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ESTIMATING RECREATIONAL BENEFITS OF THE KUAKATA SEA BEACH: A TRAVEL COST ANALYSIS

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Abstract: *Estimating recreational benefits of non-market natural resources is considered crucial for their conservation. When natural resources are degraded by various anthropogenic reasons, it negatively affects the well-being they provide to human society. But in most cases, such effects remain unaccounted as market failure is synonymous with most environmental services and provisioning. Thus, valuation of natural resources and estimation of their diverse economic benefits are important as they can play a great role in the sustainable management of natural resources for human welfare. This study has employed the Zonal Travel Cost Method (ZTCM), a variation of the popularly used TCM technique, for estimating recreational benefits of the Kuakata Sea Beach, one of the highly potential yet unexplored natural tourist destinations in Bangladesh. It is estimated that the Beach produces an annual figure of TK 29.55 million as recreational benefits to the visitors. The study also finds that improvements in the overall environmental quality of the Beach, as well as better roads and transport facilities, are more likely to increase the recreational benefits to visitors and also their visitation rates.*

Keywords: *Natural Resources, Non- market Valuation, Zonal Travel Cost, Recreational Benefits, Kuakata Sea Beach.*

Introduction

The Kuakata Sea Beach is one of the highly potential environmental sites of Bangladesh, which offers a wide range of services to its coastal communities and for the economy besides attracting thousands of recreationists every year despite having poor communication and security services. Despite such limitations, local (Bangladeshi) tourists in recent years are increasingly opting for the Kuakata Sea Beach as their destination for recreational activities. The beach provides considerable recreational benefits to the local and out-station tourists and also generates employment opportunities for local people living around it.

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Keeping this urgency in mind, this paper has made an attempt to estimate for the first time the recreational benefits of the Kuakata Sea Beach by applying a zonal travel cost method. Besides, existing management and other related problems of the Beach have also been identified from the field survey and possible way outs to overcome the problems have been suggested. It is expected that the study findings would be helpful for the policy makers and other parties to improve various tourist services by creating an improved and sustainable management practice, which in turn may generate considerable consumer welfare for the economy as well as also this research would serve as a reference for similar academic studies in future.

Objectives of Study

The main objective of the study is to estimate the recreational values of the Kuakata Sea Beach of Bangladesh for ensuring improved management of the recreational site while the specific objectives are as follows:

(a) To estimate the recreational benefits of the Kuakata Sea Beach;
(b) To understand how socio-economic and demographic factors such as travel cost, age, sex, marital status, income, expenditure, etc. affect recreational demand for the Kuakata Sea Beach.
(c) To make policy suggestions for better planning, management and conservation of the Kuakata Sea Beach for ensuring its sustainable uses.

Empirical Literature Review

A study by Shammin (1999) on zonal travel cost method (ZTCM) to determine consumers'/visitors' willingness to pay (WTP) for the better environmental services of the Dhaka Zoological Garden or Dhaka Zoo. The author also has suggested that an optimum entrance fee to the Zoo (Tk. 10) as a policy input to generate an additional amount of money for the better management and conservation of the Zoo.

In a similar fashion, Bhatt and Islam (2009) have estimated the economic valuation of biodiversity by using the travel cost method (ZTCM). They have shown a comparative study of selected wetlands of India and Bangladesh, keeping in mind the need for understanding the economic importance of wetlands as well as creating social awareness for better policy and management.

By using zonal travel cost method, Mahat and Koirala (2006) have identified the contribution of the Nepal Central Zoo to the economy as well as the environment. In their study, it has been found that there was an inverse relationship between the travel cost and the number of zoo visits.

Khan (2003) have studied estimating the recreational benefits of the Margala Hills National Park near Islamabad by using an ITCM and the study have shown that the annual benefits from the Park are substantial i.e. the total annual consumer surplus or economic benefits obtained from recreational activities by the visitors to the park is estimated to be approximately Pakistani Rs. 23 million (US $ 0.4 million).

Seenprachawong (2007) study shows that the Phi Phi Islands can generate considerable economic value through recreation to visitors. The author has estimated the consumer surplus by using a travel cost method, with an annual value of 8,216.4 million Baht (US$205.41 million).

Raybould and Lazarow (2009) have estimated the economic and social values of the recreation on the Gold Coast of Australia by using ZTCM. In their study, an average resident has made visited 10 beaches per month during the summer and 6 per month during the winter but visitation has found strongly influenced by the distance people lived from the beach. By using a crude travel cost model, they have also estimated that the average travel cost per adult beach visitor is between $0.50 and $2.30.

Mahamud (1998) has estimated the economic valuation of the Sodere Natural Recreational area by using an ITCM technique. The main aim of this research is to determine the recreational benefit of the site. The result has shown that the total annual recreational benefit of the site is estimated to be Birr 9,842,094.80.

Similarly, Blackwell (2007) has estimated the value of the recreational beach visit by using ITCM method where the annual estimation is $862 million for the entire sample, $153 million for the residents and $205 million for the visitors.

Materials and Methods

Study Area

Kuakata Sea Beach is located in Patuakhali district of Bangladesh and is increasingly becoming a favorite destination for thousands of local and outstation recreationists every year for enjoying both sunrise and sunset from a unique location beside a beautiful location as the study site for this research.

Selection of the Study Method

There are a number of methods in environmental economics which can be used to estimate the economic benefits of a natural or man-made recreational site. Among them, one prominent method is the travel cost method (TCM) that is frequently used for this purpose. The fundamental assumption of TCM is that the recreational value of a natural

site is determined by how many visitors from how far to visit it, as the cost of travel actually indicates the cost of a visit.

There are two forms of TCM: the Zonal Travel Cost Method (ZTCM) and the Individual Travel Cost Method (ITCM). For carrying out the current research, the Zonal Travel Cost method has been applied to estimate the recreational benefits of the Beach considering the following facts: a) Due to lack of poor roads and means of communication systems, most of the visitors usually come from the nearest areas but not quite frequently and not in most cases in multiple times; b) As the site is very unique, few visitors actually travel long distances to visit the site. Therefore, due to the above-mentioned facts, the Zonal TCM is more appropriate in the valuation of the site than the ITCM or any other newer variation of TCM.

In Zonal Travel Cost Method, visitation rate is a function of visit costs from each zone and each zone's socio economic explanatory variables (Bateman, 1993)

Sample Size, Sampling and Data Collection Methods

Although ZTCM is mostly dependent on secondary data on tourist flow to a recreational site and their zonal distribution, the need for conducting primary surveys is also important, particularly in the case when the zonal distribution of actual tourist flow is not available from secondary sources. This study has considered a primary data collection by using a specially designed questionnaire by directly interviewing the respondents at the Beach site as no reliable secondary source is found to be available. For this purpose, 150 visitors have been selected based on a judgment sampling at the beach during the month of October 2013. The study has collected information on age, gender, marital status, household size, household type, education level, type of residence, household size, profession, and household income of the respondents in addition to the number of visits made to the Beach site every fro recreational purpose, number of days stayed during the visit, expenditure incurred for visiting the site, etc.

It also collects information related to distance of site from respondents place of living and mode of transportation used by the them to visit the beach. In this study, relevant secondary data has also obtained from diverse sources, including government ministries/departments, reports, and publications by the Government, journals, and books and from available and reliable websites.

Application of the Zonal Travel Cost Method Approach

In Zonal travel cost method, travel and time costs increase with distances and this information ultimately will allow calculating the number of visits "purchased at different

prices" as well as to construct the demand function for the site, and estimate the consumer surplus or recreational benefits of the site. This study has applied six steps to estimate the recreational benefits of the beach which are as follows:

Step 1: The first step is to define a set of zones surrounding the beach. But it has been understood that the Kuakata being a sea beach of the southernmost area of Bangladesh will not have any possibility of having tourists coming from the southern part of the beach and thus circles cannot be created. Considering the beach from the nearest district headquarter (Patuakhali) is 70 km away, which also seems to be the reasonably good distance for making administrative zones in the context of Bangladesh, thus the present study has considered 70 km as a measuring rod of distance from creating study zones. Finally, five zones have been created and named as A, B, C, D and E which has been shown in the table below:

Table-1: Selection of the Study Zones

Zone	Distance from the Beach (in km.)	Administrative District
A	0-70	Patuakhali
B	71-140	Barguna, Barisal, Jhalokathi
C	141-210	Bhola, Pirojpur, Madaripur, Shariatpur,
D	211-280	Khulna,Bagerhat, Gopalganj, Faridpur, chandpur, Dhaka, Munshiganj
E	281-350	Narayanganj, Magura, Gazipur, Jhenaida, Kustia

Source: Based on Distance Matrix (From District HQ to District HQ) ** Length in Kilometer MoC, 2013

Step 2: The second step is to calculate the expected visits per zone over the last year based on the information on the number of visitors from each zone as well as the population of each zone to know the number visits made in the last year. Based on the discussions with relevant government departments related to travel, tourism and security and information provided by local transport, hotel and restaurant services the number of visits made in the last year to Kuakata Sea Beach has been considered to be 100,000 as there is no tourist record available at the site.

*Step 3***:** The third step is to calculate the visitations rate per 1000 population in each zone. This is simply expected visitors per year from the zone, divided by the zone's population in thousands i.e.

$$VR=\frac{Expected\ Visit\ Per\ Year}{Zone\ Population}\times 1000 \quad \text{..... (1)}$$

Where, VR: visitation rate (visits/1000/year)
The results of Step 2 and 3 are presented in the below table-2

Table 2: Zone population, Expected number of Visits, Visitation Rate/ 1000 People

Zone	Zone Population	Sample Visits	Expected Number of Visits	Visitation rate/ 1000 people
A	1460781	22	14667	10.04
B	3898762	37	24667	6.33
C	5042834	29	19333	3.83
D	18926134	47	31333	1.65
E	8071831	15	10000	1.24
Total		150	100000	

Source: Calculated from the data of MoC, BBS, and Field survey, 2013

Step 4: The fourth step is to calculate the total travel cost by adding average round trip travel cost and average round trip travel time cost. Different modes of transport are used to come to the beach. Therefore, an average per km travel cost was calculated using the data from the questionnaire. The cost of time is more complicated. In this study, students constitute 22 Percent out of total 150 respondents, they are treated as unemployed and the round –trip travel time cost of them was set to zero. Finally, the study calculated the travel time cost using the following method, assuming that about 2/3rd of the days in a week are working days[3]:

$$C=\frac{2}{3}\times \text{Visitors per day wage} \times \text{number of staying days to the site}$$

Where C= Travel time cost
Which are presented in the below table-3

[3]As weekly two days are week-ends, plus there are also designated government and other official holidays including which it comes about 2/3rd of the days as working days. For all income earning people, including the businessmen, the same formula is applied.

Table 3: Average Roundtrip Travel Cost, Average Round Travel time Cost and Total Travel Cost (in Tk.)

Zone	Average Roundtrip Travel Cost	Average Roundtrip Travel time Cost	Total Travel Cost
A	252	541	793
B	520	688	1208
C	533	786	1319
D	970	953	1923
E	616	937	1553

***Source*:** Calculated from the Data of MoC, BBS, and field survey 2013

Step 5: the fifth step is to estimate, using regression analysis, the equation that relates visits per capita to travel costs and other important variables socioeconomic variables such as income, age, education, etc. To maintain the simplest possible model, the zonal visitation rate has been regressed only against the average zonal total travel cost (TC) for estimating demand equation (King and Majjota, 2005).

Based on the outcomes of the sensitivity analysis, the Linear-Log functional form is thought to be the best-suited one for the regression analysis for this study and the outcomes are also seemed to be more rational in the present context. As shown by R^2, about 98 percent of the variation in the visitation rate is explained by this regression model. Here the goodness of fit of the model is found to be highly satisfactory.

The basic model used in this study depicts the visitation rate (i.e. number of expected visits per year) to the Kuakata Sea Beach as a function of total cost, which includes travel and time costs together. Thus, the model has been specified as follows:

$$VR = \beta_0 + In\ \beta_1 TC + \mu \quad \text{..... (2)}$$

Where,

In= Natural log (i.e. log to the base e, and where e= 2.718

VR = Visitation Rate

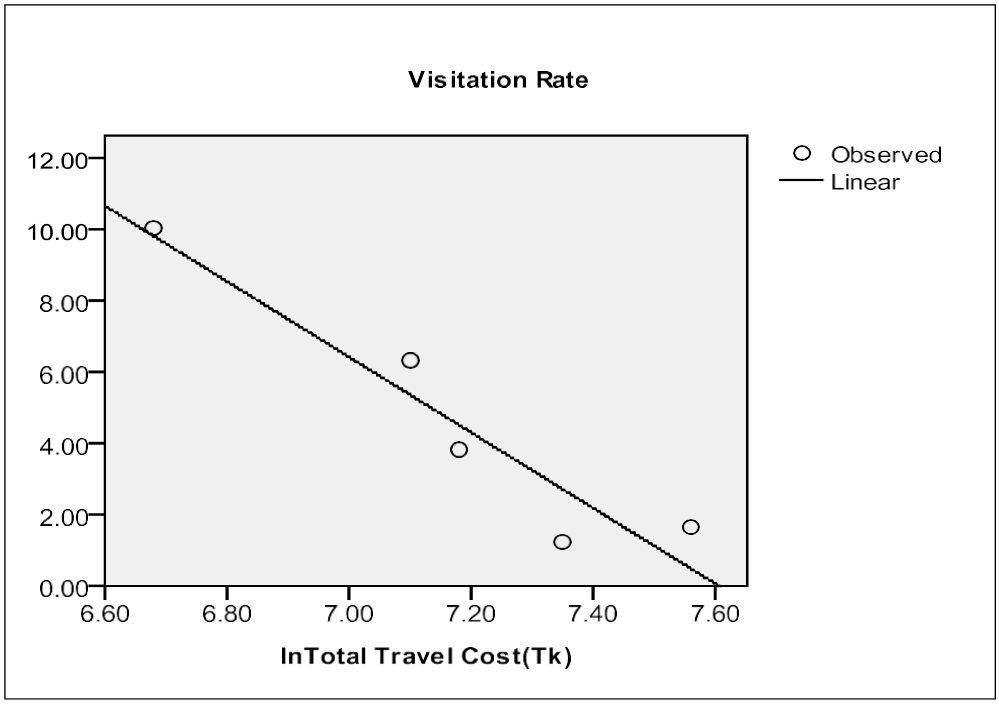
TC = Total Travel Cost

μ= Error Term

From the result of the regression analysis, the following demand equation has been estimated,

$$VR = 80.180 - 10.534\ TC\ldots \quad \text{.....(3)}$$

Figure1: Beach Visitation Demand Curve



Step 6: The sixth step is to derive recreational benefits or consumer surpluses from the demand equation (3). For this, we first calculate the choke price (CP) in the following way:

80.180 -10.534 TC=0 [the choke price of the demand when the number of visits is zero]

=>10.534TC =80.180

=> TC = 7.61

$\therefore$ TC = antilog (7.61) = $e^{7.61}$ = 2018.3= CP

Thus, after calculating the choke price, the annual consumer surplus / recreational benefit for each zone and the total recreational benefits from the beach of this study has been calculated in the following ways:

Recreational benefit for each zone, CS = 0.5× (Choke price – total cost from each zone) ×number of expected visit per year from each zone, and the total recreational benefits from the beach is the sum of all the zones consumer surpluses / recreational benefits which are presented in the below table -4

Table-4: Consumer Surpluses (CS) for the Kuakata Sea Beach Visits

Zone	Total Travel Cost (in Tk.)	Choke Price (in Tk.)	Number of Expected Visits or Average Number of Visit/Year	Recreational Benefits/Year (in million Tk.)
A	793	2018.3	14667	8.98
B	1208	2018.3	24667	10.0
C	1319	2018.3	19333	6.76
D	1923	2018.3	31333	1.49
E	1553	2018.3	10000	2.32
Total			100000	CS = 29.55

Results and Discussion

The results show that total recreational benefits of the Kuakata Sea Beach are estimated to be in the tune of Tk. 29.55 million per year (See Table-4).

The results also show that the highest recreational value was derived by visitors from Zone B, which was followed by Zone A and C. Whereas, Zone D, and Zone E derive the lowest recreational benefits. Zone D consists of two large cities one is Dhaka (the capital city of Bangladesh) and the another is Khulna (the third largest city in Bangladesh and it has the highest number of expected visits per year (i.e. 31,333) but its visitation rate is low considering its higher population figure and also its recreational benefits is lowest than that of any other zone that can be attributed to poor communication systems that incur higher travel costs. The same reason is also applicable for zone D.

Descriptive Statistics of the Study

This section presents the descriptive statistics that was collected from the 150 visitors using questionnaires. The survey also included visitors' socio-economic and demographic characteristics as well as the nature of their recreational visits to the Kuakata Sea Beach. The Table-5 reveals that the average age of the respondents has found to be 30.83 years while the average household size is 5.31 for the sample households about 91 percent of the respondents are male and the remaining 9 percent female. As many as 58 percent of the sample respondents are married and 42 percent single. Similarly, about half of the respondents have a higher level of education, while only 4 percent have a lower (i.e. primary level) education. About 91 percent of the respondents' residence belongs to urban areas while only 9.3 percent live in rural areas of the country.

The average number of visit to the beach has found to be 1.69 per year while the number of staying days at the beach is estimated to be 2.74. The average monthly household income of the respondent households is calculated as Tk. 40,647 and the average per day per head expenditure make during any recreational visit to the site is found to be Tk. 1,057 with a minimum of Tk. 3.

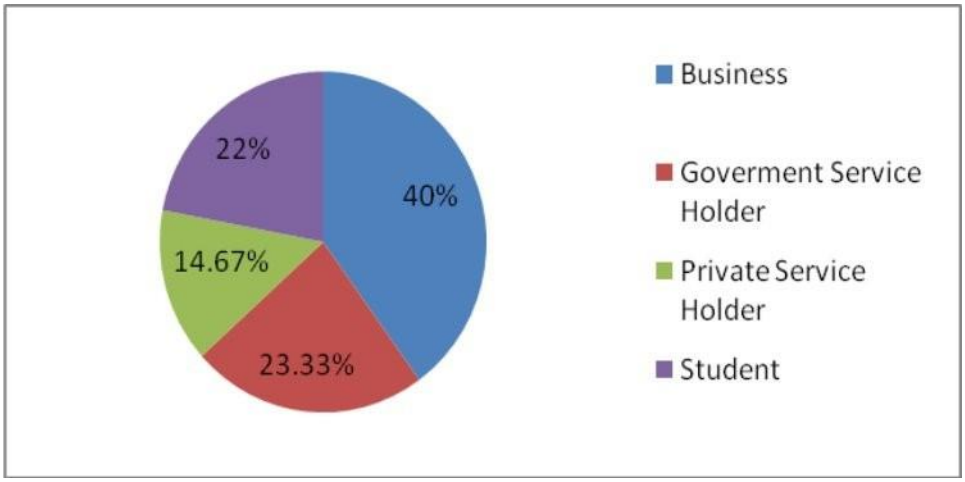
Table-5: Descriptive Statistics of the Sample Respondents

Variables	Minimum	Maximum	Mean/ Percent
Age			30.83 (mean)
Sex: *Male* *Female*			 90.7 Percent 9.3 Percent
Marital Status: *Married* *Single*			 58 Percent 42 Percent
Household type: *Joint* *Nuclear*			 54.70 Percent 45.30 Percent
Household Size			5.31(mean)
Residence: *Urban* *Rural*			 90.7 Percent 9.3 Percent
Education level: *Primary* *Secondary* *Higher Secondary /Diploma* *Degree/University*			 4 Percent 17.3 Percent 31.3 Percent 47.3 Percent
Household Income (Tk.)	20000.00	200000.00	40,647 (mean)
Number of Recreational site Visit (Yearly)	1	5	1.69 (mean)
Number of Staying Days in Beach	1	5	2.74 Percent
Expenditure (per day per head Tk.)	300.00	2350.00	1057 (mean)
Distance (km.)	41	298	189.04 (mean)

Source: Based on field survey, 2013

Figure-2 shows the profession of sample respondents by occupation. It shows that two-fifths visitor is involved in business whilst government service holder, student and private service holder account for 23.33 percent, 22 percent and 14.67 percent of the total number of visitors respectively.

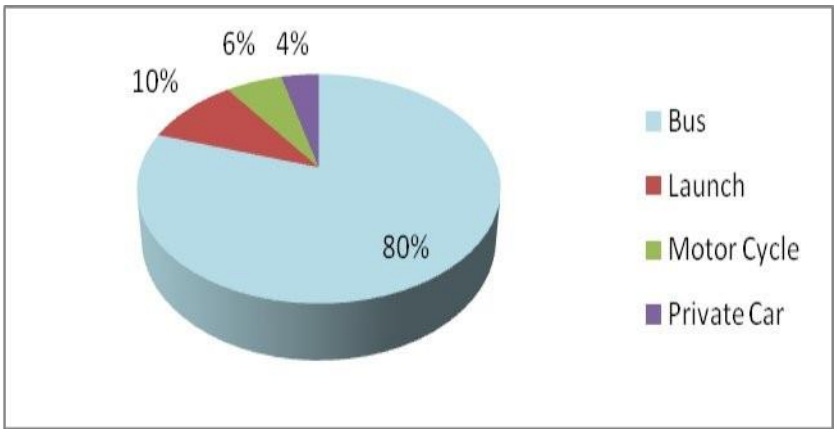
Figure 2: Profession of Sample visitors by Occupation



Source: Based on field survey, 2013

The Figure-3 below shows the classification of different types of transport services used by visitors to visit the beach. The primary mode of transportations is found to be a public bus, which is accounted for about 80 percent. The secondary mode of transportation was lunch (water vessel) which is used by only 10 percent of the sample respondents to visit the site. Other modes of transportations include motorcycle and private vehicles like car, although their numbers are found to be quite smaller, 6 percent and 4 percent, respectively.

Figure-3: Mode of Transportation Used by Visitors



Source: Based on field survey, 2013

Table-6 presents respondent household monthly income distribution by income group. As many as 33 percent of sampled households fall in the income group of Tk.20,000-30,000 per month. More than half of the respondents (52.7 percent) reported having a monthly family income in the range of Tk.30,000 to Tk.50,000. Similarly, 14 percent of the respondents have a monthly household income of Tk. 50,000 to 200,000.

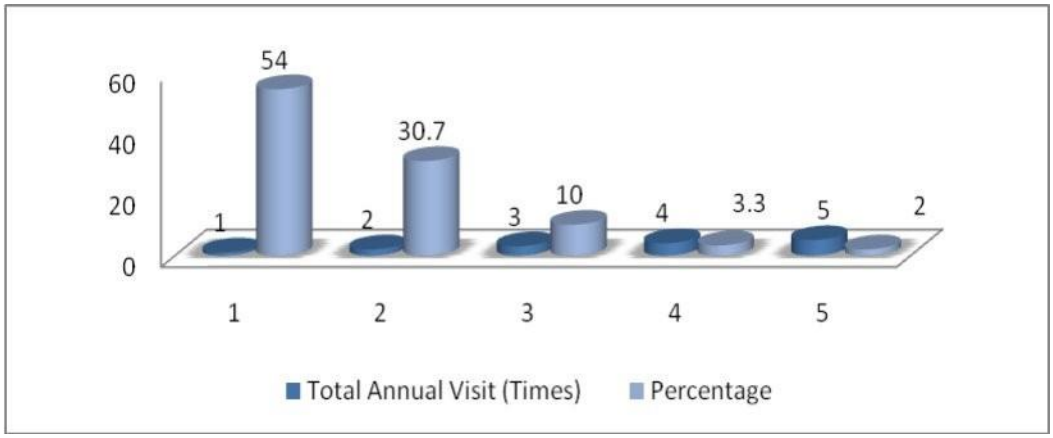
Table -6: Frequency Distribution of Household Monthly Income

Income Group (Tk/ Month)	No. of Household	Percent
20000-≤30000	50	33.3
>30000-≤40000	48	32
>40000- ≤50000	31	20.7
>50000-≤60000	12	8.0
>60000- ≤75000	4	2.7
>75000-≤100000	3	2.0
>100000-≤20000	2	1.3
Total	**150**	**100**

Source: Based on field survey, 2013

More than 50 percent of the visitors have visited the beach one time a year; the remaining 44 percent have a visitation rate of 2-4 times a year. Only 2 percent visitors have visited the Beach 5 or more times a year. These are presented in the below figure-4:

Figure-4: Total Annual Visits to the Kuakata Sea Beach



Source: Based on field survey, 2013

Visitor's Perceptions Regarding Improvements of Facilities and Management Services for the Kuakata Sea Beach

In order to find out visitors' perceptions about the existing quality of the site and on the questions of having required improvements, respondents have asked what kind of quality improvements they would like to see at the beach and the findings are presented in the Table-7 below:

Table-7: Visitor's Perceptions Regarding Improvements

Area of improvement	Specific Details
Recreational site	Clean environment, Availability of sitting chair, Walking tracks and Roads along the Beach, Lighting system, Security system
Traffic	Roads condition, Traffic safety, Parking facilities, local government transport
Miscellaneous	Waste disposal, Lavatory, Food, and Beverage

Source: Based on field survey, 2013

Findings on the Prevailing Problems at the Kuakata Sea Beach and Possible Way-outs

From the visits made to the Kuakata Sea Beach and survey conducted on the on-site recreationists about their opinions on the existing problems, if any, removing which can attract more visitors annually as well as increase consumers surplus by providing better recreational services, several problems have been identified that need to be addressed to improve the recreational, as well as environmental quality, of the site. These are presented below:

Number of seating benches along the beach should be increased, so that visitors can rest after walking along the beach as well as there should be waste disposal and lavatory facilities for the recreationists;

To ensure more security, particularly after the sunset, night guards, police, and concerned defense forces also need to be increased at the Kuakata beach, especially near the beach area where tourists feel insecure;

There should also be lamp posts along the Beach as visitors feel insecure after evening;

Unplanned construction of buildings and other development works should not be permitted in areas that can deteriorate the beauty of the beach;

Modern boats and speed boat services should be launched by the government so that visitors can make journey to the sea enjoy the attractive forest (named *Gangamotir Forest* and *Fatrar Forest*) located in the east-west direction from the beach;

Roads should be constructed along the beach so that visitors can make journey visit other attractive sites near the beach;

Proper transportation parking places should be developed, for the maintain of clean environment on beach as well as the free movement of the visitors;

Steps should be taken to keep the cost of food, lodging, and other goods at stable and at reasonable prices, as a great variation is often found in the prices of the same goods between Kuakata and other areas of the country;

Finally, the Ministry of Tourism and Civil Aviation of the Government of Bangladesh (GOB) should give special attention to developing the Kuakata Beach as an international standard beach and local participation in managing this special and unique recreational beach should be encouraged, as tourism generates additional income to the local people and contributes to boosting up the local economy.

Concluding Remarks

The Kuakata Sea Beach is a potential recreational site in Bangladesh for holidays and leisure times after the Cox's Bazar Beach. The focus of this study has been to have a recreational valuation of the Kuakata Sea Beach for generating information on its economic importance, which can thus be used to improve planning and sustainable management of the site. The study has been able to prove beyond doubt that the beach generates a large economic value through recreational services. The total gross recreational benefit is estimated to be in the tune of Tk. 29.55 million per year. Besides, if the beach is fully developed, it may also contribute to the livelihoods and socio-economic development of local communities. Moreover, the country can also earn foreign currency as more and more visitors, including foreign tourists, are expected to visit to the site.

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Appendix

Outcomes of the Sensitivity Analysis

	Linear	**Linear –Log**	**Log –Linear**	**Log –Log**
β_0	15.533 t-value (5.647)	80.180 t-value (5.746)	3.794 t-value (4.865)	18.431 t-value(3.739)
β_1	-0.008 t-value (-4.116)	-10.534 t-value (-5.420)	-0.002 t-value (-3.394)	-2.396 t-value (-3.490)
R^2	0.85	0.907	0.793	0.802
F-statistic s	16.943	29.376	11.517	12.181

Source: Estimated from the data of MoC, BBS and Filed survey, 2013