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Tourist's willingness to pay toward waste management in Gunung Salak Endah Tourism Area, Bogor District

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Abstract. *Gunung Salak Endah (GSE) Natural Tourism Area is one of the tourism destinations in the conservation area of Mount Halimun Salak National Park, which is located in Bogor District. GSE is easy to reach, whether from Bogor or Jakarta. GSE has various beautiful natural destinations such as Cigamea Waterfalls, Kondang Waterfalls, and hot spring, attracting many visitors. The number of visitors keeps increasing every year, and in the end, it causes an environmental problem: i.e., waste generation. The objectives of this study are (1) to analyze tourist perceptions regarding current and future waste management in the GSE natural tourism area and (2) to calculate the tourist's willingness to pay related to the implementation of tourist-based waste management in GSE natural tourism area. This study used a Likert scale data collection method and Contingent Valuation Method (CVM). The tourist's perception regarding waste management in the GSE natural tourism area shows positive results where tourists are willing to manage their waste with deposit refund.*

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INTRODUCTION

Mount Halimun Salak National Park (*Taman Nasional Gunung Halimun Salak*, in Bahasa; written as TNGHS hereafter) is one of the national park regulated as a conservation area. It plays an important role as a life support system with focused management to sustain a typical and unique west java mountain forest ecosystem with high biodiversity (Ekayani, 2014). The national park itself as a conservation area must have an original and complete ecosystem as its protection and conservation aspects, managed by a zoning system, utilized for research, knowledge, education, supporting cultivation, tourism and recreation. For that reason, TNGHS is a national park operating a selected of its area as natural tourism location. Natural tourism destinations of TNGHS with high visitors' interest are in Mount Salak Endah (*Gunung Salak Endah*, in Bahasa; written as GSE hereafter) area.

GSE natural tourism area is one of the long developed natural tourism areas in Bogor District. The access route to GSE natural tourism area is sufficiently convenient and not too far from the Capital City of Jakarta. GSE natural tourism area offers several beautiful natural destinations, for instance, Cigamea Waterfalls,

Kondang Waterfall, and hot spring. Having many offered destinations makes visitors' interest increases yearly toward GSE natural tourism area. In 2019 visitors in GSE natural tourism area are 167 969 people (BTNGHS, 2020). Most of these visitors are national tourists. The development concept offered by the GSE natural tourism area management focuses on combining beautiful sceneries and natural tourism activities. Due to these natural tourism activities caused by the development of GSE natural tourism area, there is a possibility of emerging environment quality problems. The problem intended to be discussed here is the pile of waste generated by tourists' activities.

The waste problem is still crucial and is an urgent problem for Bogor District Government to be solved. The number of waste keeps piling up, not only in tourist areas but also in the residential area. According to the Environment Agency of Bogor District data in 2019, the waste volume produced is 2 850 tons per day. Nevertheless, only 700 tons of waste per day is transported, while the remaining 2 150 tons of waste is piled up in the waste station. Up to now, waste management in tourism areas has still become a problem. For instance, in March 2018, in Nusa Penida, area of Bali, people around the world can see how dreadful the sea condition in Bali is due to plastic waste. It was shown in a video recorded by an England diver (Horner, 2018).

Moreover, according to Jambeck *et al.* (2015), Indonesia is the second world plastic waste producer in the sea around tourism locations, reaching 187.2 million tons, following China reaching 262.9 million tons. According to the Environment Agency of Bogor District in 2019, waste produced in tourism areas is 241 tons per day, consisting of waste from the trash can and scattered waste in several tourism locations (DLH Bogor Regency, 2019). This waste problem must not be disregarded because slowly, it can become a ticking bomb for the sustainability of living creatures and the tourism sector, particularly tourism areas in a national park located in Bogor District.

Up until now, waste management in GSE natural tourism area is conducted by collecting, transporting, and throwing waste. In the field, GSE natural tourism area already has waste management elements. Nevertheless, all these elements cannot operate optimally, and the culture of Indonesians for being ignorant of their waste management supports the problem more. This tourist's ignorance culture in managing their waste becomes a serious problem that can pollute the environment of GSE natural tourism area. Furthermore, in the future, it may endanger the sustainability of conservation functions in tourism areas.

Therefore, the concept of polluter pays principle (PPP) for tourists is required to be implemented to make them responsible for their waste. Law No. 18 of 2008 on waste management states that waste management is not solely the government's obligation. Thus, one of the tourist-based waste management activities that can be implemented is a deposit refund system. This system is carried on by asking tourists to pay a certain amount of money as a security deposit in advance for the potential waste incurred in the tourism area. This security deposit will be refunded if the tourists return their waste to the collection point near the exit door of GSE natural tourism area.

Based on the aforementioned problem, it is necessary to condition tourists in order to make them have concern and attitude to be responsible in managing their waste. Consequently, this study aims to identify and explore tourists' perceptions toward waste management plans in GSE natural tourism area, utilizing a deposit refund system and measuring tourists' willingness to pay toward the amount of security deposit of their potential produced waste.

METHODS

Location and Time of Study

This study was conducted from October to December 2019, before COVID-19 pandemic. The GSE natural tourism area of TNGHS of District Bogor became the field of this study. Cigamea Waterfalls, Kondang Waterfalls, and hot spring were chosen purposively due to the high number of tourists visiting these three locations.

Data Collection Method

We used the survey method in this study. The survey was conducted as follows: observation in the field; interview using questionnaire toward tourists as respondents; an in-depth interview with key person; and literature study regarding waste management. Our respondents are 100 persons, they are tourists visiting GSE natural tourism area, and four key persons as follow: Head of Environment Agency of Bogor District; Head of Tourism Agency of Bogor District; Head of Mount Bunder Resort; and Head of Lokapurna Green Cooperative. To determine the number of respondents, we used purposive sampling. Samples were chosen on purpose based on particular consideration, based on demography aspect, how they reach the tourism area, and their tourism intention (Suharsaputra, 2012). From those three locations, 33 respondents were obtained from Cigamea Waterfalls; 34 respondents were obtained from Kondang Waterfalls, and 33 respondents were obtained from Hot Spring. In this study, we focused on obtaining the data from tourists because the merchants in the locations have managed their own waste.

Data Analysis Method

Perception Analysis of Tourist

Perception analysis of tourists was conducted to identify the implementation potency of the deposit refund system. Perception data was made as a percentage to measure tourists' attitudes, opinions, and perceptions regarding the social economy and environmental phenomena happening (Halumiah *et al.*, 2014). The tourist's perception of handling waste management using a deposit refund system in the GSE natural tourism area was measured using a Likert Score. Scores in the questionnaire used 1-5 Likert scale (1=strongly disagree; 2=disagree; 3=uncertain; 4=agree; 5=strongly agree (Budiaji, 2013). The indicator of respondent's perception was obtained by asking 7 questions or questions with a maximal value is 35, and a minimum value is 7, having an interval per category 5.6 (see Table 1). The average of tourist score was obtained by multiplying tourist's attitude with score frequency (number of respondents was multiplied by number of questions/statements) then dividing by number of respondents.

Table 1 Scale of tourists' attitudes

No	Attitude	Score	Category
1	Strongly agree	5	>29.4-35.0
2	Agree	4	>23.8-29.4
3	Uncertain	3	>18.2-23.8
4	Disagree	2	>12.6-18.2
5	Strongly disagree	1	7.0-12.6

Source: Modification result of Likert Scale (Tiga, 2018)

Analysis of Tourist's Willingness to Pay toward Deposit Refund System

We measured Willingness To Pay (WTP) value toward security deposit of deposit refund system to determine the favorable amount of security deposit imposed in response to waste potency produced by tourists. In measuring WTP value, we used Contingent Valuation Method (CMV) Method. Thus, there are three steps in measuring WTP value (Fauzi, 2006), as follows: (1) construct mortgage market scenario; (2) obtain the offering amount of WTP value; and (3) estimate average of WTP value (EWTP). Further explanation of these steps is described as follow:

a. Mortgage Market Construction

   Mortgage market built in this study is illustrated as follows: "Tourism activity in GSE natural tourism area provides positive and negative effects. The positive effect is economic benefit and employment for local residents, while the negative effect is pile of tourism waste in the form of solid waste that can cause

environmental problem. To solve this problem, one program that can be implemented is a deposit refund system. This system is implemented by making tourists pay a certain amount of money as a security deposit in advance, assuring that they will not pollute the area by littering. If tourists keep their waste during their activities in GSE natural tourism area and return it to the waste collection point, their security deposit will be refunded. This deposit refund system is an effort conducted by management of GSE natural tourism area to change tourists' ignorance attitude toward their responsibility in managing the waste they produce. In order to succeed and sustain the objective of tourist-based waste management, tourist involvement is necessary as source of funds for deposit refund system. If this scheme is implemented in GSE natural tourism area, are you (tourists) willing to pay security deposit? If you are willing, how much the deposit you will be paid as assurance of your waste produced?".

b. Offering Value of WTP
   Open-ended questions method was used to obtain value of WTP of tourists in GSE natural tourism area. Respondents freely stated the amount of money they were willing to pay maximally. Therefore, we obtained answers and specific numbers reflecting respondents' willingness without external influence.
c. Average Value of WTP
   The obtained WTP value thus is counted to obtain its average using this formula (Fauzi, 2014):

$$EWTP = \sum_{i=1}^{n} \frac{Wi}{n}$$

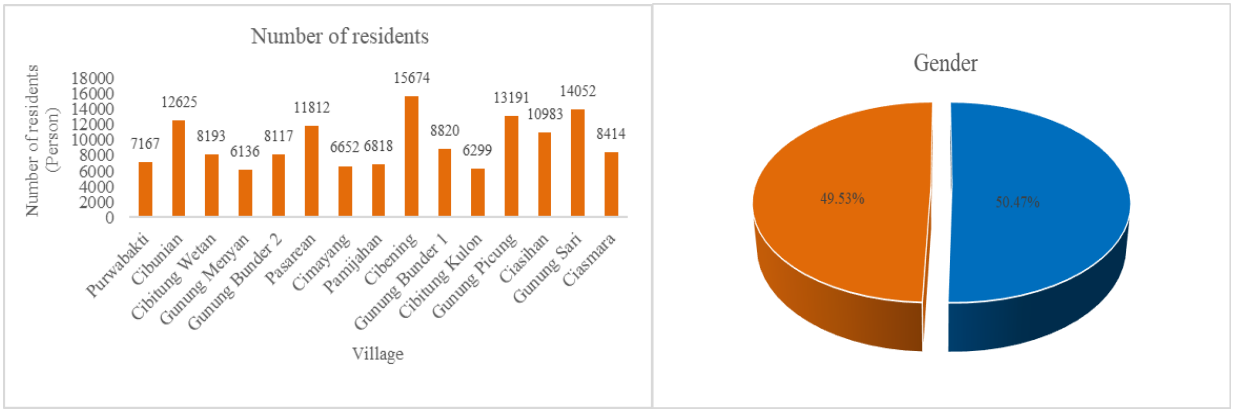
EWTP : Estimated average of WTP,
Wi : the i WTP value,
n : the number of respondents,
i : the respondent willing to pay (i=1,2,3, …n)

RESULTS AND DISCUSSION

General Description of Gunung Salak Endah Natural Tourism Area

Social Economic Characteristics of Society

Gunung Salak Endah natural tourism area is located around six villages (Gunung Sari, Gunung Bunder 2, Gunung Picung, Ciasmara, Ciasihan and Pamijahan Villages) under Pamijahan Sub-District and District Bogor, 25.16% of people of Sub-District Pamijahan are farmers or ranchers. It shows that people in Pamijahan Sub-District utilize natural resources directly due to most of the agricultural area available. Therefore, people's dependency on natural resources also is high.



Source: Pamijahan Sub-District in number in 2019 (BPS, 2019)
Figure 1 Number and gender proportion of residents in Pamijahan Sub-District in 2019

Based on monograph data of Pamijahan Sub-District in 2019, total number of residents in Pamijahan Sub-District is 144 953 persons or 37 346 families consisting of 73 164 male and 71 789 female residents. The number of male residents is higher than female residents, thus we obtained 102% sex ratio. Meanwhile, almost half of residents in GSE natural tourism area are from Pamijahan Sub-District consisting of 6 villages from total of 15 villages (see Figure 1).

Social Economic Characteristics of Respondents

We can see the characteristics of respondents visiting GSE natural tourism area based on a survey conducted on 100 respondents. General characteristics were obtained from several variables consisting of gender, marital status, age, education level, occupation, income level, and domicile. The percentage of male tourists on GSE natural tourism area is higher than female tourists, 61% and 39%, respectively. It underlies men who prefer natural tourism activities, pumping their adrenaline. Most of the respondents are 17-50 years old, and they are still able to fulfill their needs or society. Here is the more detailed age distribution: 74% of tourists are in productive age (20-30 years old); 13% of tourists are 31-40 years old; and 4% are 41-50 years old. From these findings, we can see tourists' good potency in improving the sustainability of natural tourism areas by implementing tourist-based waste management with a deposit refund system.

Most respondents finished their high school or equivalent education (53%). Therefore we can conclude that tourists in GSE natural tourism area have a good enough educational background. High people's education level will improve society's knowledge regarding waste management (Notoatmojo, 2007). With their knowledge, tourists have higher awareness to maintain environmental sustainability from the waste that they produce. Their highest level income is around 2-5 million rupiah (39%), and their smallest is from 500 thousand to 1 million rupiahs (3%). Adequate income level is expected to be able to influence the way they manage their waste better, compared with they have lower income level. We assumed that the high income of a family is expected to have a better education level in the family. Thus, the relationship between income and education will better implement waste management in the surrounding environment, particularly in a natural tourism area.

Tourist's Perception Toward Waste Management in Natural Tourism Area

Tourists' intention to participate in managing waste in GSE natural tourism area is a necessary aspect in tourist-based waste management. In the process, society must be involved in every step, starting from the planning step, implementation, and monitoring step, to achieve local society empowerment in all aspects of waste management (Yudhiantari, 2002). Positive perception will encourage society to support the planned management, while negative perception will discourage society from supporting the planned management, particularly tourism waste (Sharpley and Telfer, 2014). Therefore in order to obtain society's opinion, especially tourists, regarding waste management in GSE natural tourism area, we asked seven questions and statements to analyze tourists' perception (see Table 2).

According to questions/statements regarding tourists' perception in GSE natural tourism area, respondents agree with tourist-based waste management in the tourism area (see Table 2). It is in accordance with the high acknowledgment of most respondents regarding waste in GSE natural tourism area are solid waste (94%). Thus, waste produced by natural tourism activities can deteriorate the quality level and beauty of the environment (92%). Tourists also agree if tourist-based waste management with deposit refund system is implemented to solve the problem caused by solid waste (85%). Moreover, tourists also agree if a deposit refund system is implemented by paying a security deposit in advance. Hence they will not litter (82%).

A deposit refund system is conducted by making tourists pay certain amount of money as a security deposit and ensuring their waste produced by package of food and drink that they consumed will be brought until they reach the waste collection point near exit door to be thrown according to the type of waste. Should the waste be thrown according to its type, the security deposit will be refunded and vice versa. The balance of

the deposit fund will be used for paying the employees managing the waste left by tourists in a natural tourism area. Hence, a deposit refund system is an implementation concept of polluter pays principle for tourists and payment for ecosystem services for employees managing waste. This system is in accordance with Ekayani *et al*. (2019) stating that tourism activities can encourage the participation of society toward conservation in TNGHS, especially in GSE locations.

Table 2 Tourist's perception toward tourist-based waste management in GSE natural tourism area

Indicator	Respondent percentage (%)				
	SD (1)	D (2)	U (3)	A (4)	SA (5)
1. There is a pile of waste in GSE natural tourism area	0	64	1	33	2
2. Most of waste in GSE natural tourism area is solid waste (inorganic)	0	3	0	94	3
3. The pile of waste was produced by GSE natural tourism activities	0	6	0	89	5
4. The waste produced by natural tourism activities can deteriorate quality level and beauty of environment	0	0	0	92	8
5. What is your opinion if management of GSE natural tourism area intends to implement tourist-based waste management using deposit refund system?	0	10	2	85	3
6. Tourist-based waste management with deposit refund system is an efficient way to solve solid waste problem produced by tourists	0	11	3	83	3
7. Are you willing to pay security deposit for tourist-based waste management using deposit refund system?	0	9	3	82	6
Total	0	103	9	558	30
Average	0	15	1	80	4

Explanation: SD: strongly disagree; D: disagree; U: uncertain; A: agree; SA: strongly agree

We measured tourists' perception to show the restoration on components becoming the indicator in order to maintain quality of environment in GSE natural tourism area. Good quality of environment is where a condition of an environment consisting of biotic component (animals, plants, and human activities) and abiotic components (water, air, and sunlight) equally and mutually interconnected among ecosystems (Octaria *et al*., 2017). Positive tourist's perception in GSE natural tourism area also is followed by their intention to be involved in waste management of tourism waste that will be implemented for environmental sustainability (see Table 3).

Table 3 Evaluation of tourist's perception in GSE natural tourism area toward tourist-based waste management

No	Attitude Category	Score	Average of Total Respondents[a]	Score Frequency	Average Score
		a	b	c =bx7[b]	d=(a)x(c) /100[c]
1	Strongly Agree (29.4-35)	5	4	28	1.40
2	Agree (23.8-29.4)	4	80	560	22.40
3	Uncertain (18.2-23.8)	3	1	7	0.21
4	Disagree (12.6-18.2)	2	15	105	2.10
5	Strongly Disagree (7-12.6)	1	0	0	0.00
Total			100	700	26.11

Deposit refund system can be implemented as one of management systems in GSE natural tourism area. This system is expected to develop responsibility and awareness senses on tourists toward environmental sustainability. It is in accordance to the study conducted by Hasanah *et al*. (2019) stating that society's involvement in Mount Tangkuban Perahu Natural Tourism Park (Taman Wisata Alam Gunung Tangkuban Perahu, TWAGTP hereafter) is the key for sustainability of conservation area management through conservation activity. Awareness toward environment is not only by not littering but also concern environmental sustainability in natural tourism area. The result of analysis of likert scale regarding tourist's perception on tourist-based waste management in GSE natural tourism area can be seen in Table 3.

In general, the score result in Table 3 shows positive tourist perception by having the highest score of 26.11, meaning that tourists agree to support waste management in GSE natural tourism area. Though there are respondents who are uncertain and disagree with a score of 0.21 and 2.10 consecutively, it may be caused by tourists' lacking knowledge relating to tourist-based waste management and having a low perception and attitude toward environmental sustainability. Lack of understanding of information regarding waste management also is an important factor in determining someone's habit or attitude in managing waste (Mulasari, 2012). Hence, tourists' perception involves conserving the tourism environment. Masjhoer (2018) states that tourists' perception of waste management needs to be measured to identify the implemented waste management has relation with tourists' satisfaction when doing activities in natural tourism areas.

Tourist's Willingness to Pay toward Deposit Refund System

Tourists' willingness or unwillingness to pay is needed to be measured to estimate their willingness in participating tourist-based waste management using deposit refund system. We obtained willingness to pay 87% out of 100 respondents for the tourist-based waste management, and only 13% of respondents are unwilling to pay (see Figure 2). It shows that a deposit refund system can encourage tourists to be responsible for their waste directly. The adequate facility also influences tourists' response and participation in waste management and environmental hygiene (Amasuomo *et al*., 2015). Enforcement of regulations conducted by authoritative parties can also encourage tourists to manage their waste (Dhokhikah *et al*., 2015).

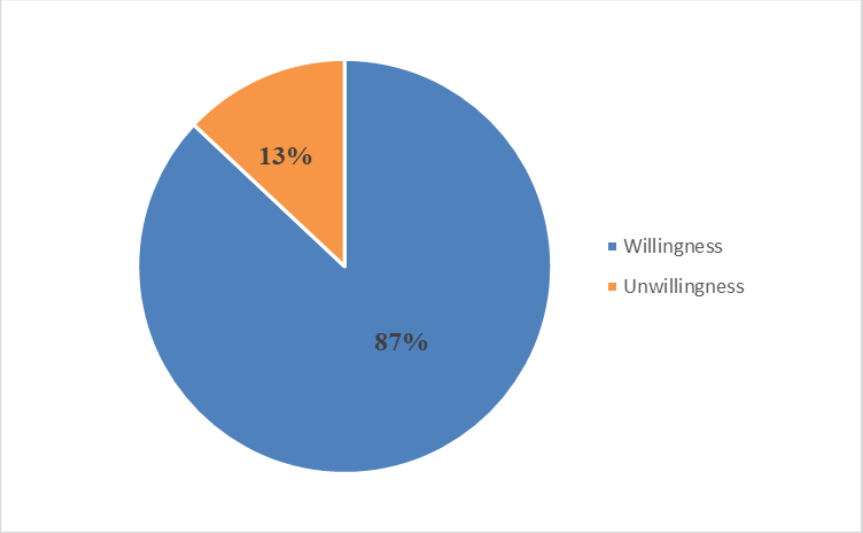


Figure 2 Willingness and unwillingness of respondents to pay security deposit of deposit refund system

After conducting two primary steps in CVM, constructing mortgage scenario and offering WTP value, the next step is estimating WTP value (EWTP) of respondents toward the deposit refund system. We can see the result of offering WTP value and average of WTP value for each type of waste produced by tourists consisting of plastic, metal, paper, and glass waste in Table 4. There are founded differences in average of

WTP from each type of waste in Table 4. Thus, to be able to determine the amount of money in deposit refund system we have to round the values. Moreover, this rounding can ease tourists in paying the security deposit for each type of waste before doing tourism activities (see Table 5).

Table 4 Average of value distribution of willingness to pay for every type of waste

WTP Value (Rp/item/person)	Respondents Votes (person)	Percentage (%)	Average of WTP (Rp)
Plastic			
4 000	24	27.59	1 103
4 500	10	11.49	517
5 000	27	31.03	1 552
6 000	10	11.49	690
7 000	6	6.90	483
10 000	8	9.20	920
15 000	2	2.30	345
Total	87	100.00	**5 609**
Metal			
5 000	4	4.60	230
8 500	27	31.03	2 638
9 000	10	11.49	1 034
9 500	19	21.84	2 075
10 000	4	4.60	460
10 500	12	13.79	1 448
11 500	6	6.90	793
15 000	5	5.75	862
Total	87	100.00	**9 540**
Paper			
1 000	4	4.60	46
2 000	6	6.90	138
3 000	18	20.69	621
3 500	11	12.64	443
4 000	16	18.39	736
5 000	16	18.39	920
6 000	5	5.75	345
9 000	11	12.64	1 138
Total	87	100.00	**4 385**
Glass			
500	37	42.53	213
550	1	1.15	6
600	13	14.94	90
700	10	11.49	80
800	4	4.60	37
1 000	17	19.54	195
1 500	1	1.15	17
2 000	4	4.60	92
Total	87	100.00	**730**

Explanation: *n= 87 (number of respondents)

Table 5 Rounding value of average of WTP in deposit refund system

Type of Waste	Average of WTP (Rp/pcs)	Rounding of Average of WTP (Rp/pcs)
Plastic	5 609	5 000
Metal	9 540	9 000
Paper	4 385	4 000
Glass	730	700

According to Table 5, various WTP values of each type of waste produced by tourist were obtained, as follow: Rp 5 000 (for plastic waste); Rp 9 000 (for metal waste); Rp 4 000 (for paper waste); and Rp 700 (for glass waste). It shows high tourists' willingness to pay security deposit for each type of waste. We assume that the high WTP underlies their perception regarding throwing non-degradable waste to environment. By determining the amount of money for the security deposit, it is expected to change tourists' culture of being ignorance to their responsibility for managing their waste. Based on the polluter pays principle, tourists who litter in tourism area may cause environmental pollution. Hence, we need to measure the favorable estimation of the deposit-refund system with the average of tourists' WTP.

The estimated total value calculation of the deposit refund according to the average WTP of tourists in the application of the deposit-refund system is to find out the deposit refunds when it is not redeemed at the exit gate. Based on the calculation, the estimated total deposit refund value for all types of waste is Rp 896 141 606 (Table 6). Table 6 shows the highest estimated deposit refund value of Rp 554 814 510 for plastic waste and the lowest of Rp 5656.18 for glass waste. Therefore, it can be assumed that the high WTP of tourists for plastic waste is due to the perception of tourists who know that the generation of plastic waste has more potential value. Thus, tourists are aware of the importance of limiting the amount of plastic waste that will be disposed of in tourism sites.

Based on Table 6, the estimated value that has been obtained can later be allocated as funds for the implementation of waste management with a deposit refund. When the deposit-refund system is implemented, the funds obtained can be used as additional funds for cleaning staff incentives, but it is hoped that more tourists are willing to take back the security deposit. This is intended to change the lifestyle of tourists in managing waste at the site. Another factor that needs to be considered is that management activities with a deposit refund system can also reduce negative externalities that can disrupt the ecosystem, beauty, and comfort. This externality has the potential to reduce the number of tourist visits, so tourism activities become unsustainable (Inayah and Istiqomah, 2020).

Table 6 Estimation of implementation of deposit refund system according to average of WTP of respondents

Type of Waste	WTP Value (Rp/item/person) a	% Composition of Each Type of Waste (%) b	Amount of Waste for Deposit Refund (kg/person) c = b x e* x N*	Deposit Refund Estimation (Rp) d = a x c
Plastic	5 000	37.49	110 963	554 814 510
Metal	9 000	2.37	7015	63 132 534
Paper	4 000	23.02	68 135	272 538 384
Glass	700	2.73	8 080	5 656 178
			Total	896 141 606

Explanation: e*= 0.05 kg/day (amount of waste/tourist in three tourism locations); N*= 59 196 person (number of tourist's willing to pay in three tourism locations in 2018).

CONCLUSION

Tourists' perception regarding waste management in GSE natural tourism area shows a positive result, in which they are willing to manage their waste using a deposit refund system. The willingness to pay the security deposit of this deposit-refund system in the GSE natural tourism area shows that most of them support this activity. The willingness to pay for every waste is as follows: Rp 5 000 per piece for plastic waste; Rp 9 000 for metal waste; Rp 4 000 for paper waste, and Rp 700 for glass waste. Therefore, according to these results, tourists' perception and willingness to pay value, deposit-refund system in GSE natural tourism area is feasible to be implemented, and tourists are likely to manage their waste.

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