



Evaluation of the Effectiveness of Sustainable Waste Management Programs in Kebakkramat District: Challenges and Solutions Towards the SDGs

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ABSTRACT

This study evaluates the effectiveness of sustainable waste management programmes in Kebakkramat District, highlighting the challenges faced and proposing solutions to align with the Sustainable Development Goals (SDGs). The research employs a mixed-methods approach, integrating quantitative data from local waste management statistics and qualitative insights from community surveys. Preliminary findings indicate that while some initiatives have been successful in reducing waste generation and promoting recycling, significant barriers remain, including lack of public awareness, inadequate infrastructure, and insufficient funding. The paper concludes with recommendations for enhancing the efficacy of these programmes, thereby contributing to the broader objectives of sustainable development.

INTRODUCTION

The rapid urbanisation and population growth in Indonesia have precipitated a waste management crisis that is particularly pronounced in regions such as Kebakkramat District. According to the Indonesian Ministry of Environment and Forestry, the nation generates an astonishing 67.8 million tonnes of waste annually, with only 60% of this waste being managed properly (Ministry of Environment and Forestry, 2020). This statistic underscores a dire situation that poses significant threats to public health and the environment. The accumulation of waste not only leads to unsightly landscapes but also creates breeding grounds for diseases, contaminates water sources, and contributes to air pollution. Thus, effective waste management transcends mere disposal; it necessitates a comprehensive approach that includes strategies to reduce waste generation, promote recycling, and ensure the responsible treatment of waste.

In the context of Kebakkramat District, various initiatives have been launched to tackle the waste management crisis. These initiatives include community-based recycling programmes and educational campaigns aimed at raising awareness about the importance of waste segregation and recycling. For instance, local authorities have introduced a "Waste Bank" system, where residents can deposit their recyclable waste in exchange for rewards. This innovative approach not only incentivises recycling but also fosters a sense of community responsibility towards waste management. However, despite these initiatives, the effectiveness of the programmes has not been rigorously evaluated, leaving a gap in understanding their true impact on waste reduction and environmental sustainability.

Examining the successes and challenges faced in implementing sustainable waste management practices in Kebakkramat is crucial. On one hand, the community-based recycling programmes have seen a positive response from residents, with many actively participating in waste segregation at the source. This shift in behaviour is indicative of a growing awareness of environmental issues among the local population. On the other hand, challenges remain, such as inadequate infrastructure for waste collection and processing, which hampers the overall effectiveness of these programmes. Furthermore, there is often a lack of coordination between various stakeholders, including local government, NGOs, and community members, which can lead to fragmented efforts and diluted impacts.

To enhance the effectiveness of waste management programmes in Kebakkramat, actionable recommendations must be developed. First, investing in infrastructure improvements, such as more accessible waste collection points and recycling facilities, is essential. Additionally, fostering partnerships between local government and community organisations can facilitate better resource allocation and support for educational campaigns. These partnerships can also help bridge the gap between policy and practice, ensuring that waste management strategies are not only well-designed but also effectively implemented.

Moreover, aligning these programmes with the Sustainable Development Goals (SDGs), particularly Goal 12: Responsible Consumption and Production, is vital. By adopting a holistic approach that integrates waste management with broader sustainability initiatives, Kebakkramat can serve as a model for other regions facing similar challenges. This alignment will not only enhance the effectiveness of waste management programmes but also contribute to the overall sustainability goals of Indonesia.

In conclusion, the waste management crisis in Kebakkramat District is a multifaceted issue that requires immediate and sustained attention. While various initiatives have been implemented to improve waste management practices, their effectiveness remains to be thoroughly evaluated. By addressing the challenges and leveraging the successes of current programmes, Kebakkramat can enhance its waste management strategies and contribute significantly to the achievement of the SDGs. The path forward lies in fostering community engagement, improving infrastructure, and ensuring cohesive collaboration among all stakeholders involved.

LITERATURE REVIEW

Sustainable waste management has gained prominence in academic and policy discussions as a crucial component of environmental sustainability. According to the World Bank (2018), sustainable waste management involves a comprehensive approach that includes waste prevention, minimisation, recycling, and safe disposal. The literature suggests that community engagement is vital for the success of waste management programmes (Mason et al., 2019). For instance, a study conducted in urban areas of Indonesia showed that community participation significantly improved recycling rates and reduced landfill waste (Sari et al., 2021).

Moreover, the role of government policies in shaping waste management practices cannot be overstated. The implementation of regulations and incentives can encourage both individuals and businesses to adopt more sustainable practices (Zhang et al., 2020). In Kebakkramat, local authorities have initiated several policies aimed at promoting waste segregation at the source, but the effectiveness of these measures remains questionable. Research indicates that without adequate enforcement and public education, even well-intentioned policies can falter (Kumar & Singh, 2020).

Challenges such as inadequate infrastructure, insufficient funding, and lack of public awareness are frequently cited in the literature as barriers to effective waste management (Wang et al., 2019). For instance, a survey conducted in various Indonesian districts revealed that over 70% of respondents were unaware of local waste management policies, highlighting a significant gap in public knowledge (Prasetyo et al., 2020). This underscores the need for targeted educational initiatives that inform residents about the importance of sustainable waste management practices and their role in achieving the SDGs.

METHODOLOGY

This study employs a mixed-methods approach to evaluate the effectiveness of sustainable waste management programmes in Kebakkramat District. Quantitative data were collected through a survey administered to residents, focusing on their awareness and participation in local waste management initiatives. A total of 300 households were selected using stratified random sampling to ensure a representative sample of the district's demographics. The survey included questions on waste generation, recycling practices, and perceptions of local waste management policies.

In addition to the quantitative survey, qualitative data were gathered through semi-structured interviews with key stakeholders, including local government officials, community leaders, and representatives from non-governmental organisations (NGOs). These interviews aimed to provide deeper insights into the challenges and successes of waste management programmes from multiple perspectives. Thematic analysis was employed to identify common themes and patterns in the qualitative data, which were then compared against the quantitative findings to provide a comprehensive understanding of the situation.

Data on waste generation and management practices in Kebakkramat were also sourced from local government reports and statistics. This included information on the volume of waste collected, recycling rates, and the effectiveness of public awareness campaigns. By triangulating data from various sources, this study aims to present a nuanced evaluation of the current state of waste management in the district.

RESULT AND DISCUSSION

Preliminary findings from the survey indicate that while awareness of waste management initiatives is relatively high among residents, actual participation in recycling programmes remains low. Approximately 65% of respondents reported being aware of local recycling initiatives; however, only 30% actively participated in these programmes. This discrepancy highlights a significant challenge in translating awareness into action, which is critical for the success of sustainable waste management efforts.

Analysis of the qualitative data reveals that several factors contribute to the low participation rates. Many residents cited a lack of convenient recycling facilities and insufficient information on how to properly segregate waste as significant barriers. For instance, one community leader noted, "People want to recycle, but they don't know how to do it effectively or where to take their recyclables." This sentiment was echoed by multiple interviewees, suggesting that educational campaigns need to be more targeted and practical.

Table 1. This Sentiment was Echoed by Multiple Interviewees

Category	Indicators	Challenges	Solutions	SDGs Alignment
Waste Collection	Coverage area, collection frequency	Inconsistent collection schedule	Implement regular collection schedules	SDG 11: Sustainable Cities and Communities
Waste Segregation	Percentage of segregated waste, public awareness levels	Low public awareness, lack of segregation infrastructure	Public awareness campaigns, provision of segregation bins	SDG 12: Responsible Consumption and Production
Recycling	Recycling rate, availability of recycling facilities	Insufficient recycling facilities	Establish more recycling canters, incentivize recycling	SDG 13: Climate Action
Composting	Volume of organic waste composted	Limited composting facilities, lack of knowledge	Training programs on composting, build community composting	SDG 2: Zero Hunger
Waste to Energy	Amount of waste converted to energy	High initial investment, technological challenges	Public-private partnerships, research funding	SDG 7: Affordable and Clean Energy
Policy and Regulation	Enforcement of waste management laws, policy effectiveness	Weak enforcement, inadequate policies	Strengthen law enforcement, review and update policies	SDG 16: Peace, Justice, and Strong Institutions
Community Participation	Level of community involvement	Low participation	Encourage community engagement through incentives	SDG 17: Partnerships for the Goals

Furthermore, the research identified funding constraints as a major challenge for local waste management programmes. Government budgets allocated for waste management are often insufficient to cover the costs of infrastructure development and public education initiatives. As a result, many proposed projects, such as the establishment of community recycling centres,

remain unfunded. This lack of financial resources limits the ability of local authorities to implement effective waste management strategies.

Despite the myriad challenges that Kebakkramat District faces in its waste management efforts, there have been notable successes that deserve recognition and further exploration. One such success is a pilot programme focused on composting organic waste, which has yielded promising results. Participating households in this initiative have reported a remarkable 40% reduction in the volume of waste sent to landfills. This statistic is not merely a number; it represents a significant shift in the community's approach to waste disposal and resource management. The programme not only alleviates the burden on landfills but also fosters an environment where sustainable practices are embraced and celebrated.

Table 2. Sustainable Practices are Embraced and Celebrated

Aspect	Description/Finding	Challenge	Potential Solution/Recommendation
Existing Initiatives	Waste Bank sub-unit in Pulosari manages waste from residents.	Limited reach (only serves about half of the residents in the targeted area).	Expand outreach and participation in the existing waste bank program. Increase awareness campaigns to encourage more residents to participate.
	DLH encourages Kebak Village to establish BUMDes for waste management. TPS in Kebak is a focal point for discussions.	Need for effective implementation of the BUMDes and a well-defined management system for the TPS.	Provide training and resources for the establishment and operation of the BUMDes. Implement a 3R (Reduce, Reuse, Recycle) system at the TPS to minimize waste and promote resource recovery.
Environmental Concerns	Piles of waste at the Kebak TPS are potential causes of flooding in Waru Village. Concerns about waste management practices contributing to river pollution.	Waste accumulation at TPS leading to environmental hazards. Potential contribution to river pollution.	Implement a 3R waste management system at the TPS to reduce the amount of waste that ends up in the environment. Regularly clean and maintain the TPS to prevent waste accumulation and related issues. Enforce regulations to prevent illegal waste dumping.

Aspect	Description/Finding	Challenge	Potential Solution/Recommendation
System Improvement Needs	Existing waste management systems require improvements to prevent environmental pollution and flooding. Village-level discussions aim to find long-term solutions to these problems.	Need for more sustainable and effective waste management systems. Lack of long-term planning.	Develop and implement long-term waste management solutions to address the root causes of pollution and flooding. Empower and train village-level cadres to independently and economically manage waste. Seek collaboration with stakeholders.
Corrective Actions	Recommendations for corrective actions in village waste management need follow-up.	Lack of follow-through on recommended improvements.	Prioritize and implement the recommended corrective actions for village waste management. Monitor progress and adjust strategies as needed to ensure effective waste management.

The composting initiative serves as an exemplary model of how local action can lead to substantial environmental benefits. For instance, the process of composting transforms organic waste – such as food scraps, yard waste, and other biodegradable materials – into nutrient-rich compost, which can then be used to enrich soil in gardens and agricultural settings. This not only reduces the amount of waste that ends up in landfills but also contributes to soil health and fertility. In a district where agricultural practices are prevalent, the dual benefit of reducing waste while enhancing soil quality cannot be overstated. This initiative exemplifies the potential for circular economy principles, where waste is reimagined as a resource rather than a burden.

Moreover, the success of this composting programme has led to increased community engagement and awareness surrounding sustainable practices. Residents who may have previously been indifferent to waste management issues are now actively participating in the composting process, learning about the importance of reducing waste and the benefits of composting. Workshops and community meetings have been organised to educate residents about the environmental impact of waste and the practical steps they can take to reduce their footprint. This grassroots involvement is crucial; it not only empowers individuals but also strengthens community bonds as residents work collectively towards a common goal.

Transitioning from individual actions to a broader perspective, it is essential to recognise that such initiatives have the potential to inspire scalable solutions within Kebakkramat District. The composting programme could serve as a blueprint for other waste management strategies, such as recycling and waste reduction campaigns. By demonstrating the effectiveness of community-led initiatives, local authorities can encourage similar programmes that address different aspects of waste management. For instance, a recycling initiative could be introduced alongside composting, targeting recyclable materials like plastics, metals, and paper. This integrated approach would further reduce landfill waste and promote a culture of sustainability within the district.

However, while the successes of the composting programme are commendable, they do not negate the significant challenges that still exist in Kebakkramat District's waste management landscape. One of the primary barriers to effective waste management is the lack of comprehensive infrastructure. Many areas within the district may lack access to proper waste collection services, making it difficult for residents to dispose of their waste responsibly. Without adequate infrastructure, even the most well-intentioned initiatives can struggle to gain traction. Therefore, addressing these infrastructural gaps is crucial for the long-term sustainability of waste management efforts.

In addition to infrastructural challenges, securing adequate funding remains a critical issue. Many waste management initiatives, including composting and recycling programmes, require financial investment for their implementation and maintenance. Without sufficient funding, these programmes may struggle to expand or sustain their operations. Local governments, non-profit organisations, and private sector partners must collaborate to identify funding sources and allocate resources effectively. This could involve applying for grants, engaging in public-private partnerships, or launching community fundraising campaigns to support waste management initiatives.

Enhancing public education efforts is another vital component of improving waste management in Kebakkramat District. While the composting programme has successfully engaged some residents, there remains a significant portion of the population that may not fully understand the importance of sustainable waste practices. Comprehensive educational campaigns that highlight the environmental, economic, and social benefits of responsible waste management can help bridge this knowledge gap. Schools, local organisations, and community leaders can play a pivotal role in disseminating information and fostering a culture of sustainability among residents.

Furthermore, it is essential to consider the role of policy and regulation in shaping waste management practices. Local authorities must develop and enforce regulations that support sustainable waste management, such as mandates for recycling and composting. These regulations can create a framework within which residents and businesses operate, encouraging compliance and participation. Additionally, policies that incentivise waste

reduction, such as tax breaks for composting households or penalties for excessive waste generation, can further motivate individuals and organisations to adopt sustainable practices.

In conclusion, while Kebakkramat District faces significant challenges in its waste management efforts, there are also numerous opportunities for improvement. The success of the composting programme serves as a beacon of hope, demonstrating that community engagement and sustainable practices can lead to meaningful change. By addressing barriers to participation, securing adequate funding, enhancing public education efforts, and implementing supportive policies, the district can make meaningful progress towards achieving the Sustainable Development Goals related to sustainable waste management. The path forward requires a collaborative approach, where residents, local authorities, and organisations work together to create a cleaner, healthier, and more sustainable environment for all. Ultimately, the lessons learned from Kebakkramat District's experiences can serve as valuable insights for other communities grappling with similar waste management challenges, showcasing the power of local action in driving global change.

CONCLUSIONS AND RECOMMENDATIONS

The evaluation of sustainable waste management programmes in Kebakkramat District reveals a complex interplay of challenges and opportunities that demand a nuanced understanding. While awareness of waste management initiatives is relatively high, translating this awareness into active participation remains a significant hurdle. This disconnection highlights an urgent need for targeted educational campaigns. Such campaigns should not only inform residents about the importance of recycling but also provide practical guidance on how to engage in these practices effectively. For instance, workshops demonstrating the recycling process or community events where residents can bring their recyclables could bridge the gap between knowledge and action.

Moreover, the funding constraints faced by local waste management programmes pose a serious challenge to their effectiveness. Without adequate financial resources, initiatives may struggle to implement necessary infrastructure or outreach efforts. Local authorities should explore partnerships with non-governmental organisations (NGOs) and the private sector to secure additional resources. This collaboration could manifest in various forms, such as joint funding for community engagement initiatives or shared facilities for waste processing. An example of successful collaboration can be seen in other regions where public-private partnerships have led to the establishment of more efficient waste collection systems, ultimately benefiting both the community and the environment.

In this context, the pilot composting programme in Kebakkramat District serves as a model for other waste management initiatives. This programme not only addresses organic waste but also fosters community involvement by encouraging residents to participate in composting efforts. By expanding such programmes, local authorities can demonstrate the tangible benefits of

sustainable waste practices, such as reducing landfill waste and enhancing soil quality. Furthermore, the establishment of more accessible recycling facilities would likely improve participation rates. For example, strategically placed recycling bins in public areas could encourage responsible waste disposal behaviours and make recycling more convenient for residents.

The study's findings underscore the importance of developing comprehensive waste management strategies that incorporate community input. Engaging residents in the planning process can help identify specific barriers to participation and ensure that initiatives are tailored to the unique needs of the community. By fostering a culture of sustainability and responsibility, Kebakkramat District can make significant strides towards achieving the Sustainable Development Goals (SDGs) related to waste management and environmental sustainability.

In conclusion, the challenges and opportunities identified in Kebakkramat District's sustainable waste management programmes highlight the need for a multi-faceted approach. By enhancing educational initiatives, securing funding through partnerships, expanding successful programmes like composting, and prioritising community engagement, local authorities can create a robust framework for sustainable waste management. This holistic strategy not only addresses the immediate challenges but also paves the way for long-term environmental benefits, ultimately fostering a more sustainable and responsible community. The potential for positive change is significant, and with concerted efforts, Kebakkramat District can lead by example in the realm of sustainable waste management.

FURTHER STUDY

Future research should focus on longitudinal studies to assess the long-term impacts of implemented waste management programmes in Kebakkramat District. Additionally, exploring the role of technology in enhancing waste management practices, such as the use of mobile applications for waste collection scheduling and recycling education, could provide valuable insights. Comparative studies with other districts that have successfully implemented sustainable waste management strategies may also yield lessons that can be adapted to the unique context of Kebakkramat.

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In addition to the local government, special thanks are extended to the community members who participated in the surveys and interviews. Their

willingness to share personal experiences and perspectives offered invaluable insights into the multifaceted challenges and successes of waste management in the district. For instance, during the interviews, several participants recounted their struggles with inadequate waste disposal facilities, highlighting the pressing need for improved infrastructure. One individual noted how overflowing bins had become a common sight, leading to unsightly streets and health hazards. Such anecdotes underscore the urgency of addressing waste management issues, as they directly impact the quality of life within the community.

Furthermore, the success of this research is a testament to the power of community involvement in environmental stewardship. When individuals feel empowered to contribute to discussions about their environment, they are more likely to adopt sustainable behaviours and advocate for necessary changes. This phenomenon was evident in Kebakkramat District, where participants expressed a desire for more educational programmes on waste segregation and recycling. Such initiatives not only equip residents with the knowledge to manage waste effectively but also cultivate a culture of sustainability that can be passed down to future generations.

In conclusion, the authors would like to reiterate their deep appreciation for the support received from the local government of Kebakkramat District and the community members who participated in this research. Their contributions have been invaluable in shedding light on the complexities of waste management within the district. As we move forward, it is imperative to harness these insights to develop targeted strategies that address the identified challenges and leverage the community's strengths. By fostering collaboration between local authorities and residents, Kebakkramat District can pave the way for a more sustainable future, setting a precedent for other communities grappling with similar environmental issues.

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