

Analysis of Gedongsongo Temple Waste Management in The Development of Sustainable Tourism Destinations

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Abstract

This research was conducted in the Gedongsongo Temple Area which aims to determine and analyze the waste management system, identify the role of stakeholders, explore management challenges, formulate sustainable management strategies. Data collection techniques used interviews, field observations, documentation Focus Group Discussion with Temple Managers, Cleaning Officers, Traders, Community Leaders, Visitors, Head of the Semarang Regency Tourism Office as research informants. The data obtained were then analyzed by means of Data Reduction, Data Presentation, Conclusion Drawing, and Triangulation. Then the data that has been analyzed is then carried out Data Validity using Source Triangulation, Method Triangulation, Member Checking, and Expert Review. The results of the study obtained are Waste Management in the Gedongsongo Temple Area with stakeholders in the development of sustainable destinations, both Temple Managers, Cleaning Officers, Traders, Community Leaders, Visitors, Head of the Semarang Regency Tourism Office is still running in accordance with the existing structure and regulations and the level of awareness of tourism destination stakeholders, especially Gedongsongo Temple, is still running well.

Keywords: Environment; Gedongsongo Temple; Waste Management

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INTRODUCTION

Waste is still one of the global problems, especially in developing countries like Indonesia. The problem of environmental pollution due to waste is also a burden and a serious problem in almost all districts/cities in Indonesia. This waste problem is exacerbated by the lack of waste disposal sites and locations, low public awareness and willingness to manage waste, lack of public knowledge about the benefits of waste, unwillingness of people to recycle waste because of prestige and the assumption that waste is dirty and must be disposed of immediately (Sari, 2016). Several of these factors also underlie the habit of people littering. Until now, the waste problem in Indonesia has not been resolved. The high population growth rate is directly proportional to the amount of waste produced each day (Prasojo, 2013).

According to the World Bank report, the amount of global waste is estimated to reach 2.24 billion tons per year by 2023, the World Bank also stated that this amount of waste is expected to continue to increase with population growth and urbanization, and is estimated to reach 3.4 billion tons by 2050. The majority of this waste, around 33%, is not disposed of properly and is often landfilled or burned, causing negative impacts on the environment and health.

Low public awareness of the importance of proper waste management is also a problem, leading to environmentally unfriendly waste disposal practices such as illegal dumping and environmental pollution (Hapsari, 2020). Good waste management is part of the concept of sustainable tourism, which

aims to minimize negative impacts on the environment and local culture, and provide long-term benefits to the surrounding community (Mahlil et.al, 2021).

Gedongsongo Temple is one of the main tourist destinations in Semarang Regency, Central Java. Located in a highland area, this temple attracts many tourists because of its natural beauty and historical value. However, the increasing number of visitors also brings challenges in waste management, which can have an impact on environmental sustainability and tourist comfort. Tourists who come with food and drinks often leave plastic and organic waste. The available trash bins are still limited, so that trash is often scattered in tourist areas, and not all visitors are aware of throwing trash in its place, so that waste that is not managed properly can pollute the soil and water and disrupt the surrounding ecosystem. Waste management at Gedongsongo Temple is a complex challenge and requires a holistic approach. With a combination of improving facilities, education, community involvement, and stakeholder movements in making policies (Pranoto,et.al, 2021). Based on this, researchers are interested in analyzing waste management in the Gedongsongo Temple area and the perspectives of stakeholders in developing sustainable destinations.

This problem cannot be solved only through government action, but requires active participation from various stakeholders, such as the community, non-governmental organizations, and the private sector (Nurhidayati, 2021). With effective collaboration, handling of waste disposal into irrigation can be done comprehensively, covering preventive, educational, and sustainable management aspects. The phenomenon related to waste problems is always interesting to discuss, waste itself is the result of human activities and activities in carrying out daily life which leads to the cause of serious problems if the handling of the waste itself is not appropriate and optimal (Aboejoewono, 1985). Based on the problems above, the following problem formulations are identified: (1) How is the waste management system implemented; (2) what is the role and coordination of stakeholders; (3) What are the challenges in waste management; (4) What is the strategy for sustainable waste management.

Waste management has high complexity because it involves various technical, social, economic, and institutional aspects. The management systems implemented vary between regions and include complex stages from sorting to final disposal. Coordination between stakeholders, such as government, private sector, community, and informal actors, is often hampered by overlapping authority and differences in interests (Rahmawati & Nugroho, 2021). Challenges also arise from low public awareness, limited infrastructure, and weak regulations. Therefore, sustainable waste management strategies need to be designed holistically, adaptive to technology, and involve behavioral changes and consistent cross-sector collaboration.

This study offers an integrative approach to analyzing waste management by examining the relationship between technical systems, stakeholder roles, cross-sector challenges, and sustainable strategies in a comprehensive manner within one analytical framework. The novelty lies in the effort to identify effective coordination patterns between stakeholders and formulate waste management strategies that are adaptive to the local context and capable of encouraging sustainable changes in community behavior. In addition, this study highlights the importance of a collaborative approach based on participatory governance, which has rarely been discussed in depth in previous studies, especially at the regional or specific area level that has different social and institutional characteristics.

This study aims to determine the waste management system implemented by Gedongsongo Temple, the role and coordination of stakeholders, the challenges faced in waste management and how to implement sustainable waste management strategies.

THEORETICAL BASIS

A. Technical Aspects

1. Waste Collection System

Waste collection aims to facilitate waste collection from each source. In addition, waste collection also aims to support waste management efforts from the source to the TPS. One of the facilities needed in waste collection is the TPS (Temporary Shelter). The impact of the number and capacity of TPS that do not meet the needs of waste services will cause serious

problems such as scattered waste, decreased aesthetics and pollution to the environment ([Achmad, et al., 2015](#)).

2. Waste Sorting

In general, waste is divided into organic and inorganic waste which are distinguished based on their chemical properties and structures. Organic waste is waste that is easily decomposed or decomposed naturally/biologically assisted by bacteria ([Kuo, L. 2019](#)), including plant and animal waste, and food waste.

3. Transportation

In the process of transportation using dump trucks, there are usually garbage officers consisting of 1 driver and 2 officers who move the garbage into the dump truck. This is in accordance with the provisions of the ([PU Department, 2013](#)), in waste transportation, the efficiency of dump truck use can be achieved if it meets several criteria, namely the number of trips or citations per day is a minimum of 3 and the maximum number of crew is 3, dump trucks in their operations require more workers compared to the workers needed when transporting garbage using armroll trucks

4. Processing

Waste processing is a process to reduce the volume of waste and/or change the form of waste to be useful, including by burning, composting, compacting, crushing, drying, and recycling. Waste processing techniques can include composting, environmentally friendly incineration, recycling, reducing waste volume by shredding or compacting, and biogasification. According to ([Satori, M. 2022](#)), waste management aims to reduce, recycle, and dispose of waste in a safe manner..

5. Final Disposal

Here are some of the main methods in the final waste disposal process, namely sanitary landfill, controlled landfill, open dumping, incineration, and waste to energy (WTE). ([Kun Maryati and Juju Suryawati, 2007](#)), stated that the selection of the TPA location must consider aspects of public health and environmental protection.

B. Social Aspects

1. Community Participation

Community participation is an important factor in sustainable waste management, especially in tourist destinations that produce a lot of waste. ([Arnstein 1969](#)) stated that participation reflects the active involvement of the community in environmental decision making and actions.

2. Visitor Education

Visitor education is an important strategy in waste management at tourist destinations. According to ([KLHK, 2019](#)), effective waste management requires the involvement of all parties, including tourists, through a sustainable educational approach. According to ([Susanti, 2020](#)), increasing visitor awareness through information boards, environmental campaigns, and educational programs has been proven to reduce the amount of waste that is disposed of carelessly. This education can also instill collective responsibility in maintaining the cleanliness of the tourist environment.

3. Environmental Awareness

Environmental awareness is an important foundation in waste management in tourist destinations. According to ([Gifford and Nilsson, 2014](#)), environmental awareness is an individual's attitude and behavior that reflects concern for the impact of human activities on nature. In tourist destinations, this awareness is important to reduce the increasing waste generation due to tourist activities. ([KLHK, 2019](#)) emphasizes that building an environmentally conscious culture, both for local communities and tourists, can be done through education, community involvement, and the provision of environmentally friendly infrastructure.

4. Waste Littering Behavior

In tourist areas, littering behavior often occurs due to lack of awareness and adequate facilities. Research by [\(Wibowo, 2020\)](#) shows that the provision of separate trash bins, warning boards, and supervision from managers can increase visitor compliance in disposing of trash in its place. According to the Ministry of Environment and Forestry (2019), the formation of positive behavior in disposing of trash in tourist attractions must start from education and role models, both by local communities and cleaning staff and destination managers. This behavior also needs to be strengthened through regulations or social sanctions for violators.

5. Community Empowerment

According to [\(Kurniawan, 2019\)](#) community empowerment increases the sense of responsibility and ownership of the surrounding environment so that waste management is more effective. [\(KLHK, 2019\)](#) emphasized that community-based waste management can maximize the use of local resources and support the 3R program (Reduce, Reuse, Recycle). Empowered communities can organize waste collection, sorting, and processing activities with training and facilities from the government and the private sector.

RESEARCH METHODE

A. Research Type

This study uses qualitative research methods and uses interviews and observations to obtain in-depth information about waste management. Qualitative research methods are research used to research the conditions of natural objects, where researchers are key instruments. The research method used is descriptive, fully aimed at providing a clear picture of the conditions of the objects studied based on the actual reality as it is..

B. Data Collecting Technique

1. Indepth Interview

The interview instruments submitted by the researcher include:

- a. Gedongsongo Temple policy in technical aspects, institutional aspects and social aspects
- b. Community behavior in the past and present in managing waste
- c. Community participation in managing waste
- d. Challenges and obstacles faced
- e. Solutions to overcome sustainable waste
- f. The role of stakeholders in waste management

2. Field Observation

Observation is a method and technique of collecting data by conducting systematic observations and recording of symptoms or phenomena that exist in the research object. In this study, the researcher observed several things, including:

- a. How is the waste management system implemented
- b. The role and coordination of stakeholders
- c. Challenges in waste management
- d. Sustainable waste management strategies

3. Documentation

Technical documentation used to obtain data by means of research rather than based on thought. Documentation is the collection of data on written things or variables in the form of notes, books, magazines, documents, regulations, meeting minutes, notes/agenda, and so on. This method is used to obtain secondary and primary data.

4. Focus Grup Discussion

Based on the results of the Focus Group Discussion (FGD) regarding waste management in the Gedongsongo Temple tourist area, the following are:

a. Identification of Stakeholders

- Local Government: Provides regulations, policies, and waste management infrastructure.
- Tourism Management: Responsible for the cleanliness and comfort of tourists.
- Local Communities: Play a role in education and the implementation of community-based waste management systems.
- Tourists: As users of tourist areas who have a role in maintaining environmental cleanliness.
- Business Actors (MSMEs and Traders): Manage waste from economic activities around tourist areas.
- Environmental Organizations and Academics: Provide policy and technology recommendations in waste management

b. Challenges Faced

The FGD participants identified several main challenges, namely:

- Lack of strict regulations regarding waste management in tourist areas.
- Minimal active participation of local communities in waste management.
- Suboptimal technology and monitoring systems in cleanliness management.
- Lack of awareness of tourists and business actors regarding sustainable waste management.
- Limited budget and resources for implementing more effective waste management programs.

C. Research Informants

Research informants are individuals or groups that are related to the research. Based on the problem, in selecting informants, researchers use purpose sampling techniques, which are techniques for determining and taking samples determined by researchers with certain considerations. The reason for using this purpose sampling technique is because it is suitable for use in qualitative research, or research that does not generalize.

Tabel 1: Research Informants

No.	Informan	Notes
1.	Gunawan Wibisono	Temple Manager
2.	Solikhun	Cleaning Officer
3.	Rini Amri, Wini, Gini, Yuni, Budiati	Trader
4.	Ruspanji	Community Leader
5.	Apiks, Winny Marlina, Dimas Muhammad Yasin	Visitor
6.	Windarsih, S.E., M.T.	Head of Destination Division

Sources: Research observation

RESULT

A. Management System

1. Infrastructure

Infrastructure management in the Gedongsongo Temple area faces several major challenges, including: The road to the temple is still rocky, steep, and uneven, making it difficult for tourists; limited public transportation to the location, forcing tourists to use private or rented vehicles; The availability of toilets and parking spaces is still inadequate; Lack of supporting facilities such as information centers and comfortable rest areas. Based on information from the temple manager, the management of this area involves three main agencies, namely the Tourism Agency, the Culture and History Agency, and the Forestry Agency, each of which has a role in the development and maintenance of the temple.

2. Human Resources

The current human resource management structure in the Gedongsongo Temple area is as follows:

- a. Cleaning Officer: Responsible for maintaining the cleanliness of the tourist area, including waste management.
- b. Tour Guide: Providing information to tourists about the history and culture of the temple.
- c. Security Officer: Supervising tourist activities and maintaining the sustainability of the site.
- d. Conservation Team: Responsible for maintaining the temple structure and its surroundings.

3. Budgets

Based on information obtained from the Head of the Semarang Regency Tourism Office, budget management in the Gedongsongo Temple area has increased, especially after the revitalization project carried out by the Ministry of Public Works and Public Housing (PUPR). In 2024, this project will cost IDR 23 billion to improve tourist facilities and attractions. The use of this budget is used to improve tourist routes, a two-story parking area, and public facilities such as toilets and parks. In addition, this budget is used to add an open stage for art performances, a horse riding park, and more organized merchant kiosks.

4. Standard Operating Procedures

The management of Standard Operating Procedures (SOP) in the Gedongsongo Temple area continues to develop to improve the effectiveness of tourism management and environmental preservation. Based on research, several main aspects of the SOP currently implemented include:

- a. SOP of Maintenance and Temple Conservation
- b. SOP of Facilities and Tourist Management
- c. SOP of Waste Management and Environmental
- d. SOP of Safety and Security
- e. SOP of Human Resources

5. Monitoring and Evaluation

The monitoring and evaluation system in the Gedongsongo Temple area focuses on ecotourism management, environmental conservation, and the development of tourism infrastructure and facilities.

B. Stakeholder Participations

1. Active Participation

The active role of stakeholders in waste management and ecosystem conservation helps maintain the natural and historical tourist attractions. Stakeholders there have invested in tourist facilities, such as walking paths and transportation systems, improving visitor comfort and supporting economic growth. Policies implemented by local governments and related organizations ensure that tourism growth remains balanced with cultural and environmental preservation.

2. Coordination

Coordination between stakeholders in waste management in the Gedongsongo Temple area still faces challenges, coordination between stakeholders is carried out if management or development will be carried out only. In addition, currently there is no specific time to coordinate between related agencies. The Tripartite Agreement makes the three related agencies continue to maintain relationships and coordination in implementing the management and development of Gedongsongo Temple, if one agency wants to carry out development, it will coordinate with other agencies.

3. Communications

Communication between stakeholders in waste management in the Gedongsongo Temple area is carried out through various mechanisms. Based on information obtained from the Head

of the Semarang Regency Tourism Office, several forms of communication that have been implemented include coordination and discussion forums, regulations and policies on environmental management, including waste management systems and building partnerships with communities that involve the community.

4. Cooperations

In this study, the cooperation referred to is the relationship between stakeholders that is established in the development of the Gedongsongo Temple tourist attraction where currently the relationship between stakeholders is bound by an agreement commonly referred to as the Tripartite Agreement. This agreement binds three stakeholders, namely the Semarang Regency Tourism Office, Central Java BPCB, and Central Java Perum Perhutani.

5. Evaluations

Joint evaluation conducted by stakeholders in waste management in the Gedongsongo Temple area aims to improve the effectiveness of sustainability strategies. Based on information obtained from the temple management, several aspects of the evaluation that have been implemented include evaluations covering community involvement in recycling programs and reducing plastic waste, as well as the effectiveness of environmental education and stakeholders evaluating the level of coordination between related parties to ensure there is no overlapping policy and increase synergy in managing the area.

C. Management Innovations

1. Reduce

The concept of reduce in waste management at Gedongsongo Temple has not been specifically documented, but there are several approaches that can be associated with this principle, such as implementing policies to limit the use of single-use plastic and encouraging tourists to dispose of waste more responsibly.

2. Reuse

The concept of reuse in waste management at Gedongsongo Temple has not been widely implemented, but there are several approaches that can be linked to this principle, such as in several temple conservation projects, materials that are still suitable are often reused for maintenance and restoration.

3. Recycle

Waste processing into recycled materials has also been carried out to utilize the waste at the tourist destination by collecting Aqua bottles and making them into useful handicrafts such as lamp accessories that can provide aesthetic value at tourist attractions, and unique and attractive flower pots.

4. Waste Banks

In Bandungan, Semarang Regency, there is a community-based waste management initiative through a waste bank. One of the programs that has been implemented is in Dusun Mejing, Duren Village, which focuses on empowering the community in waste management. The waste collected mainly comes from domestic waste, such as plastic, and is deposited every Wednesday, Thursday, and Saturday.

5. Composting

One of the processing techniques that has been applied to waste from Gedongsongo Temple is horse manure composting, which involves the use of natural microorganisms to break down horse manure into nutrient-rich fertilizer.

D. Sustainable Waste Management at Gedongsongo Temple

1. Identify Stakeholders

- a. Local Government: Regulation, funding, and supervision.
- b. Temple Management: Implementation of waste management policies and operations.
- c. Local Community: Participation in management and education.
- d. Tourists: Awareness and compliance with the waste management system.

- e. Business Actors: Reducing waste from economic activities and contributing to the recycling system.
2. Waste Management Strategy
 - a. Waste Collection System

The process of collecting waste in the Gedongsongo Temple area is carried out following the operational working hours of the caretaker, namely Monday to Sunday. Collection of leaf and twig waste is carried out by sweeping every morning, the waste collection schedule starts at 07.00 - 10.00 WIB and afternoon at 14.00 - 16.00 WIB. After that, it is collected using sacks.
 - b. Waste Sorting

In Gedongsongo Temple, the sorting process is carried out by sorting the waste into organic and inorganic waste. The sorted waste will be transported to a temporary storage warehouse and then taken to the collector. Dry waste that will be taken is plastic, paper or cardboard, and metal. The sorting process is carried out manually using human power.
 - c. Transportation

Waste collection at the source from the cleaning staff is carried out from 04.00 WIB to 14.00 WIB. Transportation from TPS to TPA is often carried out in the morning, between 05.00 and 10.00-11.30 to avoid traffic congestion. Waste transportation from TPS Bandungan is carried out using transportation equipment provided by the Lamongan Regency Environmental Service in the form of one dump truck with a capacity of 7.26 m³ and one armroll truck container with a capacity of 6 m³.
 - d. Processing

Waste from the Gedongsongo Temple tourist area is usually processed at the TPS, but until now it can only process the waste in the form of composting from horse manure and recycling. The role of stakeholders is very much needed to be the center of attention in order to improve waste processing so that the volume of waste can be reduced and still maintain environmental sustainability.
 - e. Final Disposal

Blondo TPA in Bawen, Semarang Regency, applies the sanitary landfill method. In this method, waste is covered with soil every day to reduce negative impacts such as odor, disease vectors, and environmental pollution. However, Blondo TPA faces major challenges because it has exceeded capacity since 2019, the Semarang Regency Government is looking for solutions, including the possibility of expanding the land and collaborating with waste management companies to convert waste into briquettes or fuel to reduce the excessive waste capacity.
- E. Recommendation to Increasing System
 1. Strengthening Policies and Regulations
 - a. Implementation of stricter regulations regarding waste management in tourist areas.
 - b. Incentives for business actors who implement sustainable waste management systems
 - c. Sanctions for violators who do not comply with waste management rules.
 2. Optimization of Infrastructure and Technology
 - a. Improvement of waste sorting facilities at strategic points.
 - b. Use of monitoring technology such as sensors and waste reporting applications.
 - c. Development of recycling centers to process organic and inorganic waste.
 3. Increasing Community Awareness and Participation
 - a. Continuous educational campaigns for tourists and local communities.
 - b. Incentive programs for communities active in waste management.
 - c. Involvement of local communities in waste management and utilization.
 4. Multi-Stakeholder Collaboration
 - a. Establishment of a communication forum between the government, temple managers, the community, and business actors.

- b. Partnership with the recycling industry to improve waste management efficiency.
- c. Integration of waste management into tourism development strategies.
- 5. Continuous Monitoring and Evaluation
 - a. Periodic evaluation system to measure program effectiveness.
 - b. Transparent reporting on waste management results.
 - c. Strategy adjustments based on data and feedback from stakeholders.
- F. Stakeholder empowerment strategy
 - 1. Temple Management
 - a. Establishing ecotourism-based waste management policies.
 - b. Optimizing waste sorting facilities and recycling systems.
 - c. Collaborating with communities and governments for sustainability programs.
 - 2. Local Communities
 - a. Participating in waste bank and recycling programs.
 - b. Developing waste-based businesses to boost the local economy.
 - c. Educating tourists about the importance of maintaining environmental cleanliness.
 - 3. Tourist
 - a. Raising awareness through environmental campaigns and incentives.
 - b. Using digital technology to monitor and manage tourist waste.
 - c. Contributing to community-based cleanliness programs.
 - 4. Local Government
 - a. Developing regulations that support sustainable waste management.
 - b. Providing adequate budget and infrastructure.
- G. Best Practices on Waste Management
 - 1. Community-Based Waste Management
 - 2. Technology in Waste Management
 - 3. Environmental Education and Campaign
 - 4. Multi-Stakeholder Collaboration

DISCUSSION

A. Data reduction

The following is a data reduction table that has been updated with additional questions related to waste management in the Gedongsongo Temple area in the context of sustainable destination development:

Tabel 1 : Data Reduction

Question	Informan	Answer (Short Sentences)	Analysis
What is the policy in the Gedongsongo Temple area in terms of technical, institutional, and social aspects? ?	Head of the Semarang Regency Tourism Office	"We are designing a policy that includes improving infrastructure, coordination between institutions, and public education."	A comprehensive policy is needed to ensure effective waste management, with a mutually supportive technical, institutional, and social approach
How is the behavior of society in the past and present in waste management?	Community Figure	"In the past, people threw more garbage carelessly, now there is awareness to sort and manage waste."	Changes in community behavior indicate an increase in awareness, but it is still ongoing to ensure sustainability
How is community	Traders	"We started managing our own waste, but still	Community participation in waste management still

Question	Informan	Answer (Short Sentences)	Analysis
participation in managing waste?		need support from clear facilities and regulations "	needs to be strengthened with supportive policies and the provision of adequate facilities
What are the challenges and obstacles faced in waste management?	Cleaning Officer	"High volume of waste, lack of visitor awareness, and minimal facilities are the main challenges."	The main challenges come from tourist behavior, limited infrastructure, and lack of strict regulations
What is the sustainable solution to waste management?	Temple Manager	"We want to implement a technology-based management system and tourist education."	Sustainable solutions include technological approaches, education, and policies that support systematic waste management
What is the role of stakeholders in waste management?	Head of Semarang Regency Tourism Office	"We work together with various parties, including the community, temple managers, and the private sector."	Multi-stakeholder collaboration is essential to ensure the effectiveness of waste management and the sustainability of tourist destinations

Source: Research result

From the data reduction table above, it can be concluded that waste management in the Gedongsongo Temple area requires a more structured, policy-based approach, and involves all stakeholders to create a sustainable management system.

B. Data presentation

The following is a data presentation table based on waste management problems that have been identified at Gedongsongo Temple:

Tabel 2: Research Result

Problem Category	Problem Description	Cause Impact	Proposed	Solution
Policy and Infrastructure	Lack of waste facilities and suboptimal regulations	Budget constraints, lack of coordination	Scattered waste, reducing tourist attractions	Provision of adequate waste bins, improving coordination between agencies
Public Behavior and Awareness	Visitors still often litter Lack of environmental	education and awareness	Increasing volume of waste and environmental pollution	Educational campaigns, socialization of environmentally friendly behavior
Stakeholder Participation	Community and trader	Lack of regulations and	Ineffective management	Community involvement

Problem Category	Problem Description	Cause Impact	Proposed	Solution
	involvement in waste management is still low	supporting facilities	system, impacts on the ecosystem	programs and waste management regulations for traders
Obstacles and Challenges	High volume of waste during holidays, lack of facilities	Limited capacity of cleaning staff and infrastructure	Accumulation of waste, aesthetics of the area are disturbed	Increased cleaning staff, more frequent cleaning
Sustainable Solutions	Lack of technology-based approaches and long-term policies	Lack of strategic planning and budget support	Inefficient waste management, sustainable environmental impacts	Implementation of waste sorting technology, sustainability-based policies Implementasi
Stakeholder Role ..	Coordination between related parties is still not optimal.	Lack of an integrated management system	Policies are not running effectively, implementation is hampered.	Strengthening multi-stakeholder coordination, integration of cross-sector policies

Source: Research Result

Based on the data presentation table, it can be concluded that waste management in the Gedongsongo Temple area must use a holistic approach that involves strong policies, technology, education, and close collaboration between stakeholders.

C. Inference

1. Role of Stakeholders

Local governments, tourism managers, local communities, and tourists have important roles in maintaining environmental cleanliness and sustainability. The government plays a role in regulation and infrastructure provision, while tourism managers are responsible for implementing an efficient waste management system

2. Challenges in Waste Management

Some of the main challenges faced include the lack of adequate waste management facilities, low tourist awareness of cleanliness, and limited coordination between stakeholders

3. Sustainable Management Strategy

Approaches that can be applied include tourist education, improving waste management facilities, and implementing technology in waste monitoring and management. In addition, community involvement in recycling programs and community-based waste management can increase the effectiveness of existing systems

4. Impact on Tourist Destinations

Good waste management not only maintains environmental sustainability but also increases tourist appeal. Clean and well-maintained destinations will provide a positive experience for tourists and support the economic sustainability of the surrounding community

D. Triangulation

The following is the researcher's triangulation in the analysis of waste management in the Gedongsongo Temple tourist area, which combines various perspectives and research methods to increase the validity and reliability of the results:

Tabel 3: Researcher Triangulation in Waste Management at Gedongsongo Temple

Aspect	Research Method	Data Source	Main Findings
Regulation and Policy	Document study and interviews with local governments	Local regulations, environmental policies	Need for stricter regulations and incentives for business actors
Waste Management Operations	Field observations and interviews with temple managers	Waste management system on site	Lack of waste sorting and processing facilities
Community Participation	Surveys and interviews with local communities	Community perception and involvement	Environmental awareness still needs to be improved through education
The Role of Tourists	Survey and analysis of tourist behavior	Data on tourist visits and habits	Low compliance with waste management systems
Economic Impact	Analysis of economic data and interviews with business actors	Economic contribution from waste management	The economic potential of the recycling industry has not been optimally utilized

Source: Research Result

This researcher's triangulation shows that waste management at Gedongsongo Temple requires a more holistic approach by integrating regulations, operations, community participation, tourist behavior, and economic impacts. By combining various research methods and data sources, the analysis results become more accurate and can be used to design more effective management strategies.

CONCLUSION

Waste management in the Gedongsongo Temple area still faces various challenges, although basic systems such as providing trash bins and transportation have been implemented. This system is not yet fully effective due to limited facilities, manpower, and less than optimal waste sorting. Coordination between stakeholders such as local governments, tourism managers, local communities, and business actors has not yet been optimally established. The roles of each have not yet run synergistically, so that several waste management programs run partially and are not sustainable. The main challenges include low visitor awareness, minimal supporting facilities, lack of environmental education, and the absence of a firm policy that regulates waste management in tourist areas comprehensively. Recommended sustainable strategies include increasing environmental education, strengthening the role of local communities, providing separate waste management facilities, and strengthening collaboration between stakeholders with the support of clear and long-term-oriented regulations.

SUGGESTIONS

1. For Stakeholders

It is expected that the local government can improve regulations and supervision of waste management, and provide more adequate infrastructure. It is expected that tourism managers at Gedongsongo Temple can implement a 3R-based waste management system and involve special

cleaning and visitor education officers. It is expected that local communities can get involved in waste bank programs and environmental awareness campaigns, and tourists are encouraged to dispose of waste in its place and comply with cleanliness regulations, and finally business actors (UMKM) are expected to use environmentally friendly packaging and manage business waste responsibly.

2. It is hoped that further research can further explore simple technological solutions for waste sorting and recycling by comparing them with other destinations that have found the best waste management practices.

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