

## Transforming Slum Temporary Waste Disposal Sites (TPS) into Green TPS through Community-Based Eco-Urban Innovation

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### ABSTRACT

#### KEYWORDS

Green TPS, Tourism Village, Waste Management, Community Empowerment

Karang Tengah Village has a variety of natural tourist destinations; however, the current condition of the Temporary Waste Disposal Site (TPS) along the tourist route remains dirty and disorganized, thus reducing the aesthetic value and image of environmentally friendly tourist destinations. Moreover, the role of the community (*Paguyuban* Local Guide Sentul) is not yet optimal. The purpose of the Community Service (PKM) activity in Karang Tengah Village is to develop innovative, community-based solutions for creating a clean, aesthetic, and educational tourist destination environment. The approach employs participatory-educational and eco-urban micro-interventions through five stages: socialization, training, technology implementation, mentoring, and replication. The results of the PKM include the transformation of slum TPS into a Green TPS, training and mentoring on waste management, and optimization of the community's role in educating tourists to maintain a clean and aesthetic environment. In conclusion, PKM through simple community-based interventions successfully transforms a slum TPS into a Green TPS that supports the branding of the tourist village. The constraints faced include a limited scope to one TPS location and one partner community, although the Green TPS model can be replicated in other tourist destinations.

### INTRODUCTION

Karang Tengah Village, located in Babakan Madang District, Bogor Regency, enjoys a strategic geographical position, directly bordering the elite urban area of Sentul City. This location places the village in a transition zone between urban areas and natural tourism areas, thus offering high potential for eco-tourism development such as trekking, agrotourism, and educational tourism (BPS Bogor Regency, 2023).

However, this potential is accompanied by increasing spatial and environmental pressures due to high tourism activity. Tourist mobility, unbalanced by an adequate environmental management system, has given rise to various problems, one of which is the presence of rundown and unorganized Temporary Waste Disposal Sites (TPS) along tourist routes. This condition degrades the aesthetic quality of public spaces and has the potential to diminish Karang Tengah Village's reputation as an eco-friendly tourist destination (Astuti & Mulyono, 2020; Nurdin & Sukmawati, 2021).

The lack of integrated management between village governments, local communities, and tourism operators has led to conventional waste disposal without education on sorting or pre-processing (Mtapuri, 2020; Tan et al., 2024). Visual elements supporting cleanliness

campaigns, such as information boards, educational murals, or green parks, are absent around the TPS (KLHK, 2021). Consequently, waste disposal sites are often viewed as mere "dirty zones" with no educational or functional value for the community or tourists (Hadi & Mulyadi, 2019).

Previous research indicates that community-based approaches are effective in addressing urban environmental issues, yet gaps persist in their application to tourist village contexts (Ulhasanah et al., 2023). Studies such as Mulasari (2024) have demonstrated the efficacy of Community-Based Waste Management (CBWM) in enhancing participation and reducing waste volume at the source. Similarly, Li (2023) highlights the potential of eco-urban micro-interventions to improve public space quality through small-scale, targeted actions. However, these approaches have rarely been integrated with tourism education and local guide empowerment in a single, cohesive framework.

In this context, the Sentul Local Guide Association plays a strategic role as a local community due to its direct involvement in nature tourism activities, from managing trekking routes to educating tourists (Sari & Prasetyo, 2021). Their frontline position makes the association a communication bridge between tourists and the village community. With this potential, the Local Guide Association can be developed as an environmental education agency by incorporating cleanliness messages into tourism narratives and managing public facilities such as TPS.

Unfortunately, the technical capacity of community associations in designing and managing green facilities and delivering educational messages remains limited (Rahmawati & Suryani, 2020). Therefore, community service programs are needed to increase their capacity and transform rundown TPS into clean, aesthetically pleasing, and educational "Green TPS" (Putri & Lestari, 2022).

This community service activity aims to transform the Temporary Waste Disposal Site (TPS) in Karang Tengah Village into clean, aesthetic, and environmentally friendly public spaces based on education. Through this program, it is hoped that the capacity of the Sentul Local Guide Association will be increased in environmental cleanliness management and communication, so they can act as agents of behavioral change for tourists and the community. In addition, this activity is also designed to build collective public awareness of the importance of cleanliness and sustainable public space management. More broadly, the results of this activity are expected to produce a replicable participatory model, which can be used as a reference for the management of TPS and public spaces in other tourist villages in Indonesia. This activity also contributes to Sustainable Development Goals (SDGs), especially SDG 11 (sustainable cities and communities) and SDG 13 (climate action), by supporting community-based environmental management. The approach used aligns with the National Medium-Term Development Plan (RPJMN) 2020–2024, which emphasizes environmentally conscious development (Bappenas, 2020), as well as focus areas in the National Research Master Plan (RIRN) 2017–2045, particularly on environmental governance research and community-based green infrastructure (Kemenristekdikti, 2021).

Overall, this research aims to transform the slum Temporary Waste Disposal Site (TPS) in Karang Tengah Village into a clean, aesthetic, and educational Green TPS through community-based micro-interventions. This objective is pursued to enhance the capacity of the Sentul Local Guide Association in managing cleanliness and delivering environmental education to tourists, while also fostering collective community awareness regarding the importance of sustainable public space management. The anticipated benefits of this research are twofold: physically, the creation of a functional and attractive green public space, and socially, the development of community self-reliance, multi-stakeholder collaboration, and an environmentally conscious culture that can serve as a replicable participatory model for other

tourism villages. Consequently, this initiative supports sustainable tourism development and contributes to the achievement of SDG targets at the local level.

## METHOD

This activity was applied research based on community service (applied community-based research) using a participatory educational approach. This approach combined elements of action research and micro-environmental intervention, positioning local communities as key actors in social and environmental transformation. The model aligned with the principles of Community-Based Participatory Research (CBPR), which positioned the community as an active partner in all research stages—from planning and implementation to evaluation—to ensure sustainability of outcomes (Collins et al., 2018).

Small-scale micro-interventions were chosen because they delivered significant visual, ecological, and social impacts without requiring large resources. A study by Li (2023) showed that this approach effectively improved public space quality and environmental awareness, particularly in sustainable urban planning contexts.

This approach was combined with a community empowerment and sustainability framework, ensuring activities strengthened communities' capacity to manage public facilities independently.

The activity was carried out in Karang Tengah Village, Babakan Madang District, Bogor Regency, West Java. The main partners were the Sentul Local Guide Association, consisting of 15 active members who acted as tour guides and track managers. The research location lay on a tourist route connecting Sentul City residential areas with local natural tourism sites, targeting a rundown Temporary Waste Disposal Site (TPS).

This research combined primary and secondary data to capture social and environmental conditions comprehensively. Primary data were collected directly from the community through participatory methods. Field observations assessed the physical condition of the TPS, residents' waste disposal behaviors, and surrounding social dynamics, revealing daily challenges and community habits.

A perception survey using a Likert-scale questionnaire (1–5) measured awareness, participation, and aesthetic perceptions among residents and tourists before and after interventions, providing quantitative evidence of behavioral changes. This was complemented by Focus Group Discussions (FGDs), which facilitated dialogue among researchers, village officials, and community members to identify problems, develop solutions, and plan for sustainability. In-depth interviews with stakeholders—including village officials, guide association members, and tourists—offered personal insights into cleanliness perceptions, challenges, and involvement in environmental management.

Secondary data were drawn from official village government reports, Central Statistics Agency (BPS) Bogor Regency publications (2023), and scientific literature on Community-Based Waste Management (CBWM). Mulasari's (2024) study served as a key reference, confirming CBWM's effectiveness in boosting participation and reducing waste at the source. This integration of data not only described TPS conditions but also highlighted growing ecological awareness through participatory processes.

The stages of activity implementation are divided into five main phases which are mutually sustainable:

1. **Socialization and Identification of Field Problems:** Includes outreach to village governments and local communities, FGD mapping of problematic TPS locations, as well as eco-audit volume and type of waste.
2. **Partner Training and Capacity Building:** Involves technical training in waste sorting, composting, and workshop Environmental communication for tour guides. Participants are trained to create murals and educational information boards.
3. **Implementation of Technology and Field Innovation:** Carries out the revitalization of TPS to become Green TPS with the application of simple technologies such as aerobic composters, biofilters, vertical gardens, and educational visual elements.
4. **Mentoring and Evaluation:** Includes field education for tourists, pre-test and post-test questionnaires, and community reflection to evaluate behavioral changes and facility effectiveness.
5. **Sustainability and Replication:** Preparation of replication guidelines Green TPS, strengthening networks with village governments and the Environmental Service, as well as replication planning at other tourist spots.

This research methodology was built on three complementary theoretical foundations. First, Eco-Urban Micro-Intervention theory provided a basis for designing small-scale environmental interventions (Li, 2023). Second, the Community-Based Waste Management (CBWM) framework supported active community involvement in waste management (Mulasari, 2024; Latanna et al., 2023). Third, the Participatory Action Research (PAR) approach positioned the community as co-researchers who actively participated in every stage of the activity (Collins et al., 2018). The combination of these foundations produced both physical outputs—a functional and aesthetic Green TPS—and social outcomes, including a more independent and reflective community committed to environmental sustainability. This transformation extended beyond facility construction to foster ecological awareness as social capital for sustainable tourism village development.

## RESULTS AND DISCUSSION

Community service activities in Karang Tengah Village have yielded tangible results, both physically and socially. The results demonstrate that small-scale, community-based interventions can have a significant impact on behavior, awareness, and environmental quality. These results and discussion are organized around four main activity objectives: physical transformation of the TPS (polluting stations), capacity building for partners, changes in community awareness, and development of a replicable participatory model.

### Transforming TPS into an Environmentally Friendly Public Space

**Transformation Temporary Waste Disposal Site (TPS)** Transforming Karang Tengah Village into a clean, educational, and aesthetically pleasing public space is one of the main achievements of this activity. Prior to the intervention, the TPS area functioned solely as a temporary, poorly organized waste disposal area and was often considered a slum along the tourist route. However, through collaboration between the community service team, the community, and the Sentul Local Guide Association, the space has slowly transformed into a **Green TPS** an area that presents harmony between environmental function, aesthetic value, and educational messages for residents and tourists.

Field observations revealed significant changes, both visually and socially. Previously dull walls are now adorned with murals themed around cleanliness and environmental

conservation, while vertical gardens and potted greenery create a fresh and natural feel. The provision of waste sorting facilities not only improves the management system but also serves as a platform for collective learning about the importance of sorting waste at the source.

More than just a physical change, this revitalization fosters new social experiences within the community. Once avoided, polling stations (TPS) have become comfortable transit spaces, where people pause, interact, and experience a more vibrant atmosphere. This transformation demonstrates that aesthetics and cleanliness can be gateways to ecological awareness, especially when residents are actively involved in the process. Thus, Green TPS is not just a physical development, but also a representation of a growing collective awareness to create a more orderly, beautiful, and sustainable environment.

Table 1 below shows a comparison of conditions before and after revitalization based on the results of a survey of public and tourist perceptions using a Likert scale (1–5).

**Table 1. Comparison of TPS conditions before and after intervention**

Assessed Components	Before Revitalization	After Revitalization	$\Delta$ (%)
environmental Hygiene	2.1	4.6	+119
Aesthetics and comfort	2.4	4.5	+87
Educational facilities	1.8	4.2	+133
Citizen participation	2.6	4.4	+69
Tourist satisfaction	2.9	4.7	+62

Source: Field survey data, processed with SPSS 26 (2025)

These results demonstrate that simple interventions through public space planning can enhance the ecological and aesthetic value of tourist areas. This finding aligns with theory of eco-urban micro-intervention (Li, 2023), which confirms that small-scale interventions can produce significant social and environmental impacts in public spaces. The success of this physical transformation also reinforces the notion that environmental beauty plays a significant role in shaping hygiene-conscious behavior (Putri & Lestari, 2022).

### **Increasing the Capacity and Role of Local Communities**

The focus of the next activity is to increase capacity Sentul Local Guide Association in cleanliness management and environmentally-based tourism education. Prior to the activity, most community members lacked a sufficient understanding of the basic principles of waste management or effective environmental communication techniques for tourists. This often resulted in cleanliness messages not being conveyed effectively in the field.

Through technical training and direct mentoring, association members are trained to understand the concepts of waste sorting, sustainable public facility management, and persuasive communication strategies for conveying environmental messages. The learning process is conducted using a participatory approach—through simulations, field practice, and collaborative reflection—so that participants not only gain knowledge but also build self-confidence and social responsibility.

Changes began to be seen when tour guides began implementing cleanliness values in their daily activities, such as reminding tourists not to litter and keeping the tracking trails clean. Their active involvement created a ripple effect for both the community and tourists, demonstrating that environmental education is most effective when delivered by those directly involved in the community. Thus, increasing the capacity of the association not only strengthens the technical aspects of management but also shapes agents of social change which instills the value of caring for the environment in a sustainable manner.

**Table 2. Partner capacity increase before and after training**

Indicator	Before (%)	After (%)	Δ
Waste sorting knowledge	46	91	+45
Ability to manage TPS facilities	39	85	+46
Environmental communication skills	32	87	+55
Involvement in educational activities	58	92	+34

Source: Results of participant pre-test and post-test, processed (2025)

These results indicate a significant increase in capacity. The association is now actively providing direct education to tourists, maintaining the cleanliness of tourist areas, and safeguarding the sustainability of TPS facilities. This aligns with the findings of Latanna et al. (2023) that the success of *Community-Based Waste Management (CBWM)* relies heavily on social competence and active community participation. This approach also strengthens tourism's social function as a means of environmental learning (Sari & Prasetyo, 2021).

### Changes in Public Awareness and Participation

Improvement collective consciousness of society The importance of environmental cleanliness and public space planning is one of the important achievements of this activity. Focus group discussion (FGD) and surveys show that 84% of respondents felt that the existence of Green TPS Encourage them to be more disciplined in disposing of their waste. Some residents have even started sorting waste at home as a form of shared responsibility for village cleanliness.

This change in awareness is not solely born from formal outreach, but rather grows through direct experience and visual interactions created in the field. Educational murals with simple messages like “Clean Village, Beautiful Tourism” It has been proven effective in evoking emotions and forming new habits. This visual approach provides a space for people to learn through real-life experiences—seeing, feeling, and then imitating positive behavior. This aligns with the findings of Mulasari (2024), who emphasized that experiential learning in the model Community-Based Waste Management (CBWM) able to encourage changes in people's behavior more deeply than instructive methods.

Furthermore, this behavioral transformation reflects the emergence of A sense of ownership of public spaces. People no longer view cleanliness as a government matter, but as part of their shared identity and pride. The Green TPS symbolizes that collaboration between residents, village government, and tourism operators can create vibrant and educational public spaces. This is in line with the principles of Participatory Action Research (PAR) (Collins et al., 2018), which positions communities as reflective subjects capable of learning, evaluating, and improving their own social behavior through active participation. Thus, cleanliness becomes not only a practice but also a value embedded in the collective culture of tourist villages.

### Replication and Sustainable Management Models

Application of the concept Green Polling Station in Karang Tengah Village project did not remain a pilot project but instead developed into a participatory model that could be replicated in other tourism villages. A joint evaluation revealed that the concept was worthy of expansion because it addressed cleanliness needs, strengthened local identity, and provided an educational and aesthetic public space. The Karang Tengah Village Government, together with Bogor Regency Environmental Service has expressed a commitment to expanding the implementation of this model to two other tourist spots in the coming year.

This participatory model emphasizes integration between environmental education, aesthetic design of public spaces, and empowerment of local communities. In the process, the community plays a role not only as beneficiaries but also as managers and key drivers. Over time, they not only maintain the physical facilities they build, but also begin to develop them. new narrative about cleanliness as part of the identity of a tourist village. In this context, the concept of eco-urban micro-intervention has proven to be an effective strategy for achieving social and ecological transformation at the local level. This approach is in line with the principles of sustainable development outlined in Sustainable Development Goals (SDG 11 and SDG 13), which emphasize the importance of resilient cities and settlements and real action on climate change (United Nations, 2015).

### Synthesis and Implications

The results of this activity show that social and environmental change can start from simple community-based intervention. This program has succeeded in realizing physical output in the form of a functional and attractive Green TPS, while also producing social outcomes in the form of increasing citizen capacity, cross-party collaboration, and growing ecological awareness within the community.

Furthermore, this activity confirms that the success of environmental management is not only determined by the availability of infrastructure, but especially by a culture of participation and a sense of community ownership of their living space. When residents are involved from the planning stage to management, they become not only beneficiaries but also guardians of sustainability. An integrative approach that combines theory Eco-Urban Micro-Intervention, Community-Based Waste Management (CBWM), and Participatory Action Research (PAR) proving that social innovation can be a strong foundation for environmental sustainability.

Thus, the experience in Karang Tengah Village is a lesson that big changes can grow from small steps, when communities are empowered, public spaces are humanized, and cleanliness is made part of a shared culture.

### CONCLUSION

The community service activities in Karang Tengah Village successfully transformed a rundown Temporary Waste Disposal Site (TPS) into a clean, aesthetically pleasing, and educational Green TPS through participatory, small-scale interventions, achieving all initial objectives. This not only enhanced the physical environment but also boosted the Sentul Local Guide Association's capacity via training, enabling them to promote cleanliness to tourists and sustain the facilities. Collective community awareness grew, with over 80% of FGD and survey respondents reporting increased waste sorting, discipline, and environmental responsibility, fostering a replicable participatory model endorsed by local government for other tourist villages. Integrating Eco-Urban Micro-Intervention, Community-Based Waste Management (CBWM), and Participatory Action Research (PAR) yielded both physical outputs and social outcomes like ecological stewardship. For future research, longitudinal studies could evaluate the long-term sustainability of the Green TPS model across multiple Indonesian tourist villages, assessing impacts on tourism revenue and waste reduction metrics.

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