Beachgoers' Knowledge, Perceptions, and Willingness to Pay for Sustainable Waste Management in Kuakata Sea Beach, Bangladesh

Md. Al Amin*† iD **and Md. Tanvir Ahmed**** iD

*Department of Agricultural and Applied Economics, University of Georgia, Athens, GA 30602, United States of America
**Department of Economics, University of Barishal, Barishal-8254, Bangladesh
†Corresponding author: Md. Al Amin; ma99587@uga.edu

ABSTRACT

With rising public awareness and concern for environmental sustainability, calls for nature-friendly marine and beach litter management have grown louder. This study, employing logistic and ordinary least square regressions, explores tourists' knowledge, perceptions, and willingness to pay (WTP) using data (n = 400) collected from Kuakata Sea Beach, Bangladesh. Results showed that approximately 99% of the respondents recognize the urgency for further development in the waste management system, while 53% are aware of it. Gender is identified as a statistically significant factor impacting beachgoers' WTP – males are willing to pay more. Besides, visitors with higher incomes demonstrate the willingness to pay more. Additionally, 37% of the respondents think that appropriate information dissemination and raising awareness are critical to confronting this problem, and another 38% recommended proper placement of dustbins on the beach. These outcomes can be very useful in designing any relevant policies for promoting sustainable beach waste management.

INTRODUCTION

Tourism plays a crucial role in generating Income and contributes immensely to the economic development of the countries around the globe. Tourism is frequently considered an essential mechanism for a country's economic expansion and societal evolution (Brida & Risso 2009), boosting the economic well-being of the local population (Tang & Tan 2015). Many nations have established tourist hotspots and generated significant foreign currency from tourism earnings, as the World Tourism Organization (UNWTO 2019) reported, accounting for 29% of global service exports and 7% of overall exports of goods and services. Globally, tourism significantly contributed to the economy, accounting for 10.3% of GDP in 2019, the pre-covid time. In recent years, the tourism industry in Bangladesh has shown significant growth, which has boosted the country's economy. The number of foreign tourists visiting Bangladesh increased by 13.6% in 2019, with a total of 2.1 million visitors compared to 1.9 million in 2018 (Bangladesh Tourism Board 2019). The overall contribution of travel and tourism to Bangladesh's GDP was approximately BDT 809.6 billion, equivalent to 4.7% of the country's total GDP. This figure is anticipated to continue to grow annually by 6.4%, reaching BDT 1,596 billion, equivalent to 5% of the total GDP by 2026 (WTTC 2015).

Kuakata Sea Beach, the second longest sea beach in Bangladesh, is considered one of the country's most popular tourist destinations and has seen a significant surge of domestic and international travel enthusiasts, vacationers, and beachgoers recently. Despite its positive economic impact, tourism exerts a huge negative environmental burden on local ecosystems and poses serious threats to environmental sustainability. Tourism's consumption of natural resources in popular destinations can lead to dire social and environmental catastrophes (Camarda & Grassini 2003). With increased tourist activities, a large amount of waste is generated, contributing to global climate changes and public health challenges as the tourism sector acts as a primary source of CO_2 emissions, particularly in low-income countries (Haseeb & Azam 2021). According to research conducted by the UN Environment, the tourism industry's consumption of vital resources, such as water and energy, is increasing in proportion to its production of solid waste, including marine plastic pollution, sewage, greenhouse gas emissions, and biodiversity loss. Due to our addiction to plastics, some of the world's most stunning beaches have encountered dire consequences (UNEP 2021). Numerous beaches in Bangladesh, including Kuakata, have been inundated with piles of plastic waste. Kuakata Beach has been losing its potential as a tourist attraction because of plastic pollution and the disappearance of livestock resulting from

uncontrolled tourism (The Business Standard 2021). The lack of appropriate waste management practices in Kuakata has led to significant environmental deterioration, including the accumulation of solid waste, which can negatively impact the tourism industry and local community. Consequently, waste management has surfaced as a critical issue for sustainable tourism in this area.

Understanding tourists' willingness to pay (WTP) for sustainable waste management at Kuakata Sea Beach can offer valuable insights into the demand for environmental services and the potential for financing sustainable tourism management and promotion. WTP is a metric that gauges the maximum amount of money an individual is willing to spend on a specific good or service, indicating the perceived value of that good or service. Sustainable waste management at Kuakata Sea Beach is an intricate dilemma involving multiple stakeholders, tourists, residents, businesses, and government entities. Unfortunately, the lack of appropriate infrastructure and awareness among tourists and locals has led to greater environmental catastrophes in this area.

Despite extensive global research, there has yet to be research on tourists' WTP for sustainable waste management, specifically in Bangladesh's Kuakata and other sea beaches. This knowledge gap poses a grave challenge for policymakers and stakeholders in developing effective, pragmatic, and nature-friendly regional waste management systems and policies. Therefore, the implementation of sustainable waste management practices at tourist destinations such as Kuakata is crucial for preserving the environment quality and sustaining the tourism industry. In this study, our goal is to identify the factors influencing tourists' attitudes and behaviors towards sustainable waste management in the context of a developing country and provide recommendations for promoting sustainable waste management practices in tourist destinations across Bangladesh. This research delves deeper into tourists' knowledge, perception, and willingness to pay for sustainable waste management at Kuakata Sea Beach in Bangladesh using the Contingent Valuation Method (CVM). Additionally, this study examines various factors influencing tourists' WTP, including demographic characteristics, travel patterns, and environmental literacy, and their implications for fostering sustainable development in the tourism sector in the country.

Never before has the world experienced this kind of precarious environmental challenge. As public awareness and concern for the environment has grown, the issue of marine and beach litter has become more prominent. This type of litter, mainly composed of plastics, originates from various types of waste and can pose considerable dangers to wildlife and humans. Current recycling policies are deemed insufficient to address this issue, necessitating a global approach to prevent oceanic waste. Studies have highlighted plastics as the primary contaminant in Bangladeshi marine ecosystems, underscoring the significance of coastal management strategies. A sustainable waste management system is increasingly crucial in tourism, especially in renowned tourist destinations like Kuakata Beach Beach, Bangladesh. The impact of waste management approaches on the environment and the tourism experience is explored in a wide range of global studies and reports. Kaza et al. (2018) present an overview of the global solid waste management issue, shedding light on the magnitude of this issue. According to Agyeiwaah et al. (2017), sustainable tourism is defined by key indicators that offer valuable insights into waste management practices.

Moreover, studies conducted by Torres-Delgado & Saarinen (2017) provide us with the frameworks for assessing sustainable tourism development. Furthermore, Budeanu et al. (2016) offer frameworks to evaluate sustainable tourism development and identify the associated challenges and opportunities. Pan et al. (2018) highlight the advancements and hurdles in sustainable tourism, focusing on its contribution to a green economy and offering relevant context. To gain a local perspective, Islam (2015) and Mondal (2017) explore sustainable tourism strategies in Bangladesh. Additionally, studies by Das et al. (2019) and Rodić & Wilson (2017) underscore solid waste management challenges and governance issues, serving the need for researching sustainable waste management practices at Kuakata Sea Beach in Bangladesh.

Liu et al. (2019) find that 80.8% of tourists are willing to pay to safeguard beach tourism resources in Qingdao and China, with factors such as gender and frequency of travel significantly influencing their willingness to pay. The researchers estimate the non-use value of beach tourism resources in the region to be $0.8 billion. Another study conducted by Halkos & Matsiori (2012) examines various factors that affect people's willingness to pay for enhancing coastal zone quality, such as environmental and recreational activities. The study emphasizes that previous experience of participation in environmental protection programs and individual characteristics, such as Income and age, significantly impact the willingness to pay. According to Rodella et al. (2019), tourists are willing to pay an average of €14.84 per year per user to preserve beach quality on Italian beaches, with natural beaches having the highest value. The study also found that beach typologies, level of urbanization, and lack of knowledge of beach management and related issues influenced tourists' WTP.

Moreover, the findings from contingent valuation and

choice experiment models to evaluate the social costs of marine litter in China demonstrated that visitors' willingness to pay for removing marine litter ranged from USD 0.12-0.20 per person, whereas the social costs of marine litter varied from USD 1.00-1.40 per person, indicating 8-14% of the beach entrance fee. This study highlights the importance of additional entrance fees and environmental strategies that prioritize quality and incentives to encourage volunteerism. The results showed that over 70% of the respondents were willing to pay for environmental preservation, and the amount varied based on beach quality. However, a lack of trust in the fee collection agency and uncertainty about how money will be used can discourage individuals from contributing (Peters & Hawkins 2009). Al-Amin et al. (2021) analyzed wetland ecosystem services in northeastern Bangladesh by studying the perspectives of local experts and the community. They found that these services met the diverse needs of nearby communities. However, only 25% of the respondents expressed an interest in cash payments for conservation, while 45% were willing to contribute through volunteering.

International tourists' perspectives on beach cleanup exercises should be addressed despite their contribution to and impact on beach litter. A total of 685 tourists are surveyed in Ghana to examine their perceptions of beach litter and willingness to participate in cleanup activities. The results show that tourists have negative perceptions of the impact of litter on health, recreation, aesthetics, and the environment. Factors such as age, gender, education, travel party status, and environmental values significantly influence the willingness to participate. This study highlights the need to involve tourists in beach litter management at coastal destinations (Adam 2021). Tourists can influence the sustainability notion of popular tourism attractions significantly. Their knowledge, awareness, and perceptions about sustainable waste dumping practices can deeply shape their actions and expectations towards the destination. For example, a study conducted by Lee and Jan (2015) finds that visitors who have positive experiences in a destination tend to adopt pro-environmental attitudes and biospheric values, meaning that they are more likely to engage in environmentally responsible behavior, like disposing of, recycling, and minimizing their waste in a nature-friendly manner. A separate investigation conducted by Hall et al. (2016) found that tourists' perceptions of sustainable practices within the hospitality and tourism management industry can enormously impact their decision-making activities. For instance, tourists who are aware of the environmental impacts of single-use plastics might be inclined to choose hotels that offer reusable water bottles. Siyambalapitiya et al. (2018) also highlight the importance of green human resource management in advancing sustainability within the tourism sector, indicating that businesses should hire and train employees who possess a strong understanding of the environmental aspect of their work and are dedicated to sustainable practices.

Iqbal & Hossain (2023) evaluate the extent to which tourists would pay to restore Sundarban mangrove forest ecosystems in Bangladesh, the largest mangrove forest in the world, by collecting data from 607 tourists. The results showed that, on average, tourists were willing to pay BDT 64.54 for the restoration initiatives, which could generate an annual revenue of BDT 11.81 billion. The WTP is affected by tourists' age, monthly Income, and years of schooling. To understand tourists' perceptions of sustainable waste management and willingness to pay (WTP), we conducted this study using the contingent valuation method (CVM). CVM is a survey-based method to estimate the value of non-market goods and services (Orlowski & Wicker 2019). This method involves asking respondents to state how much they would be willing to pay for a particular good or service, even if it is not currently accessible and no market exists for the good. There are several reasons for employing the CVM in our study. Firstly, it is a well-established method used in diverse scenarios (Bennett et al. 2018, Damigos et al. 2016). Secondly, it enables us to capture the full range of values that visitors may place on sustainable waste management, encompassing both use and non-use values (Andersson et al. 2012, Nandagiri 2015). Thirdly, CVM is a cost-effective method to administer (Haab et al. 2013, Weimer et al. 2019, McIntosh 2013). Consequently, CVM is the best way to assess tourists' WTP concerning sustainable waste management at Kuakata Sea Beach, as it allows us to get a direct and unbiased estimation of their willingness to pay without being affected by other factors.

MATERIALS AND METHODS

In this study, we employed a robust methodology to gather comprehensive data from 400 tourists visiting Kuakata Sea Beach. Using the Taro Yamane method, we determined the sample size (n) as follows:

$$n = \frac{N}{1 + N(e^2)}$$

Where N represents the population size (approximately 13500 (The Daily Star 2022)), and *e* represents the desired precision level (5%). The sample size based on the formula is 388. For convenience, we interviewed 400 individuals to collect the data. We can ensure that having this sample size ensures an adequate representation of the total population and increases the study's reliability.

To ensure the quality and fairness of data collection, we

employed trained enumerators who carried out face-to-face interviews with the tourists by being physically present in the Kuakata sea beach. Enumerators underwent thorough training to reduce the possibility of any biases in data collection, emphasizing the importance of neutrality and consistency in their interactions with the survey respondents.

We structured our questionnaire into three sections to cover various aspects of beachgoers' perspectives, knowledge, and behaviors. Part A was designed to collect data about the tourists' socioeconomic profiles and travel patterns. Part B delved into their knowledge and perceptions regarding sustainable beach waste management, investigating their awareness and attitudes toward this critical issue. Finally, Part C focused on tourists' Willingness to Pay (WTP) for beach litter management and proper disposal.

To assess tourists' WTP for sustainable waste management, we adopted a statistical method using the following logistic regression model, denoted by equation 1.

$$\ln\left[\frac{p}{1-p}\right] = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \varepsilon \qquad \ldots(1)$$

Where p is the probability of willingness to pay and $\ln\left[\frac{p}{1-p}\right]$ is the logarithm of odd ratios of individuals' WTP. The regression coefficients $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are associated with the intercept, gender, age, educational attainment, occupation, and Income, respectively.

In order to quantify the correlation between beachgoers' willingness to contribute to sustainable waste management and relevant demographic variables financially, we employed an Ordinary Least Squares (OLS) regression analysis, expressed by equation 2.

WTP = $\beta_0 + \beta_1$ Gender + β_2 Age + β_3 Education + β_4 Occupation + β_5 Income + β …(2)

Where WTP represents beachgoers' willingness to pay for sustainable waste management measured in BDT per day, gender is a binary variable (1 for male and 0 for female). Education is a binary variable indicating whether the individual has graduated (1 for complete and 0 for incomplete). Occupation is a binary variable denoting employment status (1 for employed and 0 for unemployed). Income indicates the monthly Income of the beachgoer in BDT. β_0 is the intercept. β_1, β_2, β_3, β_4, and β_5 are the parameters associated with gender, age, education, occupation, and Income.

These models enable us to analyze the relationships between WTP and relevant socioeconomic characteristics, revealing the factors influencing tourists' WTP in effective beach litter management practices. By employing this robust methodology, we aim to provide valuable insights into tourists' preferences and motivations, contributing to the development of sustainable waste management strategies for Kuakata Sea Beach and similar coastal tourist destinations.

RESULTS AND DISCUSSION

In the context of our study conducted at Kuakata Sea Beach, Bangladesh, a comprehensive analysis of the socioeconomic characteristics of tourists was undertaken to provide a more profound understanding of the socio-demographics of the targeted population. The outcomes of the analysis reveal several noteworthy patterns within the sampled visitors. As shown in Table 1, the gender distribution highlights a clear majority of male respondents, comprising 73.6% of the total sample, while counterparts account for 26.5%. As for the age distribution, the data demonstrate that individuals between the ages of 31 and 65 constitute the largest group, representing 44% of the total, followed by the 19-30 age group at 38.25%. Remarkably, there are no respondents aged above 65 in our sample. In terms of educational attainment, a substantial proportion of beachgoers achieve graduation (34%) and higher secondary education (29%), while only 7.25% of interviewees have completed primary schooling. The distribution of educational background by stream, as depicted in Fig. 1, provides that among seaside visitors, a significant proportion of those with secondary education have backgrounds in science (34.68%), whereas those with higher secondary and graduation-level education are more evenly distributed across Science, Business, and Humanities streams.

Regarding occupation, the majority of participants identified as students (44.75%), followed by the unemployed (27.5%) and employed (16.25%). A smaller fraction identified as retired (9.75%), homemaker (0.5%), or fell into other occupational categories (0.25%). Concerning income levels, the majority of the targeted population (44.5%) report an income of less than BDT20,000, with only a tiny proportion reporting an income exceeding BDT100,000. These demographic statistics offer valuable insights into the composition of the beachgoing population at Kuakata Sea Beach, serving as a foundation for tailored strategies for sustainable waste management initiatives and related undertakings.

The travel pattern of the tourists at Kuakata Sea Beach is analyzed through a set of inquiries outlined in Table 2. The initial inquiry aims at ascertaining whether participants previously visited Kuakata Sea Beach, with 53% answering affirmatively. Among those who had visited before, their frequency of prior visits was analyzed, revealing that 48% visited 1-2 times, 24% came 3-5 times, and 28% toured more

Table 1: Socioeconomic Characteristics.

Socioeconomic Characteristics	Classes	Frequency	Proportion of total [%]
Gender	Male	294	73.6
	Female	106	26.5
Age (years)	<19	71	17.75
	19–30	153	38.25
	31–65	176	44
	>65	0	0
Education	Primary	29	7.25
	Secondary	64	16
	Higher Secondary	116	29
	Graduation	136	34
	Post-Graduation	55	13.75
Occupation	Student	179	44.75
	Employed	69	16.25
	Unemployed	110	27.5
	Homemaker	2	0.5
	Retired	39	9.75
	Others	1	0.25
Income (BDT in thousand per month)	<20	178	44.5
	21-30	72	18
	31-40	82	20.5
	41-50	52	13
	51-70	14	3.5
	71-100	1	0.25
	>100	1	0.25

than 5 times. Respondents were also asked about their travel habits to other sea beaches apart from Kuakata, with 58% acknowledging such travels. In terms of transportation to Kuakata Sea Beach, 14% chose private cars, 73% relied on public buses, 8% opted for motorcycles, and 5% preferred other means. The duration of their typical stay at Kuakata Sea Beach varied, with 11% spending less than a day, 87% staying 1-2 days, and 3% enjoying a 3–5-day visit, while a mere 1% extended more than 5 days. Their trips' primary motive was leisure (87%), with only 3% indicating business purposes, 10% for family gatherings, and a minor 1% for other motivations. Regarding accommodation choices, 96% preferred hotels or resorts, 2% opted for guesthouses or homestays, and 2% made other accommodation arrangements. Regarding daily expenditure, 53% spent less than 1 thousand Bangladeshi Taka, 43% allocated between 1-3 thousand Taka, 3% expended 3-5 thousand Taka, and only 1% exceeded 5 thousand Taka. Additionally, 53% of respondents demonstrated awareness of waste management initiatives at Kuakata Sea Beach, while only 3% had actively participated in beach cleanup activities. These findings provide a valuable understanding of the travel patterns and behaviors of Kuakata's beach visitors, which are essential for comprehending their knowledge, perceptions, and willingness to pay for sustainable waste management initiatives in the region.

Table 3 comprehensively analyzes tourists' knowledge and outlook concerning sustainable waste management at Kuakata Sea Beach, Bangladesh. The data highlights a strong consensus among survey participants, with 99% recognizing
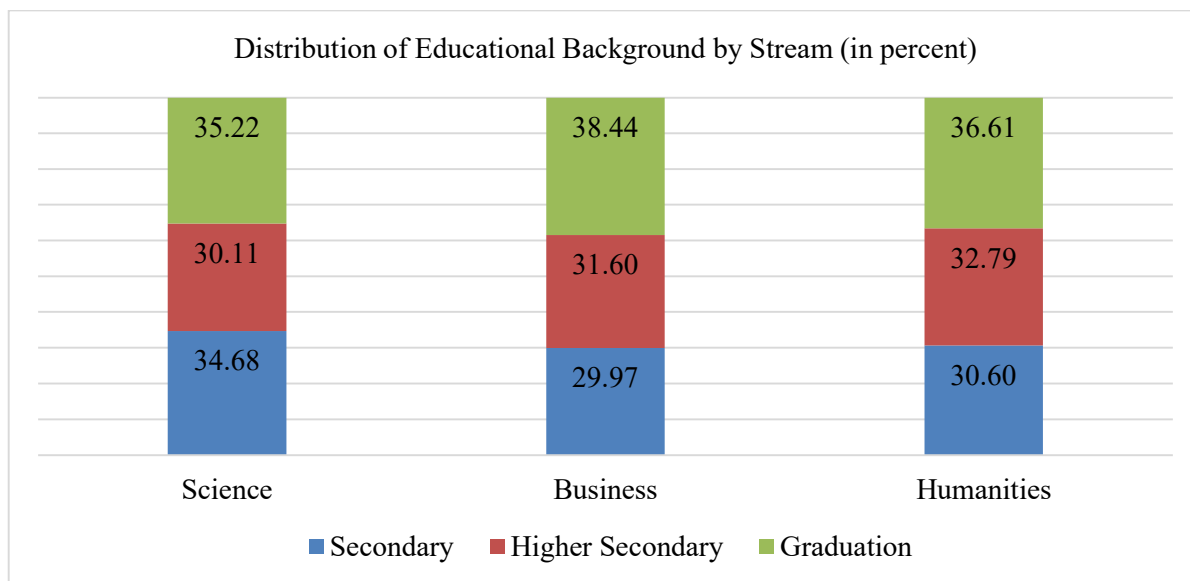

Fig. 1: Educational background.

Table 2: Tourists' travel pattern.

Inquiry	Response	Response Classification [%]			
		1	2	3	4
Have you visited Kuakata Sea Beach before?	1. Yes 2. No	0.53	0.47	-	-
If the answer to the previous question is yes, how many times have you visited Kuakata Sea Beach in the past year?	1.1-2 times 2. 3-5 times 3. More than 5 times	0.48	0.24	0.28	-
Have you traveled to any other sea beaches besides Kuakata?	1. Yes 2. No	0.58	0.43	-	-
How do you usually travel to Kuakata Sea Beach?	1. Private car 2. Public bus 3. Motorcycle 4. Other	0.14	0.73	0.08	0.05
How long is your typical stay at Kuakata Sea Beach (in a day)?	1. <1 2. 1-2 3. 3-5 4. >5	0.11	0.87	0.03	-
What is the main purpose of your visit to Kuakata Sea Beach?	1. Leisure 2. Business 3. Family gathering 4. Other	0.87	0.03	0.10	0.01
How do you usually select your accommodation at Kuakata Sea Beach?	1. Hotel/resort 2. Guesthouse/homestay 3. Others___	0.96	0.02	0.02	-
On average, how much do you spend per day during your stay at Kuakata Sea Beach (in thousand Bangladeshi Taka)?	1. <1 2. 1-3 3. 3-5 4. >5	0.53	0.43	0.03	0.01
Are you aware of any waste management initiatives at Kuakata Sea Beach?	1. Yes 2. No	0.53	0.47		
Have you ever participated in any beach cleanup activities at Kuakata Sea Beach?	1. Yes 2. No	0.03	0.97		

the urgent need for further development in the current waste management situation and an equally resounding 99% expressing their willingness to dispose of waste if suitable dustbins are installed responsibly. Respondents offered a range of perspectives on effective methods for sustainable waste management, with 37% advocating the importance of increasing tourists' awareness, 38% emphasizing the strategic placement of dustbins, 25% underscoring the need for strict government regulations, and only 1% supporting an entry fee for waste management. Moreover, findings demonstrate varying levels of awareness and knowledge among tourists, with 36% confirming their awareness of environmental issues linked to waste management, 54% considering themselves somewhat knowledgeable, and 35% voting for a lack of knowledge on the topic. In terms of satisfaction, 42% of participants expressed satisfaction with existing waste management practices, with an additional 37% reporting general satisfaction. Solid waste pollution was identified as a prominent concern by 34% of respondents, while 51% pointed to air pollution, and 12% specifically noted water pollution, with noise pollution receiving the least attention at 3%. The cleanliness of the beach area during visits was perceived positively, with 46% considering it clean and 43% describing it as moderately clean. Furthermore, 53% showed a willingness to participate in waste management initiatives, and a remarkable 59% expressed being very likely to recommend Kuakata Sea Beach based on its waste management practices, bringing attention to the potential impact of sustainable waste management on the overall tourist experience and destination promotion.

Table 4 presents an insightful analysis of tourists' willingness to pay for beach litter management and proper disposal at Kuakata Sea Beach, Bangladesh. The data reveals that a noteworthy segment of beachgoers express concern about the presence of litter or waste on the beach, with 37% indicating they are "very concerned" and 41% characterizing themselves as "somewhat concerned." Furthermore, a substantial majority, comprising 68% of respondents, believe that having effective waste management and disposal systems in place is "extremely important." Regarding the willingness to financially support sustainable waste management and litter disposal, 51% of tourists expressed their positive inclination. Additionally, the study found that 63% of those inclined to contribute were open to paying between 26-50 BDT taka daily for this purpose. Moreover, a majority of 71% of respondents who were unwilling to pay cited the belief that it is the government's or local authorities' responsibility as their main reason for not contributing. This research also highlights that 46% of tourists would be more likely to support these initiatives if they were provided with transparent details on the utilization of their payment.

The findings of our logistic regression analysis, as presented in Table 5, shed light on the intricate relationships between tourists' willingness to pay for sustainable waste management in the Kuakata Sea Beach and various household

Table 3: Tourists' knowledge and perception of sustainable beach waste management.

Inquiry	Response	Response Classification [%]				
		1	2	3	4	5
Do you think there is any need for further development of the current situation?	1. Yes 2. No	0.99	0.01			
Are you willing to dump the waste if dustbins are installed on beaches by the appropriate authority?	1. Yes 2. No	0.99	0.01			
What is the most effective method for sustainable waste management, according to you (respondents)?	1. Increasing tourists' awareness 2. Strict government regulation 3. Installing dustbins in frequent places on the beach 4. Entry fee for waste management	0.37	0.25	0.38	0.01	
Are you aware of the environmental issues associated with waste management at Kuakata Sea Beach?	1. Yes 2. I have some knowledge 3. No	0.36	0.51	0.14		
How do you acquire relevant waste management information?	1. TV and newspaper 2. Propaganda and indoctrination 3. Environmental activities 4. Friends and relatives	0.63	0.01	0.08	0.28	
How would you rate your level of knowledge about sustainable waste management practices?	1. Very knowledgeable 2. Somewhat knowledgeable 3. Not knowledgeable at all	0.12	0.54	0.35		
How do you perceive the current waste management practices at Kuakata Sea Beach?	1. Excellent 2. Good 3. Fair 4. Poor	0.10	0.60	0.25	0.06	
Are you satisfied with the current waste management at Kuakata Sea Beach?	1. Very satisfied 2. Satisfied 3. General satisfaction 4. Not satisfied	0.14	0.42	0.37	0.07	
Which kind of environmental pollution do you think is more serious and should be paid more attention to?	1. Water pollution 2. Air pollution 3. Solid waste pollution 4. Noise pollution	0.12	0.51	0.34	0.03	
How would you rate the overall cleanliness of the beach area during your visit?	1. Very clean 2. Clean 3. Moderately clean 4. Dirty 5. Very dirty	0.06	0.46	0.43	0.05	0.00
Are you willing to participate in waste management initiatives at Kuakata Sea Beach?	1. Yes 2. Maybe 3. No	0.11	0.53	0.36		
How likely are you to recommend Kuakata Sea Beach to others based on its waste management practices?	1. Very likely 2. Somewhat 3. Not Likely	0.59	0.39	0.03		

Table 4: Tourists' willingness to pay (WTP) for beach litter management.

Inquiry	Response	Response Classification [%]				
		1	2	3	4	5
How concerned are you about the presence of litter or waste on Kuakata Sea Beach?	1. Very concerned 2. Somewhat concerned 3. Neutral 4. Not concerned 5. Not sure	0.37	0.41	0.11	0.06	0.05
How important do you think it is to have proper waste management and disposal systems on Kuakata Sea Beach?	1. Extremely important 2. Important 3. Neutral 4. Not important 5. Not sure	0.68	0.31	0.01	0.00	0.00
Are you willing to pay an additional fee to support sustainable waste management and proper disposal of beach litter in Kuakata Sea Beach?	1. Yes 2. No	0.51	0.49			
Please indicate the maximum amount (in BDT taka) you would be willing to pay per day for sustainable waste management and proper disposal of beach litter in Kuakata Sea Beach:	1. <25 2. 26-50 3. 51-75 4. 76-100 5. >100	0.63	0.32	0.02	0.03	0.00
If you are not willing to pay an additional fee, please select the reason(s) that apply:	1. I believe it is the responsibility of the government/local authorities. 2. I think the existing fees are already sufficient. 3. I am not convinced that it will make any difference. 4. Other	0.71	0.08	0.16	0.06	
Would you be more likely to support sustainable waste management and proper disposal of beach litter if you were provided with clear information on how your payment would be used?	1. Yes 2. No 3. Not sure	0.46	0.17	0.37		

characteristics. Notably, gender emerges as a significant factor influencing willingness to pay, with a coefficient of 0.53 (p = 0.04), indicating that the probability of males' willingness to pay for sustainable waste management is higher than that of females, which is statistically significant at 5%. However, age, education, occupation, and Income do not exhibit statistically significant associations with willingness to pay, as evidenced by their p-values associated with coefficients. These findings emphasize the importance of considering gender-specific strategies when devising sustainable waste management programs to boost beachgoers' participation and support.

Table 6 presents the findings of our OLS regression analysis, illuminating the key factors of beachgoers' financial commitment to sustainable waste management. The constant term, at 26.35 with a p-value of approximately 0, signifies robust baseline support for these initiatives and also indicates that tourists are willing to pay BDT 26.35 per day as compensation for waste management. In terms of significance, Income emerges as a significant determinant, exhibiting a coefficient of 0.35 (SE = 0.10, p < 0.001***), suggesting that individuals with higher income levels are notably more inclined to allocate resources for this cause. Although the effects of gender, age, educational attainment, and occupation are statistically significant coefficients, their inclusion enriches our understanding of the broader demographic context, providing a comprehensive view of the factors at play in beachgoers' financial support for waste management.

CONCLUSION

In these unprecedented times of global climatic challenges, increasing environmental literacy among the people has led to rethinking the impact of poor beach waste management

Table 5: Logistic regression analysis: Relationships between WTP and household characteristics.

Variables	Coefficient	Stand. Error	P-value	95% conf. interval	
Constant	-1.02	0.51	0.04*	-2.02	-0.03
Gender	0.53	0.26	0.04*	0.01	1.04
Age	0.00	0.01	0.94	-0.02	0.02
Education	0.13	0.10	0.22	-0.08	0.33
Occupation	-0.02	0.14	0.90	-0.28	0.25
Income	0.01	0.01	0.24	-0.01	0.03

Notes: The dependent variable is the beachgoers' WTP for sustainable waste management, indicating 1 for yes and 0 for no. 'Gender' (1 for male and 0 for female), 'Education' (1 for complete graduation and 0 for incomplete), and 'Occupation' (1 for employed and 0 for unemployed) are binary regressors. 'Income' is the beachgoer's monthly Income in BDT. * indicates a 5% level of significance.

Table 6: Relationships between WTP and demographic statistics.

Variables	Coefficient	Stand. Error	P-value	95% conf. interval	
Constant	26.35	5.87	0.00***	14.77	37.92
Gender	-3.77	3.37	0.27	-10.42	2.89
Age	-0.10	0.14	0.50	-0.38	0.19
Education	-0.97	2.78	0.73	-6.45	4.51
Occupation	-2.42	4.92	0.62	-12.12	7.28
Income	0.35	0.10	0.00***	0.15	0.54

Notes: The dependent variable is the beachgoers' WTP for sustainable waste management, measured in BDT per day. 'Gender' is a binary variable, with 1 denoting male and 0 denoting female. 'Education' is also binary, with 1 for complete graduation and 0 for incomplete. Similarly, 'Occupation' is binary, reflecting employment status, where 1 for employed and 0 for unemployed. 'Income' refers to the beachgoer's monthly Income in BDT. *** indicates a 1% level of significance.

on environmental quality. Using a structured questionnaire survey, this study investigated tourists' attitudes, travel patterns, socio-demographic characteristics, and willingness to pay for sustainable beach litter management. Results identified that around half of the respondents (53%) are aware of the threats that poor beach litter management poses to the environment. In comparison, only 3% actively took part in beach cleanup activities in their lifetime. Furthermore, as data showed, 37% of the respondents are very concerned about the current waste management practices in Kuakata Sea Beach. However, 99% of the respondents are willing to dump the waste properly if dustbins are installed and made available in appropriate places on the beach.

Around 50% of the people surveyed are willing to pay for the development of a sustainable beach management system, though almost 71% of the respondents think that it is the primary responsibility of the government or appropriate authorities to maintain and ensure beach cleanliness. Most importantly, level of Income and gender difference act as statistically significant factors for their willingness to pay. A larger portion of the respondents willing to pay for beach cleanliness wants to pay less than BDT 25 per day, which the current poor waste management system of the beach may explain. These results are critical for the concerned policymakers and appropriate beach management authority to investigate this problem. Besides, these results can facilitate introducing and implementing tailor-made policies to address this issue, as the values of these non-market services cannot be determined easily. Last but not least, the focus should be given to raising environmental literacy, the conception of conservation, and sustainability to navigate this problem.

Although this study reflected some valuable insights regarding sustainable beach waste management, it is not

free from some limitations. First of all, a bigger sample size could have generated more precise results. Secondly, a comparative study with other beaches of the country might bring different dimensions of the results found and lead to robust outcomes. Thirdly, an analysis of travel behavior using other methods, such as the Travel Cost Method (TCM), will play a significant role in analyzing beachgoers' willingness to pay. Finally, a cross-country analysis could provide us with a precise understanding of visitors' attitudes, environmental literacy, and WTP from international perspectives. Future research should address these issues to understand better tourists' knowledge, perception, and willingness to pay.

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ORCID DETAILS OF THE AUTHORS

Md. Al Amin: https://orcid.org/0009-0006-3909-7606
Md. Tanvir Ahmed: https://orcid.org/0000-0002-6202-9461