

Analysis of Waste Management in Supporting the Implementation of Sustainable Tourism

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Abstract

This research was conducted in Central Lombok Regency the aims of the research are: (1) to know how the tourism waste management system, (2) to analyze the condition of facilities and infrastructure and (3) to analyze the participation of the community and tourists, and tourism business actors in waste management in Central Lombok Regency. The research population includes all society areas in Central Lombok Regency which was selected by scope sampling technique. The research sample involved key informants consisting of the Head of the Environmental Service, the head of the tourism office, and the Village Head managing the Tourism Village. The data was collected through interviews, observation, and documentation. Furthermore, the data were analyzed qualitatively. The results of the study show: (1) the tourism waste management system in Central Lombok Regency is still carried out traditionally (collect-transport-dispose), (2) the condition of waste management facilities and infrastructure is still very limited, (3) and the role and involvement of the community, tourists, and business actors in the tourism sector in waste management are still relatively low. Based on indicators of tourism waste management, waste management in Central Lombok Regency is currently unable to support the implementation of sustainable tourism.

Keywords: Waste, Waste management, Tourism, Sustainable tourism, Central Lombok

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1. Introduction

The tourism industry is an important sector in efforts to receive potential income (Wesnawa, 2017). However, the development of the tourism industry hurts environmental sustainability due to the amount of waste produced, the waste originating from tourists is almost double compared to the waste originating from the population in general (Minister of Tourism and Creative Economy & ILO, 2012). Several studies on waste collection and management show a close relationship between the population size of an area and the amount of waste produced (Kazuva et al., 2018). The waste problem is a global problem that occurs throughout the world, including Indonesia. The condition of waste in Indonesia is directly proportional to the population which is followed by various economic activities, one of which is the tourism industry (Juliandi, 2022). The Nova Chemicals survey explains that Indonesia is the second largest contributor to marine waste after China, namely 1.29 million metric tons/year (Ariyani, 2021). Data from the Ministry of Environment and Forestry in 2021 recorded that the volume of waste in Indonesia, which consists of 154 regencies/cities throughout Indonesia, reached 18.2 million tons/year. Waste that is well managed is only 13.2 million tons/year or 72.95% (Minister of the Environment, 2021).

West Nusa Tenggara is one of the popular tourist destinations in Indonesia and has experienced significant visitor growth in recent years (Ramadhanti, 2020). Lombok West Nusa Tenggara is an island in Indonesia flanked by the islands of Bali and Sumbawa (Irfan & Suryani, 2017). Lombok Island has become one of three main areas prepared as a halal tourist destination and has succeeded in obtaining various world-class awards (Hamzana, 2018). Based on the Crescentrating-Mastercard Indonesia Muslim Travel Index (IMTI) ranking, Lombok succeeded in becoming the best halal tourist destination in Indonesia in 2018 and 2019 (Warapsari & Rusfian, 2021). Judging from the number of tourist visits in West Nusa Tenggara, it has consistently increased from 2008 with 544,501 tourists to 2017 reaching 3,508,903 tourists (Government Tourism Office, 2019).

One of the central tourist destinations on Lombok Island is Central Lombok Regency. Central Lombok is an international gateway and center of the tourism industry in West Nusa Tenggara Province. Central Lombok is the

district with the second largest waste contributor in West Nusa Tenggara (West Nusa Tenggara Department of Environment, 2018). Central Lombok produces 645 tons of waste per day, of which 12% is managed by landfills and 88% is unmanaged (Ashilly Achidsti, Sofiyah, Hendrik Saputro, 2022). This is a big problem faced in the development of the tourism industry in Central Lombok Regency, with the number of tourist visits consistently increasing from year to year which has an impact on the amount of waste produced which is not balanced with proper waste management, because of the waste problems that are often found in the area. Tourist destinations in the future will become a threat to the tourism industry itself (Sutrisnawati & M. Purwahita, 2018). The trend in tourism development which previously tended towards quantity tourism is now becoming quality tourism to support sustainable tourism (Wesnawa. IGA, 2022). Sustainable tourism is defined as all forms of tourism activities, management and development that preserve natural, economic and social integrity and ensure the maintenance of natural and cultural resources (Niedziółka, 2012).

The study of sustainable tourism in several studies has begun to be applied in various aspects, starting from combining the tourism industry, technological advances, and ecological economic development (Yang et al., 2023), lifestyle entrepreneurship in supporting sustainable tourism (Antunes et al., 2023) and transportation in supporting sustainable tourism (Mazzulla et al., 2021). This topic has generated discussion and has been developed from different points of view, not only covering the social perspective of society, such as lifestyle in supporting sustainable tourism but also physical aspects such as infrastructure and supporting technology in implementing sustainable tourism. Thus, there is an important part of implementing sustainable tourism that has not been explored and needs attention, namely waste management. Because, one of the supporting parameters for sustainable tourism development is paying attention to the waste management system implemented so that a sustainable tourism industry can be realized (Minister of Environment and Forestry, 2022).

Based on the description above, as a human activity, tourism will put pressure on resources in the natural environment, especially with various tourism activities which have an impact on increasing the amount of waste produced. A balance between people, the environment and profits through sustainable tourism development in Central Lombok Regency can be realized. To overcome this problem, this study examines waste management analysis as an effort to support the implementation of sustainable tourism in Central Lombok Regency.

2. Research Methods

Environmental management research was carried out in Central Lombok District with a focus on waste management in support of sustainable tourism. This research was carried out using a qualitative approach (Sugiyono, 2017). The research population includes tourist areas in Central Lombok Regency, selected by purposive sampling technique. The sample research subjects involved key informants consisting of the Head of the Central Lombok Regency Environmental Service, the Head of the Central Lombok Regency Tourism Office, and the Village Head managing the Tourism Village.

The stages of this research include three stages. The first stage is pre-field activities carried out by studying literature related to the research topic, collecting secondary data, preparing research materials and tools and determining purposive samples by considering villages that develop tourist villages, areas directly involved in tourism development, and areas traversed by tourism activities. The second stage is fieldwork carried out with field orientation and interviews with the Head of the Tourism Service, the head of the Environmental Service, the village Head who manages the tourist village, the community around the tourist area, tourists and business actors in the tourism sector, direct field observations and interviews with the local community regarding applied waste management. Carrying out field surveys to carry out: (a) identification of waste management implementation, (b) identification of waste management facilities and infrastructure, (c) observation of the participation of the community, tourists and tourism business actors in waste management. The third stage is the aftercare field stage which includes data analysis.

Data collection was carried out through interviews, observation and documentation. The data were analyzed using the Miles and Huberman model. Analysis is carried out during data collection and after completion of data collection for a certain period. Miles and Huberman (1984) stated that activities in qualitative data analysis are carried out interactively and continue continuously until they are finished and the data is saturated (Sugiyono, 2017). The data processing stages in this research start from data collection, data reduction, data presentation, and conclusion/verification. To ensure the validity of the data produced in the research, triangulation techniques were used. This triangulation technique is used to compare and recheck the degree of trustworthiness of information obtained through different times, tools and methods (Subandi, 2011). The triangulation technique in this research is to compare the results collected from interviews with the results of observations and

documentation carried out.

3. Results and Discussion

3.1 Tourism Waste Management System in Central Lombok Regency

The Head of the Central Lombok Regency Tourism Office (2023) explained that the tourism waste management system in Central Lombok Regency for the Mandalika Indonesian Tourism Development Corporation (ITDC) area has its management, while tourist areas outside the ITDC are the responsibility of the Central Lombok Regency Environmental Service who collaborates with the village government in implementing source-based waste management. In general, waste management carried out in Central Lombok Regency still uses the traditional system (collect-transport-dispose). There were 153,263.50 tons/year of waste stockpiles in Central Lombok Regency and 22,630.00 tons/year of handled waste or 14.77 % (Central Lombok Regency Environmental Service, 2023). This condition is certainly a problem in supporting the sustainability of tourism in Central Lombok Regency.



Figure 1. Condition of garbage in the tourist area
 Source: Juliandi Documents, 2023

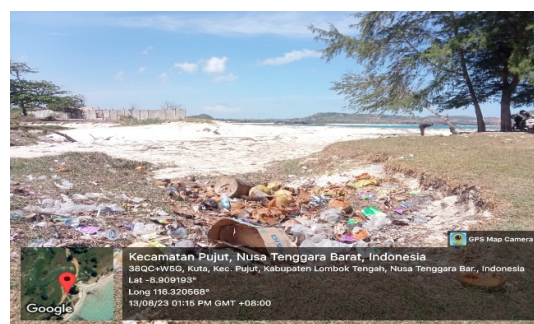


Figure 2. Condition of garbage in the tourist area
 Source: Juliandi Documents, 2023

The image above shows the condition of waste in the Central Lombok Tourism area. The high amount of waste produced and still very little waste that can be recycled, this condition is caused by source-based waste management which has been implemented by several villages in Central Lombok Regency which is still unable to be independent due to constraints due to budget, facilities and infrastructure as well as awareness of the public. In particular, hazardous and toxic waste cannot be managed. However, on the other hand, the development of tourism through tourist villages in Central Lombok Regency is very rapid, this can be seen in the table below.

Table 1. Tourism Villages in Central Lombok Regency in 2020

No	Name Of The Village	Types Of Tourism	Classification	Subdistrict
1	Aik Bual village	Forest nature tourism	Develop	Kopang
2	Wajageseng village	Agro nature tourism	Pioneer	Kopang
3	Monggas village	Religious tourism	Pioneer	Kopang
4	Kopang Rembiga village	Rural tourism	Pioneer	Kopang
5	Muncan village	Rural tourism	Pioneer	Kopang
6	Darmaji village	Knock crafts	Pioneer	Kopang
7	Karang Sidemen village	Forest nature tourism	Pioneer	North Batukliang
8	Lantan village	Waterfall and outbound nature tourism	Pioneer	North Batukliang
9	Aik Berik village	Rinjani waterfall nature tourism and Tracking	Develop	North Batukliang
10	Teratak village	natural tourism	Pioneer	North Batukliang
11	Mas-Mas village	Rural tourism	Develop	North Batukliang
12	Aik Bukak village	Nature tourism	Develop	North Batukliang
13	Seteling village	Nature tourism	Pioneer	North Batukliang
14	Tanak Beak village	Rural tourism	Pioneer	North Batukliang
15	Kuta village	Cultural and beach tourism	Proceed	Pujut
16	Sengkol village	Cultural tourism	Develop	Pujut
17	Rembitan village	Cultural tourism	Develop	Pujut
18	Mertak village	Marine tourism	Develop	Pujut
19	Prabu village	Marine tourism	Pioneer	Pujut

20	Tumpak village	Marine tourism	Develop	Pujut
21	Ketare village	Culture tour	Pioneer	Pujut
22	Teruwai village	Rural tourism	Pioneer	Pujut
23	Tanak Awu village	Rural tourism	Pioneer	Pujut
24	Pejanggik village	Beleq tourism	Pioneer	Pujut
25	Pengembur village	Rural tourism	Pioneer	Pujut
26	Penujak village	Pottery tourism	Pioneer	West Praya
27	Mung village	Rural tourism	Pioneer	West Praya
28	Mekar Sari village	Marine tourism	Pioneer	West Praya
29	Selong Belanak village	Marine tourism	Pioneer	West Praya
30	Setanggor village	Culture tour	Pioneer	West Praya
31	Batujai village	Rural tourism	Pioneer	West Praya
32	Kateng village	Rural tourism	Pioneer	West Praya
33	Ungga village	Silver crafts tourism	Pioneer	Southwest Praya
34	Montong Ajan village	Marine tourism	Pioneer	Southwest Praya
35	Batu Jangkih village	Rural tourism	Pioneer	Southwest Praya
36	Teduh village	Rural tourism	Pioneer	Southwest Praya
37	Kabul village	Rural tourism	Pioneer	Southwest Praya
38	Bile Bante village	Rural tourism	Pioneer	Pringgarata
39	Sepakek village	Rural tourism	Pioneer	Pringgarata
40	Sintung village	Rural tourism	Pioneer	Pringgarata
41	Pringgarata village	Rural tourism	Pioneer	Pringgarata
42	Bagu village	Rural tourism	Pioneer	Pringgarata
43	Sukarara village	Weaving crafts	Develop	Jonggat
44	Bonjeruk village	Historical tourism	Pioneer	Jonggat
45	Bare Julat village	Rural tourism	Pioneer	Jonggat
46	Bilelando village	Marine tourism	Pioneer	East Praya
47	Marong village	Culture tour	Pioneer	East Praya
48	Beleke village	Ketak tourism	Develop	East Praya
49	Ganti village	Ketak tourism	Pioneer	East Praya
50	Sengkerang village	Rural tourism	Pioneer	East Praya
51	Semoyang village	Rural tourism	Pioneer	East Praya
52	Selebung village	Natural tourism	Develop	Batukliang
53	Presak village	Rural tourism	Pioneer	Batukliang
54	Bujak village	Rural tourism	Pioneer	Batukliang
55	Barabali village	Rural tourism	Pioneer	Batukliang
56	Mantang village	Rural tourism	Pioneer	Batukliang
57	Pagutan village	Natural tourism	Develop	Batukliang
58	Montong Terep village	Rural tourism	Pioneer	Praya
59	Mertak Tombok village	Rural tourism	Pioneer	Praya
60	Jango village	Artificial tourism	Develop	Janapria
61	Langko village	Artificial tourism	Pioneer	Janapria

Source: (Tourism Department, 2020)

Based on the table above, it can be seen that the development of tourism villages in Central Lombok Regency is very rapid. Central Lombok has 142 villages (Central Lombok Regency Central Statistics Agency, 2022). 61 of them are tourist villages and it is estimated that the development of tourist villages will increase because Central Lombok is one of the five super-priority areas for tourism in Indonesia. The important thing in tourism development is waste management because waste management is one of the parameters of sustainable tourism development. In the development of tourism, three components must be considered, namely economic, social and environmental, one of which is regarding the applied waste management. Of the 61 tourist villages in Central Lombok, five tourist villages work together with the Environmental Service in waste management. This can be seen in the table below.

Table 2. List of Waste Management Tourism Villages

No	Name of Tourist Village	Waste Management System
1	Batujai Tourism Village	Managing waste with the traditional system (<i>collect-transport-dispose</i>)
2	Puyung Tourism Village	Manage waste with the traditional system (collect-transport-dispose). However, there is still a shortage of garbage collection vehicles so that garbage buildup occurs
3	Kopang Rembiga Tourism Village	Kopang Rembiga Village manages waste in the traditional way (<i>collect-transport-dispose</i>) which is assisted by the Environment Agency of Central Lombok Regency in the process of transporting waste to the Pengengat landfills
4	Darmaji Tourism Village	The Central Lombok Regency Environmental Service assisted in the process of transporting waste to the landfills
5	Bonjeruk Tourism Village	Managing source-based waste with the integrated waste management site system but still not independent and not optimal in waste management because it can only handle waste in one hamlet, namely around the village office

Source: (Central Lombok Regency Environmental Service, 2023)

Based on the table above, it can be seen that tourism village tourism waste management in collaboration with the Central Lombok Regency Environmental Service is still very low and in general, still manages waste traditionally. Of the 61 tourist villages, five tourist villages manage waste in collaboration with the Environmental Service. Apart from that, other tourist villages manage waste independently, but in general, they have not been able to overcome the problem of tourism waste which is caused by constraints due to budget, facilities and infrastructure as well as awareness of the community.

The need for special officers in waste management is certainly very important, Central Lombok Regency has 198 waste management officers. With this condition, waste management officers are still very low due to budget limitations, so that with the current condition of waste management officers they are not yet able to overcome waste problems, especially in tourist areas because of the size of Central Lombok Regency and the rapid development of tourist areas. Waste management in Central Lombok Regency is currently still far from expectations, because it is very limited in terms of budget. With waste management conditions like this, the waste problem in Central Lombok Regency still cannot be resolved so the sustainability of tourism in Central Lombok Regency from an environmental perspective, especially in waste management, is still a threat in itself.

3.2 Condition of Tourism Waste Management Facilities and Infrastructure in Central Lombok Regency

The head of the Central Lombok Regency Environmental Service (2023) explained that the condition of facilities and infrastructure supporting waste management in the Central Lombok Regency is very limited. The Secretary of the Central Lombok Regency Tourism Office (2023) also conveyed the same thing that the limited budget and not including waste management costs in calculating profits in developing tourist areas is a problem due to the limited facilities and infrastructure that Central Lombok Regency has in dealing with waste management, especially tourism waste. This can be seen in the data below.

Tabel 3. Condition of Waste Management Facilities and Infrastructure

No	Type of Facility	Condition		Amount	Information
		New	Long		
1	Garbage Truck	6	5	11	
2	Alarm Roll	5	3	8	
3	Ordinary Truck	-	2	2	Landfill
4	Pick Up	-	4	4	
5	Heavy Equipment	1	3	4	Landfill
6	Tricycle	5	9	14	
7	Garbage Container	11	11	22	
8	landfill	-	1	1	
9	Recycling Center	-	1	1	

Source: (Central Lombok Regency Environmental Service, 2023)

Based on the table above, as explained by Mr. Ir. Mohammad Amir Ali as Head of the Central Lombok Regency Environmental Service in Praya on August 7 2023, stated the following.

"The condition of waste management facilities and infrastructure in Central Lombok Regency is still very limited with Central Lombok being so large, apart from that some of the facilities and infrastructure are no longer feasible to operate. The current condition of facilities and infrastructure is still unable to overcome the problem of tourism waste in Central Lombok Regency. The waste problem in Praya City still cannot be resolved due to limited facilities and infrastructure, especially in other tourist spots. A garbage sweeper car is needed for the City area and the SEZ Mandalika area so that it can reduce the limitations of cleaning staff, because according to regulations it is not permissible to hire honorary workers with very minimal and very inhumane salaries. Proposing a special budget for handling waste from the center is very important to do in order to overcome the problem of waste, and the most important thing is to implement a resource-based waste management system".

Waste disposal facilities based on type already exist, namely based on organic and inorganic waste, but are still very limited and only available in a few tourist areas, not all tourist attractions. Special management related to inorganic waste has not yet been carried out, this is still in collaboration with waste banks, but is still very minimal and not carried out by all tourist areas, while the management of organic waste which is processed into maggots is still very minimal but is not carried out by all tourist areas.

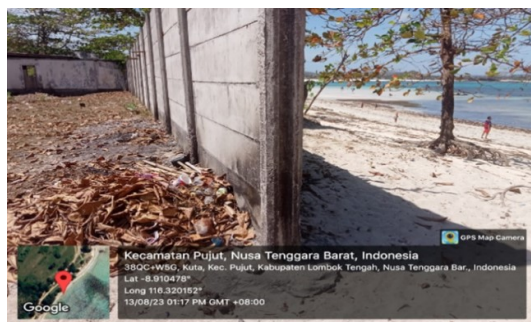


Figure 3. Rubbish thrown carelessly
Source: Juliandi Documents, 2023



Figure 4. Facilities and low public awareness
Source: Juliandi Documents, 2023



Figure 5. Piles of rubbish in the Tourist Village
Source: Juliandi Documents, 2023



Figure 6. Illegal rubbish dump in a Tourist Village
Source: Juliandi Documents, 2023

Figure above shows the condition of facilities and infrastructure that are still unable and very far from supporting the implementation of sustainable tourism in Central Lombok Regency. The area of Central Lombok is 1,208.39 Km² which is followed by limited facilities and infrastructure the Central Lombok final processing site which is located in the south area makes the waste management system in the northern part of Central Lombok still uses a heap and burning system, besides that there are several illegal Garbage disposal sites made by the community to overcome the problem of waste in the vicinity. This will certainly threaten the sustainability of tourism in Central Lombok Regency.

3.3 Attitudes, Participation and Participation of the Community, Tourists and Tourism Business Actors in Tourism Waste Management

Zero waste is one of the flagship programs of West Nusa Tenggara Province in collaboration with the Central Lombok Regency Environmental Service which regulates the community, tourists and tourism business actors in waste management. However, the implementation of the zero waste program is still minimal and far from

expectations. It can be seen that restrictions on the use of plastic have not been carried out. Thus the participation of the community, tourists and business actors in the tourism sector is still very low, only a few people implement the program. This can be seen in the figure below.



Figure 7. Tourist trash

Source: Juliandi Documents, 2023



Figure 8. International event tourism waste

Source: Juliandi Documents, 2022

Most of the participation of the public, tourists and tourism businesses in managing tourism waste still uses the traditional waste management system (collect-transport-dispose). Communities around tourism areas in northern Central Lombok solve the waste problem independently by hoarding them and creating illegal TPS. This is caused by the lack of facilities and infrastructure for waste management and the location of the landfill which is located in the southern part of Central Lombok. This condition will certainly threaten the sustainability of tourism in Central Lombok Regency.

Tourism is a very multidimensional concept and has different definitions (Wesnawa, 2022). Tourism is a system that has social, environmental and economic impacts on a global scale. These impacts, which seem to be chronic problems, especially on the balance of the environment and the economy, need to be evaluated from various perspectives (ÇALIŞKAN, 2021). Waste can have a significant impact on the environment in a number of ways: the use of energy and materials needed to produce supplies and the pollution problems that arise when waste is dumped in landfills and incinerators or dumped illegally. Much of the waste generated from tourism facilities is disposed of illegally, which poses a safety hazard to humans, disturbs wildlife habitats and destroys the beauty of destinations. These impacts threaten the economic well-being of a facility and ultimately a tourist destination (UNEP, 2003).

It is very important to implement sustainable waste management practices to enhance the development and preservation of tourist destinations by reducing pollution and other environmental damage (Kiš et al., 2021). (World Tourism Organization, 2004) explain regarding several indicators that must be considered in tourism waste management in order to create sustainable tourist areas, including: the amount of waste production, the amount of waste reduction, the availability of waste management facilities, and hazardous and toxic waste management. The realization of sustainable tourism areas in terms of waste management is a form of integration between an appropriate waste management system, adequate facilities and infrastructure, and the participation of the community, tourists and business actors in the tourism sector.

1. Waste management system implemented

The waste management system implemented is important in realizing sustainable tourism. The sustainability of tourist areas can be seen from the waste management system they implement. The urgency of the importance of a waste management system arises due to the rapid development of the tourism industry (Dinh et al., 2022). The rapid growth of tourism has an impact on environmental damage, one of which is the condition of the waste produced. Based on the waste management policy issued by the Ministry of Public Works and Public Housing in Indonesia in accordance with SNI 3242:2008, it explains that waste management is a system consisting of 5 subsystem components, namely: institutional aspects, financing aspects, regulatory (legal) aspects, community participation, and operational technical aspects. These five aspects are interrelated and must be considered to create an effective waste management system (Hendra, 2016). Developing a source-based waste management system for all tourist areas is something that must be done and regulated in regional regulations. Regional governments must require regions that develop tourism in their planning to allocate a special budget for waste management from waste generated from tourism activities so as to create tourist areas that are environmentally sustainable, especially in waste management.

2. Condition of waste management facilities and infrastructure

Facilities and infrastructure to support waste management are one of the important things in supporting the implementation of the applied waste management system, both in quality and quantity (BAYRAM et al., 2019). The existence of management facilities and infrastructure is very important to support the sustainability of waste management. Without adequate facilities and infrastructure, the waste management system that has been planned will not be able to run according to what has been planned.

3. Participation of the community, tourists, and business actors in the tourism sector

Without the participation of the community, tourists, and business actors in the tourism sector as the main source of waste production in tourism waste management, all planned tourism waste management systems will certainly not be achieved (Affandy et al., 2015). The problems that occur because people are often only as objects. The participation of the community, tourists and business actors in the tourism sector in waste management is basically an active involvement in the process of waste disposal, transportation and management, based on a sense of awareness and responsibility for achieving the common goal of creating a clean and healthy environment (Sulistiyorini et al (Sulistiyorini et al., 2015). It is important to carry out a special approach to foster the participation of the community, tourists and business actors in the tourism sector in an effort to create sustainable tourist areas. Because the community, tourists and business actors in the tourism sector are sources of waste generation, their participation and involvement needs to be increased as a form of accountability for the waste they produce.

4. Conclusion

Based on the research results that have been achieved when linked to indicators for sustainable tourism waste management issued by (the World Tourism Organization, 2004) explain several indicators that must be considered in managing tourism waste to create sustainable tourist areas, including indicators of waste production, indicators for waste reduction, indicators for the adequacy of waste management services, and indicators related to the handling and disposal of hazardous materials. So it can be concluded that the waste management system implemented in Central Lombok Regency is still unable to support the implementation of sustainable tourism, there are limited facilities and infrastructure and the low participation of the community, tourists and tourism business actors in waste management. Apart from that, if we look at the environmental management system implemented in tourism waste management in Central Lombok Regency, based on theory (Buchholz, 1993) it still applies traditional environmental management because waste management costs have not been included in tourism development and the emphasis is still on gaining economic benefits and profits.

5. Thank-You Note

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