municipalities lacked specialized expertise in environmental accounting and assessment, creating significant implementation gaps.

Financial constraints remain a persistent obstacle as demonstrated byCoop (2005), who documented how fiscal decentralization without corresponding resource allocation hampered green budgeting implementation across 28 municipalities in South America. Similarly,(Abdullah et al., 2022)) identified how competing priorities in post-COVID recovery budgets systematically displaced green initiatives in Asian cities, with environmental allocations declining by an average of 38% even in municipalities with formal green budgeting commitments.

Political economy factors also significantly influence implementation effectiveness. Extensive research by Khoirunurrofik and Farina, (2021)across municipalities in South Asia revealed that electoral cycles significantly influenced the stability of green budgeting initiatives, with implementation consistency dropping by 42% during election years. Complementary

work by Fox (2015) demonstrated that transparency mechanisms and civil society oversight substantially improved implementation consistency, particularly in contexts with changing political leadership.

Green Budgeting in Indonesian Context

Research on green budgeting in Indonesia remains limited but emerging. Nihayah and Diastuti (2023) documented nascent green budgeting initiatives across five Indonesian provinces, finding significant variability in implementation quality and revealing that formal frameworks often failed to translate into substantive resource allocation. Their analysis showed that climate adaptation received disproportionate funding (78% of environmental allocations) compared to mitigation or broader sustainability initiatives.

Faizi et al, (2024) conducted a comprehensive assessment of environmental expenditure tracking in 12 Indonesian municipalities, revealing systematic challenges in classification and monitoring of green budget components. Their research identified that on average, only 43% of claimed environmental expenditures directly contributed to environmental improvements, with the remainder representing administrative overhead or tangentially related initiatives.

In tourism-dependent regions specifically, Darmanto and Wahyudi (2024) examined how three Indonesian municipalities with significant tourism sectors integrated environmental considerations into fiscal planning. Their findings demonstrated that despite strong ecotourism narratives, budget allocations heavily favored infrastructure development (68% of tourism-related spending) over environmental protection (7%) or community-based sustainable tourism initiatives (4%).

In Indonesia, the implementation of Green Budgeting is still in its early stages, despite several initiatives supporting environmental management. For example, the government has launched the Green Sukuk, a green bond used to finance sustainability projects such as renewable energy, water resource conservation, and waste management (UNDP, 2018). This initiative reflects the government's commitment to integrating environmental agendas into fiscal policies. However, research indicates that Green Budgeting at the local level faces various challenges, including limited technical capacity, insufficient data, and misalignment between national policies and local needs (Djalante & Thomalla, 2012). Another study by Purnomo et al. (2021) identifies that community and private sector involvement is a critical factor for the successful implementation of green policies at the local level.

As a city heavily reliant on the tourism sector, Batu City faces significant challenges in balancing economic growth with environmental sustainability. According to Abbas et al. (2021) development pressures in Batu City have led to environmental degradation, including deforestation and declining water quality. Thus, the implementation of Green Budgeting is highly relevant to ensure more sustainable development. This approach may include

integrating green budgets to support environmental conservation and green infrastructure, such as integrated waste management and the development of eco-friendly transportation.

Despite the expanding body of literature on green budgeting practices globally, significant research gaps exist particularly relevant to the case of Batu Government in Indonesia. Current research predominantly focuses on national-level frameworks or large metropolitan areas, leaving a critical void in understanding how medium-sized, tourism-dependent municipalities like Batu implement green budgeting within their unique socio-economic contexts. While existing studies have examined green budgeting in various regions, they inadequately address the specific challenges faced by municipalities where tourism represents a major economic driver with distinct environmental implications. Furthermore, the literature fails to sufficiently explore the integration between cultural preservation expenditures and environmental sustainability goals in contexts where cultural assets are integral to eco-tourism strategies.

Though implementation challenges are well-documented globally, limited research investigates how Indonesia's particular decentralization structure affects green budgeting effectiveness at the municipal level. Additionally, there is insufficient systematic assessment of the balance between reactive environmental management spending versus preventive or transformative allocations in medium-sized municipalities of developing economies, particularly in tourism-oriented contexts. Most notably, current research on Indonesian green budgeting primarily concentrates on provincial capitals or major urban centers, creating a substantial knowledge gap regarding economically significant secondary cities like Batu that face unique sustainability challenges while serving as regional tourism hubs. This study addresses these gaps by providing empirically grounded insights into green budgeting practices in Batu, contributing valuable knowledge for both academic understanding and practical policy implementation in similar contexts throughout Indonesia and other developing economies.

This study seeks to fill the gap in the literature by exploring how Green Budgeting can be applied in local contexts, identifying supporting and inhibiting factors, and providing data-driven recommendations for more effective budget planning. Research on Green Budgeting has demonstrated its relevance as a strategic approach to achieving sustainability goals. However, there is a significant gap in the literature regarding its implementation at the local level, particularly in developing countries like Indonesia. This study aims to contribute to the literature by exploring Green Budgeting in the context of Batu City, creating a model that can be replicated in other regions with similar characteristics.

METHOD

This study used a qualitative approach to explore the implementation of the Green Budgeting concept in the context of local government, community representatives and environmental experts in Batu city. Qualitative data was collected through a purposive

sampling technique to ensure stakeholder involvement in the implementation of green budgeting in Batu city. Participants in the following in-depth interviews involved stakeholders, including the Head of the Regional Development Planning Agency (Bappeda), the Environmental Agency, BPKAD, Community Representatives (Heads of Farmer Groups, Coordination of Community Forums, Pokdarwis and Community Leaders) and Environmental Experts (NGOs, Academics and Consultants) to identify priority Green Budgeting issues. The selection of respondents with diverse interests is certainly expected to produce comprehensive research data to answer the research objectives in exploring priority issues and the framework for implementing Green Budgeting in Batu City. In addition, document analysis, such as policy reports, budget planning documents, and environmental reports and participatory observations were also carried out to understand the dynamics of budget implementation in the field.

All data were analyzed using NVivo software, which enables systematic coding, theme identification, and visualization of relationships between variables. The analysis process began with initial coding to identify key concepts, such as environmental awareness, policy support, technical limitations, and stakeholder collaboration. Subsequently, major themes, such as the priority issues in green budgeting in Batu City, were analyzed in-depth using thematic analysis tools in NVivo. Relationships between themes were visualized through concept maps and relationship diagrams to gain insights into the priority issues of green budgeting in Batu City.

This approach also facilitated data validation through triangulation among interviews, documents, and observations, thereby enhancing the validity of the research findings. By employing this methodology, the study aims to provide insights into a relevant framework for green budget management in Batu City. NVivo proved to be an essential tool for improving efficiency, consistency, and transparency in the analysis process, making the research more systematic and reliable.

RESULTS, DISCUSSION, AND ANALYSIS

Figure 1 illustrates that the programs, activities, and budgeting of the Batu City government support the implementation of the green budgeting concept. This is reflected in the prioritization of environmental issues, including sustainability, agriculture, tourism, and other related areas, as key development priorities. The data cloud emphasizes that environmental issues are critical and must be appropriately addressed in budget policy decisions. Agriculture is also highlighted as a significant concern, given that Batu City holds substantial potential in the agricultural sector. However, this potential must be managed carefully to prevent environmental degradation. Similarly, the tourism sector requires the establishment of eco-friendly management practices aligned with the mission of sustainable environmental development.

Figure 3 highlights the significant role of public participation in the formulation of budget policies in Batu City, particularly concerning several key issues previously discussed. However, based on the data presented in Figure 3, public participation shows a strong correlation with sustainable urban development, indicating that the residents of Batu City view urban planning as a critical issue that has long affected other sectors. For instance, traffic congestion, which frequently occurs during holiday seasons, is a notable concern. While tourist visits to Batu City positively contribute to the local economy, they simultaneously exacerbate traffic congestion issues. Fundamentally, addressing traffic congestion requires budget policies that prioritize solutions to this problem. Additionally, the people of Batu City consider the establishment of environmentally friendly plantations to be crucial. This perspective arises from the recognition that the current management of plantations in Batu City has negatively impacted the environment. For example, the uncontrolled use of pesticides has not only caused environmental degradation but also reduced the competitive advantage of plantation products in the region. Therefore, public awareness and participation underscore the necessity of budget policies that align with sustainable urban planning and environmentally responsible agricultural practices.

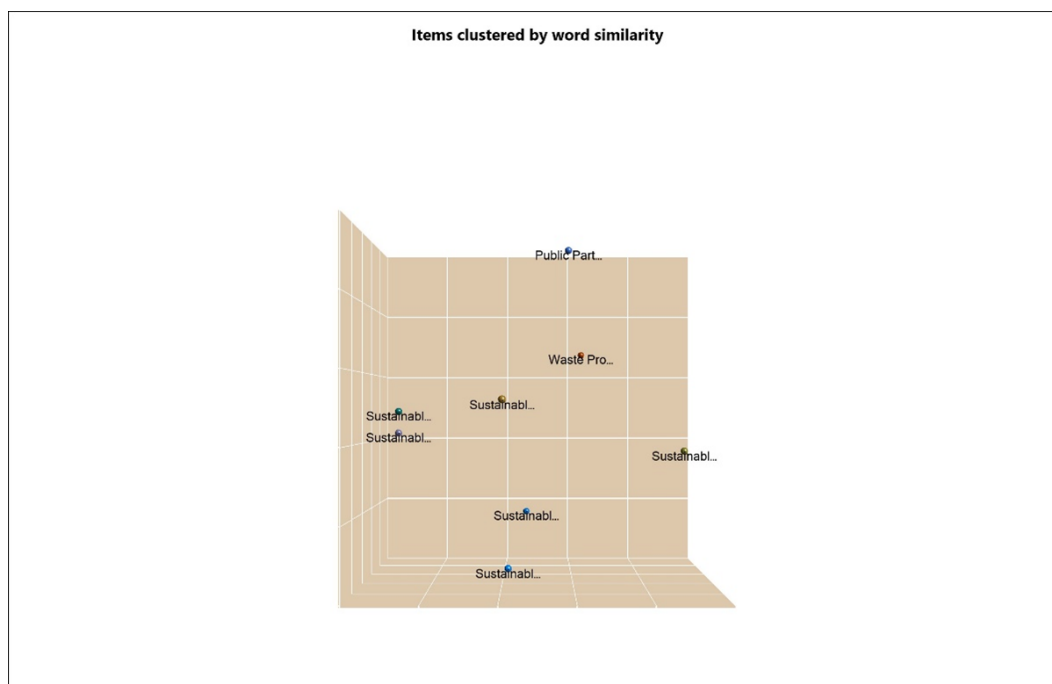


Figure 3. Correlation Analysis of Public Participation in Green Budgeting Issues in Batu City

Figure 4 demonstrates that the concept of green budgeting is supported by policies in the form of programs and activities, as well as appropriate budgetary policies. These two policy dimensions are interrelated and collectively support green issues and sustainable environmental objectives in Batu City, including sustainable cities, green participatory

approaches, tourism, environment, agriculture, and sustainable energy. However, one notable divergence between the two policy areas lies in the issue of sustainable plantations, which is only addressed through programs and activities but not incorporated into budgetary policies. This indicates that sustainable plantations have not received optimal funding support through Batu City's Regional Budget (APBD), particularly in the 2024 fiscal year. This discrepancy warrants academic discussion, as sustainable plantations represent one of the priority issues for the Batu City government and reflect public aspirations. Despite their strategic importance, this sector has not been adequately supported by budgetary allocations in the government's financial planning. Addressing this gap is critical to ensuring that both policy and financial frameworks align with the city's sustainability goals.

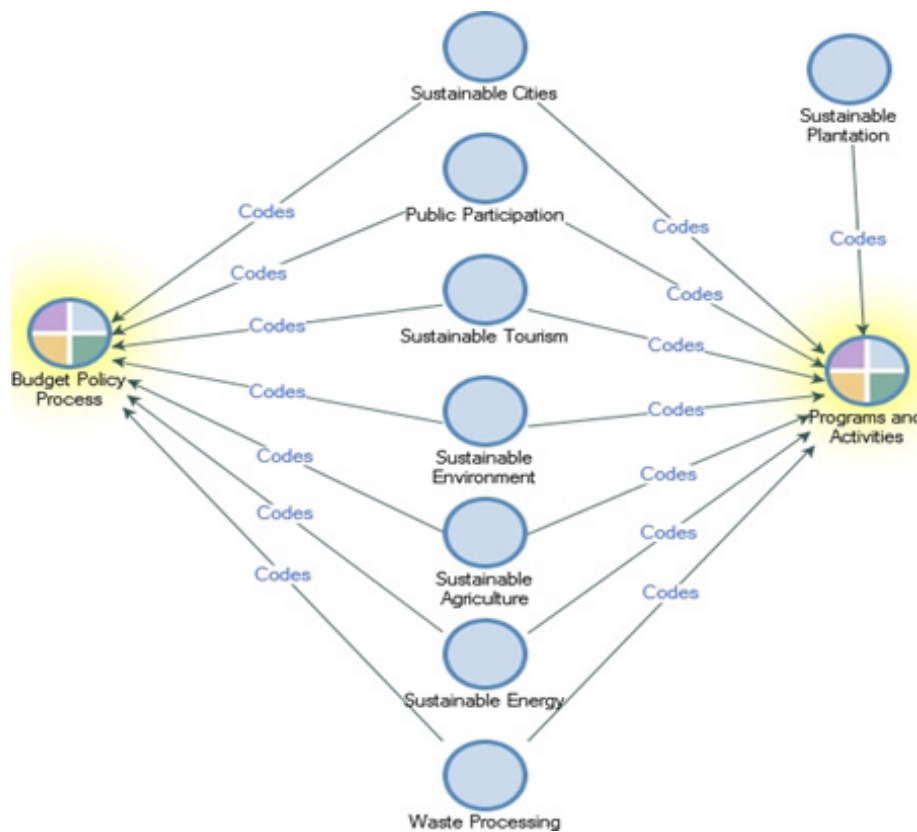
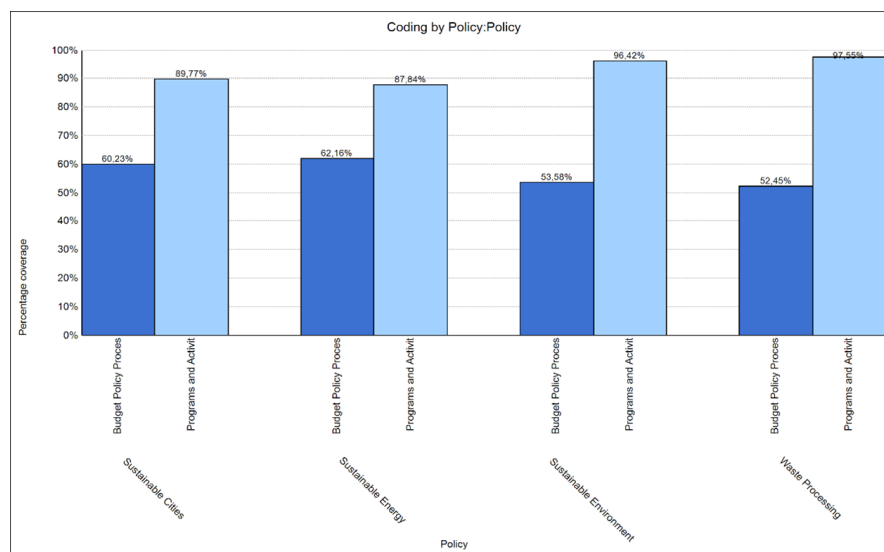


Figure 4. Comparative Analysis of Programs, Activities, and Budgeting in Green Budgeting Issues in Batu City

Graph 1 illustrates the comparison between budget policies and program/activity policies in terms of sustainable development, environmental friendliness, and long-term regional development in Batu City. A comparative analysis reveals that waste management programs receive the highest level of support through the government's program and activity policies for 2024, compared to other initiatives such as sustainable environment, sustainable city,

and renewable energy programs. This prioritization indicates that both the government and the community of Batu City view waste management as a critical issue requiring immediate and comprehensive resolution. The commitment of the Batu City government aligns with the effective performance of its waste management initiatives, which have demonstrated significant positive impacts on the city's environmental sustainability. Waste management practices in Batu City have garnered widespread recognition and praise for successfully implementing the Temporary Waste Collection Site concept, known as TPS3R (Reduce, Reuse, Recycle).

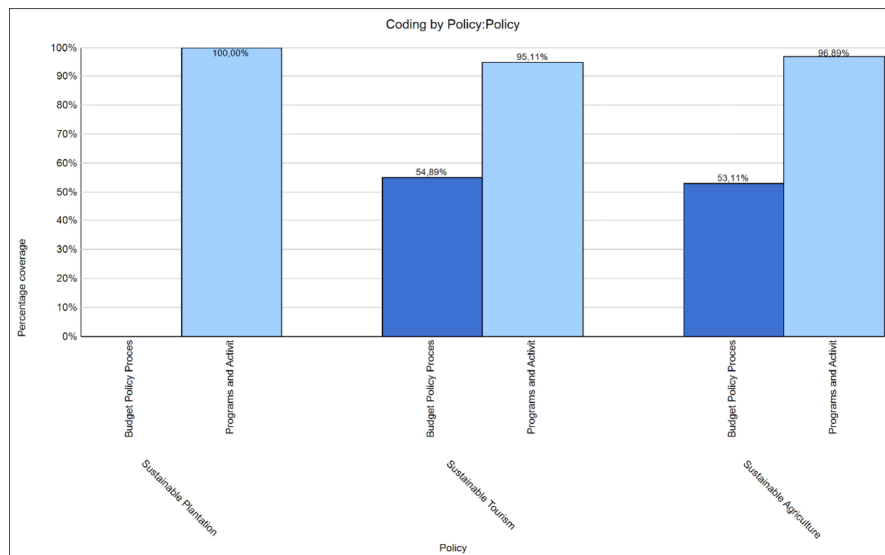


Graph 1. Comparison of Budgeting, Programs, and Activities in Green Budgeting Issues in Batu City

However, in terms of budgeting, the Batu City government prioritizes sustainable energy issues, followed by sustainable city and sustainable environment concerns. Budget allocation for waste management is not given as much importance as these other issues. This discrepancy between budget policies and program/activity policies highlights that Batu City has yet to implement an integrated planning approach, aligning program/activity formulation with budget policy in addressing sustainable development. Furthermore, this inconsistency suggests that the government's commitment to sustainable development remains relatively weak, hindered by various factors, including limited commitment, vision, and a lack of comprehensive understanding of sustainable and environmentally friendly development management in Batu City.

Graph 2 illustrates discrepancies between programs/activities and budget allocations concerning the issues of tourism, agriculture, and sustainable plantations. Sustainable plantations are considered essential programs and activities for sustainable development in Batu City. This stems from Batu City's status as an agro-tech region with notable local

advantages in plantation products such as apples and oranges. Interestingly, plantations in Batu City not only generate agricultural production but also serve as tourist attractions, drawing visitors to the region. However, this potential is not well managed. The local community shows limited interest in developing plantations, instead focusing more on vegetable farming, which has detrimental ecological impacts on Batu City.



Graph 2. Comparison of Budgeting, Programs, and Activities in Green Budgeting Issues in Batu City

The graph 2 also reveals that the Batu City government's attention to the sustainable plantation sector is not matched by its seriousness in formulating budget policies to support it. No budget allocation is dedicated to sustainable plantations. On the other hand, in terms of programs and activities, sustainable tourism receives less emphasis compared to plantations. However, the Batu City government prioritizes budget policies favoring sustainable tourism. This indicates that the government views tourism as a critical sector underpinning sustainable economic development. Additionally, the Batu City government seeks to position agriculture as a vital sector to be managed effectively, supported by programs, activities, and budget policies that are aligned and sustainable. This dual focus highlights the government's efforts to balance economic growth and environmental sustainability, despite the observed gaps in policy coherence and resource allocation.

Figure 5 illustrates that the overall sustainable development policies in Batu City—encompassing programs, activities, and budgeting—are directly related to energy. Energy plays a significant role in supporting the sustainability of Batu City as a tourism destination, agricultural hub, plantation center, and livestock area. It is also a strategic resource in advancing Batu City as an environmentally friendly city, particularly given its abundant potential.

Water resources represent the most critical energy supply in Batu City, with the Brantas River providing a vital water flow that benefits not only the residents of Batu City but also those in surrounding regions such as Malang, Kediri, and Surabaya. Unfortunately, Batu City's water resources are increasingly under pressure. Water discharge rates have declined, and river pollution has become a growing concern due to uncontrolled agricultural and plantation activities. These issues highlight the urgent need for improved management and preservation of water resources to ensure sustainable energy and environmental stability in Batu City.

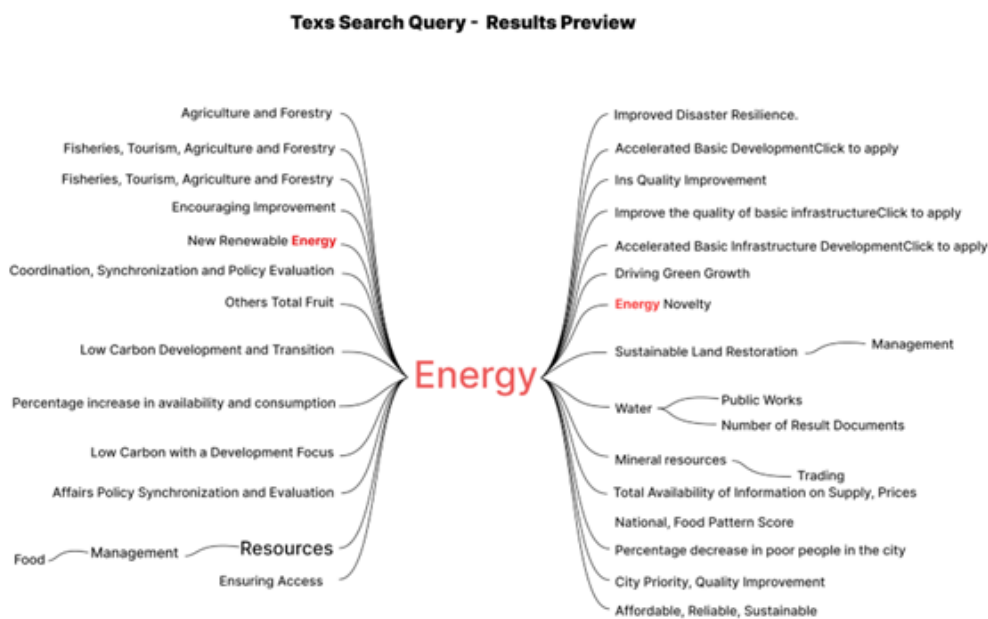


Figure 5. Mapping of Energy Issues in the Concept of Green Budgeting in Batu City

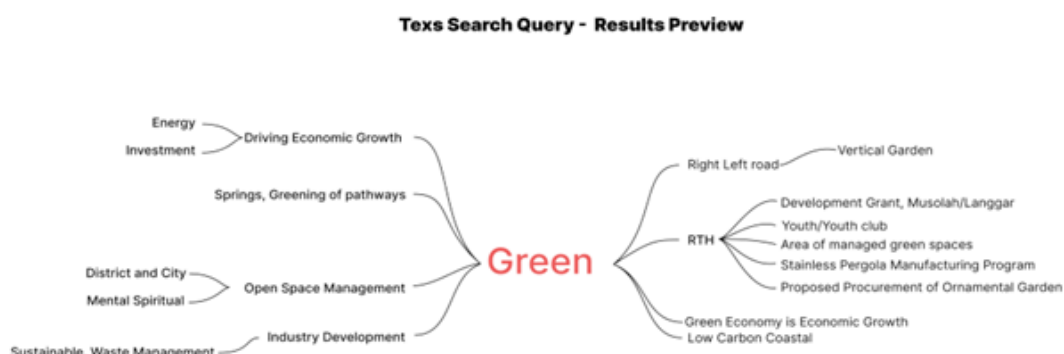


Figure 6. Mapping of Green Issues in the Context of Green Budgeting in Batu City

Figure 6 also highlights that the concept of “green” is connected to multiple aspects, particularly the key sectors in Batu City. Green serves as the foundation and cornerstone of development in Batu City. All stakeholders, including community organizations and youth leaders, must play an active role in future-oriented development processes. Regarding green open spaces (RTH), all parties are involved in their development and management to ensure that RTHs are evenly distributed across Batu City. These spaces are not limited to the central city area but are also integrated into educational zones, commercial districts, and government office complexes. Moreover, RTHs should be prioritized in the development of industries, tourism, plantations, agriculture, and urban areas to ensure the realization of sustainable development in Batu City.

DISCUSSION

The Batu City Government has identified key issues such as sustainable environment, agriculture, tourism, and waste management as integral components of sustainable development. The emphasis on environmental issues, as evidenced by the cloud analysis, reflects the government’s awareness of the importance of managing natural resources to support long-term sustainability. This aligns with the findings of Blöndal (2010), which state that Green Budgeting is effective when environmental priorities are integrated into policy planning and budgeting processes. The prominence of agriculture and tourism in the analysis underscores the central role these sectors play in Batu City’s economy. However, the challenge lies in ensuring that both sectors are managed sustainably. For instance, in agriculture, uncontrolled pesticide use leads to environmental degradation. Feig et al. (2024) assert that environmentally unfriendly agricultural practices can harm long-term productivity and the quality of local ecosystems. In the tourism sector, environmentally friendly management is critical to mitigating negative impacts such as traffic congestion and pollution, which frequently occur during peak tourist seasons in Batu City.

The strong correlation between public participation and sustainable city issues indicates that the residents of Batu City understand the urgency of better urban planning to address problems such as traffic congestion. This finding is consistent with Purnomo et al. (2021), who argue that fiscal policies that are responsive to public input are more effective in addressing local needs. Additionally, public views on environmentally friendly plantations highlight collective awareness to mitigate the adverse effects of unsustainable plantation practices. However, this study also reveals that despite public awareness, community involvement in the budgeting process remains limited to certain aspects. Blöndal, (2010) recommends strengthening green participatory budgeting to ensure broader public engagement in environmental budgeting priorities.

A significant disparity exists between the priorities of program/activity policies and budget allocations. For instance, while sustainable energy issues are the primary focus of budgeting, waste management receives more attention in programs and activities. This mismatch reflects a lack of integration in the budgeting planning process. According to Vaòo et al. (2021)(Policy & No, 2019), unintegrated planning often hampers the effectiveness of Green Budgeting implementation. Furthermore, the absence of budget allocations for sustainable plantations, despite being part of the priority program, indicates weaknesses in comprehensively identifying sectoral needs. This aligns with the findings of Lee & Kim (2020), which suggest that regions with non-integrated budgeting systems often fail to support priority sectors effectively.

Another finding of this study highlights energy as a strategic resource for the Batu City Government. Significant water resources, such as the Brantas River, play a crucial role in meeting local energy needs. However, pollution from agricultural and plantation activities underscores the need for stricter resource management policies. UNEP (2021) emphasizes that resource conservation strategies should be a priority in Green Budgeting, especially to prevent damage that could threaten long-term sustainability. Furthermore, the concept of “green” forms the foundation of Batu City’s development. Green open spaces (RTH), which are distributed across various areas, are a key component in supporting sustainability. However, equitable distribution and effective management of RTH require synergy between the government, community, and private sectors. Feig et al. (2024) stress that RTH not only provides ecological benefits but also contributes to the quality of life for communities.

This study explores the implementation of green budgeting in Batu City as a strategic initiative to support sustainable development at the local level. The findings reveal that the Batu City government has incorporated key issues such as sustainable environment, agriculture, tourism, waste management, and energy into its programs, activities, and budgeting policies. The prioritization of environmental issues underscores the government’s awareness of the urgency of mitigating environmental impacts and improving resource management. Additionally, agriculture and tourism, as the primary economic strengths of Batu City, have also received attention, although challenges remain in ensuring the sustainability of these sectors.

Public participation in budget policy formulation emerges as a critical element identified in the study. The residents of Batu City demonstrate significant concern for issues such as sustainable plantations, urban planning, and environmentally friendly waste management. However, the study finds discrepancies between program/activity policies and budget allocation, where certain priority sectors, such as sustainable plantations, lack sufficient budgetary support despite their strategic importance. This highlights the need for better integration between program planning processes and budget policy formulation. Inconsistencies in policy prioritization are also evident in the energy management and waste

management sectors. Although waste management is recognized as an exemplary program with successful implementation, more budget is allocated to sustainable energy issues. This reflects a lack of alignment in the comprehensive and integrated vision for development.

CONCLUSION

The study concludes that while the implementation of green budgeting in Batu City has addressed many essential elements, there is still room for improvement, particularly in terms of consistency, policy integration, and balanced budget support. To enhance the effectiveness of implementation, the Batu City government needs to adopt a green participatory budgeting approach, strengthen its commitment to sustainable development, and ensure that budget allocations align with the actual needs of priority sectors. By adopting these measures, Batu City can serve as a model for green budgeting implementation that not only focuses on environmental sustainability but also promotes long-term societal welfare.

Following the findings of the green budgeting implementation study in Batu City, future research endeavors should address several critical dimensions to advance understanding and improve practice in this emerging field. Researchers should conduct longitudinal impact assessments to empirically measure the environmental, economic, and social outcomes of green budgeting initiatives over extended timeframes, establishing clearer causality between budgetary decisions and sustainability outcomes. Comparative analyses with other tourism-dependent municipalities would provide valuable insights into contextual adaptations of green budgeting frameworks, while detailed examination of public participation mechanisms could yield models for more effective citizen engagement in environmental budget priorities. Given the identified inconsistencies between policy rhetoric and financial allocations, developing standardized methodologies to evaluate policy-budget alignment represents an urgent research priority.

Additionally, studies exploring inter-sectoral budget integration could address the current siloed approach by developing models that recognize interdependencies between agriculture, tourism, and environmental conservation sectors. The development and validation of green budget performance indicators specific to Indonesian local governments would enhance accountability and effectiveness measurement beyond simple allocation figures. Research into institutional capacity building models tailored to local government contexts could address implementation challenges identified in the study, while exploration of innovative green finance mechanisms could help municipalities overcome budget constraints limiting environmental initiatives. By pursuing these research directions, scholars would significantly advance both the theoretical foundations and practical application of green budgeting at the local government level, potentially transforming how Indonesian municipalities and similar contexts worldwide approach sustainable development through fiscal policy instruments.

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