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Community based integrated sustainable waste management in Lerep tourism village

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Abstract. The waste generated in tourist villages is not only from household activities but also from tourism activities. If not managed wisely, it can effect on health and the surrounding environment and are usually thrown away without a chance to return to the economy. The waste management system in the Lerep Tourism Village has started paying attention to the concept of sustainability and being integrated by empowering the community through BUMdes to achieve zero plastic. This article aims to explore the efforts of the community of this village in managing waste of tourism and domestic activities. This research applied a qualitative study by interviewing the key informants in this village, The villagers reduce the use of plastic in one of the tourist attractions, namely the rural culinary market by replacing plastic containers with leaf containers. Other efforts made such as early segregation of waste by residents from their respective homes, reducing burning waste, provision of 3R facility and waste banks to recycle waste become a more economical product. These efforts not only have an impact on quality environment, but also on the community's economy where the results of waste banks are able to help people pay health insurance.

1. Introduction

Rural tourism is one of the most popular tourist destinations in the world today [1,2]. Tourism activities in rural areas are considered as an alternative economic activity to agriculture and animal husbandry. In addition, rural communities themselves become a tourist attraction by taking advantage of their cultural differences from people living in urban areas [3]. Although tourism activities have a good impact on the local community's economy, they also have negative impacts including on the environment. The presence of tourist visits will cause the generation of waste generated to increase [4, 5]. If this waste is not handled wisely, it can cause various problems such as damaging the environment, natural resources and cultivation [6,7]. Waste processing is carried out so as not to cause a negative impact on the environment [8]. The community is the main actor in the waste management system [9], so it needs to be empowered to be able to work on waste management in their own environment. A waste management system that empowers the community should be integrated with various elements (government, NGOs, schools and others) by making the community the main object and subject to be able to create a sustainable tourism village waste management system and improve the community's economy [10]. The concept of community participation in waste management in a tourism village is in line with the concept



of community-based tourism [11-13] which focusing on the empowerment the local people in managing their tourism activities in order to leverage their livelihood.

Waste in various regions in Indonesia is still managed traditionally and does not implement an integrated system, where the process of waste generation, collection and disposal is still carried out separately. Lerep Tourism Village is one of the tourist villages in Semarang Regency, Central Java, starting to pay attention to the concept of sustainable waste management that empowers the community managed by local institution called as BUMdes in order to create a zero plastic tourism village. In 2021, the Lerep Tourism Village received an award from the Ministry of Tourism and Creative Economy as a Sustainable Tourism Village. Interestingly, the Lerep Tourism Village also implements the Climate Village Program (Proklm) which is a certification program initiated by the government to increase community participation in implementing climate change mitigation and adaptation [14]. One of its flagship programs is the reduction of plastic waste, namely replacing plastic containers with leaf containers at tourist attractions in rural culinary market. Based on this, this article aims to explore the efforts of the community in Lerep Tourism Village to reduce waste generation and how they play a role in a sustainable waste management system.

2. Method

This research applied qualitative case study [15, 16] as the research method. The data were collected in June-July 2022 with Lerep Tourism Village as the case study. Lerep is one of the tourist villages in Semarang Regency, precisely in West Ungaran District, Semarang Regency, Central Java. The majority of the people's livelihood is in agriculture with its main commodities, namely fruits, cassava, sweet potatoes and vegetables. Meanwhile, in the livestock sector, the main activity is dairy farming. In terms of data collection, the researchers interview key informants who were selected based on their capacity and knowledge related to this topic. The key informants are the representative of the local group concerning on tourism (called as pokdarwis / kelompok sadar wisata), manager of the TPS 3R (temporary waste station applying reduce, reduce, and recycle), and the representatives of local seller in the culinary market. Additionally, the researchers also applied naturalistic observation [17] to explore village's facilities related to waste management and community's activities related to this topic.

3. Results and Discussion

3.1. Characteristics of the waste

As a Tourism Village, the waste generated in Lerep Village is not only from household activities, but also from tourism activities. Household waste is generated from daily activities in each house. The characteristics of the waste lifted by the Lerep Tourism Village waste transportation services consist of organic waste, plastic, paper, glass bottles and metal. Organic waste that is transported such as leftover cooking activities, yard sweeping waste in the form of leaves. The daily amount of waste generated from household activities is around 70m³. Meanwhile, the characteristics of waste from tourism activities are mostly organic waste. This is because tourism activities in Lerep Village have reduced the use of plastic waste. In addition, inorganic waste such as drink bottles and plastic bag were also found which were brought and left by tourists during their visit to Lerep Village.

3.2. Community behaviors related to waste management

This research found that the community has already aware on the importance of protecting the environment, including in sustainable waste management. This is illustrated, among other things, by changes in the behavior of the people of Lerep Village in processing waste. Previously, people processed waste by burning it. However, after the socialization through the climate village program, they have realized that this activity can cause air pollution due to the waste burning process. Although the community already understand how to manage sustainable waste, in its application it has not been fully implemented by the people in the Lerep Tourism Village. Some of them still combine the waste and use

the plastic containers/bags. Hence, the willingness of the community to be actively involved ⁸ in the process of sustainable waste management is needed, especially in the process of reducing plastic waste, sorting waste from an early age and so on.

3.3. Village's facilities related to waste management

Facilities and infrastructure to support sustainable waste management in Lerep Tourism Village include:

3.3.1 Waste Transport Vehicles. The process of transporting waste in the Lerep Tourism Village has been integrated where waste transportation vehicle has been provided. The vehicle is motorbike tubs operated every two days.



Figure 1. Motorbike tubs to collect waste in Lerep Village

3.3.2. TPS 3R /Tempat Pembuangan Sementara (Temporary Waste Station applying 3R/reduce, reuse, recycle). The TPS 3R has been provided to manage waste sustainably. The TPS 3R of Lerep Tourism Village is named as TPS Sukaku Asri. Nowadays, this facility only covers one hamlet, namely Dusun Suko (Suko Hamlet). This TPS 3R implements a membership system in which people who are the members of this facility will be provided with a trash can in each house. In addition, TPS 3R Sukaku Asri has also provided garbage transportation services that will transport waste from each member's house and the operational costs come from members' fees. The Sukaku Asri 3R TPS has also been equipped with various tools to process waste such as chopping machines and so on.



Figure 2. TPS 3R /Tempat Pembuangan Sementara (Temporary Waste Station)

3.3.3. *Waste Bank.* The efforts to implement sustainable waste management in the Lerep Tourism Village are also supported by a waste bank facility that functions to collect sorted plastic waste from residents' homes to then be sold to collectors and some are also used as more economical products. The collection of plastic waste in the waste bank is only done once a week, which is every Sunday. The results obtained by residents from waste bank savings are up to Rp. 500,000 per month and able to help the local community's economy.

3.4. Mechanism of waste management

3.4.1 *Waste Collection.* Waste generated from household activities in Lerep Tourism Village is collected in front of each house. As for tourism activities, the waste generated from the culinary market attractions is collected by each trader in the trash cans provided at each trade stall. There is a communal 3R trash can provided at the culinary market for tourist visitors. However, based on the results of observations, there are still many visitors who throw garbage out of place.

3.4.2 *Waste Sorting.* Waste sorting is carried out by the community only separating plastic bottle waste from other waste. There is no further sorting such as sorting paper waste, organic waste and so on. Further sorting of waste is only carried out at 3R TPS.

3.4.3 *Waste Transportation.* Waste sorting is carried out by the community, only separating the waste resulting from household activities which has been collected by residents in front of their respective homes and then transported by waste transportation services to be taken to the TPS every two days. Meanwhile, the waste generated from tourism activities is partly transported directly by garbage collectors and partly transported by waste transport services provided by the BUMdes of Lerep Village. between plastic bottle waste and other waste. There is no further sorting such as sorting paper waste, organic waste and so on. Further sorting of waste is only carried out at TPS 3R.

3.4.4 *Tourism waste reduction.* The waste reduction carried out in the Culinary Market by replacing plastic goods with organic container, particularly from leaf. This strategy is a compulsory for the all sellers in this market. The aim of this program is to achieve zero plastic from tourism activities and also to improve the value and attractiveness of this culinary market.

2.5. Community Participation in the Waste Management

Community participation in waste management is the willingness of the community to help the success of the waste management program that has been determined according to their respective abilities without inflaming their own interests. Waste management in Lerep Tourism Village has empowered the community as the main actor.

3.5.1 *Waste Reduction.* The community in the Lerep Tourism Village reduces the use of plastic materials, one of which was in the tourist attractions of the rural culinary market. This effort is being made to replace plastic containers with banana leaves and teak leaves by traders who are local people of the Lerep Tourism Village. The existence of this concept itself is a special attraction for tourists because in addition to serving typical village snacks, it also teaches environmental care. Even though they already have an understanding of sustainable waste management, not many people are implicated in reducing plastic waste in their daily activities. In household activities, the villagers still use plastic because it is considered more effective and efficient.

3.5.2 *Waste Sorting.* The Lerep Village Government has conducted socialization to the community to start sorting waste from an early age from their respective homes. It aims to make people aware of the types of waste. However, in practice, only a small part of the community has started sorting waste from their respective homes. The form of sorting that is carried out is not comprehensive, where people only

separate plastic bottle waste to be saved in a waste bank. According to the community, the existence of the 3R TPS makes it no longer necessary to sort waste from the house. The lack of public interest in sorting waste is very unfortunate because if it has been implemented thoroughly it can make it easier for 3R TPS managers at the next processing stage.

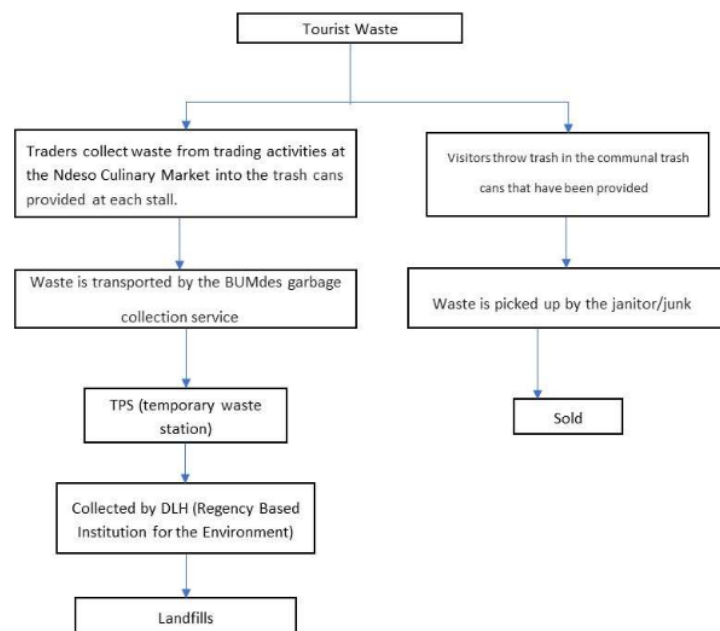


Figure 3. Mechanism of tourism waste management in Lerep village

3.5.3 Waste Recycle. Through the waste bank provided by BUMdes, the people of Lerep Tourism Village, especially mothers and young women, are empowered to recycle plastic waste into more economical goods. Products resulting from recycling activities are fruit baskets, shopping baskets, mats and so on. The product is then marketed through BUMdes where the results are able to help the community's economy, one of which is to cover the cost of health insurance. However, for organic waste both generated from tourism and household activities, it has not been recycled by the community.

3.6. Challenges in implementing solid waste management in Lerep Tourism Village

Based on the interviews with the informants and observation in the field, there are two main challenges in implementing solid waste management in Lerep Village. Those challenges are:

- The people of Lerep Village have not been fully engaged in the implementation of this concept. Initially, the community was expected to routinely sort waste from their households before it was taken to the 3R TPS, but in reality, the community was reluctant to do this with the assumption that the waste would be sorted at the 3R TPS. Based on the interview with the representative of *pokdarwis* and the manager of the TPS 3R, only 10-15% of the community are actively involved in

this program. The community's willingness to be active will affect the time and costs that must be spent at 3R polling stations. In addition, not all communities are willing to pay regular fees for waste management. Various things can be the cause of this community's reluctance, including the assumption that waste is leftover goods that must be disposed of and also the assumption that people can process their own waste, either through making compost from organic waste and burning un-organic waste.

- TPS 3R operations are not yet independent as expected. The operational funds referred to waste transportation vehicles, staff salaries, and unexpected budgets. However, based on the results of interviews, the money generated from TPS 3R activities, both from villagers' fees and from sales of TPS 3R products, often still cannot cover routine operational costs that must be incurred, so they must be subsidized from the village funds managed by BUMDes.

In order to overcome this challenge, the government can increase efforts to empower the community through socialization from the lowest level of community, such as groups of women in the neighborhood to the wider level, such as meetings in the village level. Additionally, the manager of waste bank can seek for collaboration with private sector to buy the sorted waste from the community. This strategy can increase the value of sorted waste and make waste bank program more interesting for the community.

4. Conclusion

The waste management system in the Lerep Tourism Village has begun to pay attention to the concept of sustainability and is integrated by empowering local communities. It aims to support the realization of a sustainable tourism village. The community as the main actor has an important role in its implementation [9, 10]. The efforts made by the people of Lerep Tourism Village are to reduce waste burning, sorting plastic bottle waste for further savings in a waste bank, paying waste fees and recycling plastic waste through a waste bank. Although it has not been fully implemented, the efforts that have been made by the community have been able to have a good impact on the environment such as reducing air pollution and also an initial step to implement the concept of circular economy in the tourism activities [18] at the community level. In the future, the local government, particularly BUMDes and *pokdarwis* as the main actors in the development of this village can empower more people in this community-based waste management through outreach activities, improving the performance of waste banks, and scaling up strategies implemented in the culinary market at other tourist attractions.

Acknowledgement

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