Demand for Ecotourism: An Assessment of Recreation Value of Negombo Lagoon in Sri Lanka

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S L J E R

Abstract

Recreation and tourism represent a major opportunity and nexus for managing the interaction between ecosystems and people, including particularly to urban ecosystems, where people living in an environment, that its' contact with natural or semi natural ecosystems is often limited. The Negombo lagoon has proven to be an important recreational site in a greater urban area in the face of the growing demand for urban recreational amenities. This study evaluates the recreation demand for Negombo lagoon while Specifically, identifies the current status of recreational activities in Negombo lagoon to motivate and sustain public support for lagoon protection and conservation through monetary signals. The study employs both Individual Travel Cost Method and Zonal Travel Cost Method in order to estimate the welfare gains from recreation. The social welfare derived for both local (USD 4.7 Million) and foreign visitors (USD 911 Million) demonstrates the trade-off and synergies of sharing lagoon for recreational activities.

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INTRODUCTION

Coastal ecosystems are viewed as important ecological resources to generate significant activities associated with tourism and outdoor recreation in many coastal communities that endorses protecting and managing coastal lands. Assessing the benefits generated by coastal lands against the costs associated with their protection as well as management has led to a growing literature examining the recreational value of coastal ecosystems (Ghermandi et al., 2010).

Recreation and tourism represent a major opportunity and nexus for managing the interaction between eco systems and people, including the development and protection of ecosystems. Recreational activities, such as walking, boating, photography, nature study and swimming, offer an opportunity for many people to experience the benefits of ES directly. This applies particularly to urban ecosystems, where people living in an environment, that its' contact with natural or semi natural ecosystems is often limited.

Recreation and tourism also provide many important benefits in both physical as well as psychological wellbeing through aesthetic experiences, intellectual stimulation, and inspiration. In literature, recreation in form of everyday or short term in nearby green spaces, day tourism, and overnight tourism are often lumped and discussed together. Although the overnight tourism seems to be recognized and integrated to some extent, everyday outdoor recreation is not even mentioned in literature. Further the existing literature on coastal recreation is devoted almost exclusively to estimate the value of recreation but not to identify the trade-off among external and local visitors who have often free access to a variety of outdoor recreation activities (Everard and Kataria, 2011; Wang et al., 2010).

This study uses travel cost methods to examine the recreational demand for Negombo lagoon in Sri Lanka. The site is typical of the many local and foreign, free-access coastal locations throughout Sri Lanka are alternative destinations to large, more popular beaches. With this background, the purpose of the present study is to derive recreational demand for both local and foreign visitors in Negombo lagoon. Specifically, the objectives of the study are to identify the current status of recreational activities in Negombo lagoon and, to motivate and sustain public support for lagoon protection and conservation through monetary signals.

Literature review

Nonmarket valuation techniques for wetlands can be broadly categorized under two methods, direct; (that use surveys to ask an individual's valuation of the goods in a hypothetical market) and indirect (methods rely on the behaviour of consumers in related markets) methods. Further recreational value can be measured through those two categories under three basic approaches: single site demand (Travel Cost) method, site

choice (Random Utility) method, and stated preference (Contingent Valuation) method (Haab and McConnell, 2002). Often in Literature revealed preference and stated preference methods had been used either individually or in combination, in order to estimate the welfare changes due to quality changes in recreational sites (Whitehead et al., 1999).

Travel cost method (TCM) is a revealed preference method based on observed behaviour reflecting utility maximization subject to a constraint, that developed by Hotelling, is one of the oldest methods in environmental valuation (Freeman, 1993). TCM measures Marshallian consumer surplus that approximates and bounded by the compensating variation (CV) and equivalent variation (EV) welfare measures (Brander et al., 2006). This method uses the travel cost as a proxy for the price of recreation assuming rational behaviour on the part of the consumer while the sole decision variable is the number of visits paid by the consumer to a certain recreation site within a time period. The travel cost varies with distance from the recreational site, a surrogate demand curve can be derived based on the varying cost information that can be used to estimate the consumer surplus as a measure of welfare (Gunatilake, 2003).

There are two alternates, (a) Individual Travel Cost Method (ITCM) which is appropriate for sites with high individual visitation rates and, (b) the Zonal Travel Cost Method (ZTCM) which is applicable for sites with very low individual visitation patterns (Rolfe and Prayaga, 2007). The advantage of ITCM over ZTCM is that it takes into account the inherent variation in the data compared to the aggregation and can be estimated using a smaller number of observations. Although the researchers prefer ITCM over ZTCM for reasons such as statistical efficiency, theoretical consistency, and increasing heterogeneity among populations within zones, the application of the correct TCM depends on the identification of the dependent variable and reason of some studies for using both methods (see Rolfe and Prayaga, 2007; Nam et al., 2005; Bowker and Leeworthy, 1998).

According to Groot et al., 2012 TCM has extensively used in natural recreation research (19%) but not very often in South Asian continent. There are only few evidences from Sri Lanka (Gunatilake and Vieth, 1998; Marawila et al., 2010) and many more conceptual, theoretical and methodological aspects not being explored yet.

In many studies the Ordinary Least Squared (OLS) estimation has been using in order to estimate the parameters of the recreational demand equation and the maximum likelihood method seems more appealing for the purpose of analyzing truncated samples due to the non-negative values and the trips occur in integer values (Creel and Loomis, 1990). Further the ordinary regression methods require the dependent variable to take on values over the full range of real numbers as it leads to biased coefficient estimates in the analysis of recreational demand curves.

Assessing the opportunity cost of time is a major issue in recreation demand analysis as ignoring the time cost can generate significant bias in the analysis. Researchers recognize the importance of the opportunity cost of time but forced to make strong assumptions due to the unavailability of a direct methodology to address it. The often-used strategy is to use a fraction of wage to evaluate time costs. Researchers have extended recreational demand studies to compute the welfare loss through wetlands disintegration (Farber., 1996), preserving through restrictions on development (Grigalunas et al., 2004) as well as in public investment (Mcgrath, 2006).

THEORETICAL FRAMEWORK

Individual preferences for non-market goods are derived in correspondence to the costs of travel to acquire is known as travel cost method. This method is predominantly applied to outdoor recreation modelling and is applicable to valuation of certain amenities in biodiversity and ecosystem. It is often assumed, that there is an associate cost with the recreational experiences as a direct or an opportunity cost. The change of the quality or quantity can be valued through the demand function for visiting the site that is being studied. There are range of issues including; analyst's judgements with regard to the treatment of costs, extent of the access (closer sites with large number of visitor and restricted areas with no value under the TC), and difficulty in recognising the importance or existence of a site (Chee, 2004; Farber et al., 2002).

Travel cost model is based on that the cost of travelling to a site as an important component of the full cost of a visit and also wide variation in travel costs across any sample of visitors to that site. According to McConnell (1992), the individual's utility "u" depends on bundle of other commodities (x), number of visits to the recreational site (r), quality of the recreational site (q); and can be expressed by $u = u(x, r, q)$.

The consumer faces the budget constraint: $M + pw.t_w = x + c.r$, where "M" is exogenous income "pw" is wage rate "t_w" is hours of work and c is monetary cost of a trip.

In addition to the above budget constraint, the consumer faces the following time constraint: $t^* = t_w + (t_1 + t_2)r$, where t^* is total discretionary time, t_1 is round trip travel time, and t_2 is time spent at site. Substituting the t_w to budget constraint; $M + pw.t^* = x + r[c + pw(t_1 + t_2)]$. This equation implies that the total income of the individual is spent on recreation site as well as the bundle of other commodities.

Total income has two facets i.e. the exogenous income and the potential income earned by allocating all the available time for work. Consumer's expenditure includes cost of the other commodities and cost of recreation. The price of recreation (Pr) $[c + pw(t_1 + t_2)]$ includes the monetary cost of travel to the site (c), the time cost of travel to the site and the cost of time spent at the sitepw $(t_1 + t_2)$. The monetary cost of travel has two

components; the admission fee and the monetary cost of travel. If the admission fee represents by f and the monetary cost of travel is given by p_d.d wherep_d, is the cost of travel/Km and d is the distance travelled. Thus, the utility maximization problem of the consumer can be represented as: Max:u(x,r,q); St.M+pw.t^*= x+r[f+p_d.d + pw(t_1+t_2)]. The Lagrangian function of the maximization problem is: L=u(x,r,q)+ h(M+pw.t^*-[x+r{f+ p_d.d+pw(t_1+t_2)} where h is the marginal utility of money income.

By using the first order necessary conditions of the utility maximization problem are: M+pw.t^*=x+r{f+ p_d.d+pw(t_1+t_2). This equation shows the consumer's income to his expenditure. Solution to the above equations provides demand function for number of visits to the recreation site that can be expressed as: r[p_r (f,p_d,d,pw,t_1,t_2),M,Q]

Economic valuation of a recreational site involves the estimation of the demand for recreation through calculation of the associated consumer surplus. Observable Marshallian demand curve is used to estimate the value.

Those who live close to the recreational site would be expected to make more visits to the site as implicit price measured in terms of travel and time cost is lower than the other visitors. Therefore, according to the law of demand the visitation rate should have a negative relation to the travel cost. Consumer surplus is expected to be lower for the other visitors than for the visitors from adjacent. Thus, the demand function for an un-priced commodity can be estimated by using visitation rate and the travel cost that can be used to calculate the total consumer surplus or the welfare derived from the recreational site.

In this study, the recreational demand of local visitors was derived through individual travel cost method (ITCM), where the number of visits that the individuals actually made to the site during a specified period of time that depends on the travel cost, time costs, monthly household income and other individual characteristics.

Then the Zonal Travel Cost Method (ZTCM) was applied to derive the recreational demand of foreign visitors, where the site has very low individual visitation patterns.

METHODOLOGY

Study site

Negombo is one of foremost cities in Sri Lanka, located on the west coast of the island and at the mouth of the Negombo Lagoon in Western Province. Negombo is the fifth largest city and the second largest city in the Western province after Colombo. Negombo is also the administrative capital of the Negombo Division. It is one of the key commercial hubs in Sri Lanka with about 128,000 inhabitants within city limits. The economy of Negombo is mainly based on tourism and fishing industry. Although the lagoon is state

owned the surrounding areas are partly state owned and partly private. Over 100,000 people live in Negombo lagoon area where livelihoods of most of them are based mainly on fishing and natural resource harvesting, with a minority of residents earning income from employment and small-scale trade. The lagoon area is characterised by high levels of poverty. The clearing of mangroves for housing projects, cutting of mangroves for firewood and illicit manufacture of liquor are the major threats been facing by the lagoon.

The estuary socially perceived as a major tourist destination and ideal place of luxury and tropical life style with those who want quick access to international airport and Colombo city. Estuary includes Muthurajawela Marshland, which has a substantial biological value with the protected mangroves that are home to over 190 species of wildlife.

DATA COLLECTION AND DATA ANALYSIS

By using the inputs of our primary study, we have selected highly dense 9 recreational and tourist sites but not hotels or restaurants. Data were collected from those sites that were located within the study area during five months started from December, 2016 to April, 2017. Data were collected from Monday to Sunday (to identify the variation within weekdays and weekends) and also 4th week of Dec, 3rd week of Jan, 2nd week of Feb, 1st week of Mar, and 4th week of April to identify the seasonal variation in visits. Primary data were collected from pre tested and numbered questionnaire and the secondary data from Sri Lanka Tourism Development Authority. Data were collected at the entry point and from those only who were over the age of 16 and, only one member per group. At the end of five months we had 1055 filled questionnaires from local (domestic) respondents and we removed all the questionnaires that were filled by respondents who were visiting the site from more than 25km distance. This was done in order to treat very low visiting rates and multi-destination trips. It is difficult to allocate the travel cost to different recreational sites visited by multiple sites visitors, and it may overestimate the travel cost if the visitors stop at other sites. But this was minimized by restricting respondent within 25km and within city limits. Then there were 990 pre-numbered questionnaires that were filled by respondents who were visiting the site from Negombo city limit. Then we generated random numbers and weighted the sample of 330 visitors to capture the variation by obtaining a representative sample. Recreational data were collected only from 100 foreigners due to lack of cooperation. We consider all the respondents, as the sample was very small.

Recreational demand of local visitors was were derived through ITCM and number of average trips per month taken by an individual to the recreational site was taken as the dependent variable. The explanatory variables include the travel cost per individual to the site, age, and household income. Gender, type of employment, educational level, and marital status were used as dummy variables. Travel cost was derived by aggregating

round trip travel cost to the site and opportunity cost of the time. Different modes of transport were considered and average per km travel cost was calculated using the data from the questionnaire.

Total time was derived by adding round trip time with the onsite time. Time cost was derived by multiplying a fixed fraction (0.004/hr on weekday and 0.002/hr on weekends) of the wage rate as proxy to the opportunity cost of time. The basic count data model that satisfies discrete probability distribution and non-negative integers is Poisson regression. Therefore data were analyzed by using negative binomial regression in generalization of Poisson regression by generalized linear model. Consumer surplus of a local person per year was derived by using the travel cost and average visiting rate.

Recreational demand of foreign visitors was derived through ZTCM. Visitation rate was taken as the dependent variable and it is derived by collecting data on the number of visitors and their country of origin was collected. Only eight countries were considered and others were excluded since the number of visitors from these countries were very low or one during the period of the study. The countries considered in this assessment include USA, England, Germany, Netherland, Australia, Malaysia, Singapore and India. Travel cost per individual to the site, age, and income were used as the explanatory variables while gender, type of employment, educational level, and marital status were used as dummy variables. Travel cost was derived by aggregating airfare, round trip travel cost to the site, accommodation cost and opportunity cost of the time. Including airfare gives recreation value for Sri Lanka rather than recreation value of lagoon. Therefore, a fixed fraction (0.01) of airfare, accommodation cost at Negombo, and transport cost from hotel to the lagoon was taken as the travel cost. Time cost was derived as a fixed fraction (0.004) of income. Per capita income for the country was used as the income. The same method was used to estimate the consumer surplus/recreational benefits accrued by foreigners. Visiting rate was calculated by dividing the total count of visitors to the lagoon from total number of visitors to Sri Lanka that was obtained from the Sri Lanka Tourism Development Authority. Based on normal p-p plots and variance inflation factors, OLS regression model was fitted for the visitation rate.

RESULTS AND DISCUSSION

Table 1 shows the demographic characteristics of local respondents. The average visiting rate of the respondents was 2 times with a minimum of 1, and a maximum of 7 years and a standard deviation of 1. The monthly income of the respondents varied considerably with a standard deviation of LKR 48,137. The mean monthly wage of the respondents was LKR 54,195 while the maximum was LKR 450, 000. Majority of the visitors were ranked above the national urban minimum monthly income. Average travel cost was LKR 232 with minimum and maximum of LKR 30 and LKR 1000 respectively.

In the sample, nearly three fourths (n= 234) of the visitors were male while approximately 65% percent of the visitors were married.

Table 1 Demographic -Local respondents

Demographic factors	Count	Per (%)
Age		
18-25	78	23.6%
26-35	93	28.2%
36-45	93	28.2%
over 55	66	20.0%
Gender		
Male	234	70.9%
Female	96	29.1%
Marital stage		
Un-married	114	34.5%
Married	216	65.5%
Education		
Primary	24	7.3%
GCE O/L	102	30.9%
GCE A/L	120	36.4%
Degree	84	25.5%
Employment		
Unemployed	36	10.9%
Employed	192	58.2%
Freelancer	60	18.2%
Pensioner	21	6.4%
Student	21	6.4%

Source: Based on survey data

More than 75 percent of the respondents had a secondary education while the less literate percentage was comparatively low. Only 17% of the respondents were unpaid family workers or students over 16 years.

Table 2 Demographic -Foreign respondents

Demographic factors	Count	Percentage
Age		
18-25	23	23%

26-35	14	14%
36-45	23	23%
over 55	40	40%
Gender		
Male	61	61%
Female	39	39%
Marital stage		
Un-married	40	40%
Married	60	60%
Education		
Primary	3	3%
High school	59	59%
Degree	38	38%
Employment		
Unemployed	2	2%
Employed	67	67%
Freelancer	23	23%
Pensioner	4	4%
Student	4	4%

Source: Based on survey data

Table 2 shows the demographic characteristics of foreign respondents. Only 8 countries (Figure 1) were considered and the monthly income of the respondents varied considerably with a standard deviation of USD 20,642. In the sample, nearly three fifth (n= 61) of the visitors were male while approximately 60% percent of the visitors were married. Only 3% of them were below the high school education. Only 6% of the respondents were unpaid family workers or students over 16 years.

Figure 1 Visitor from different countries
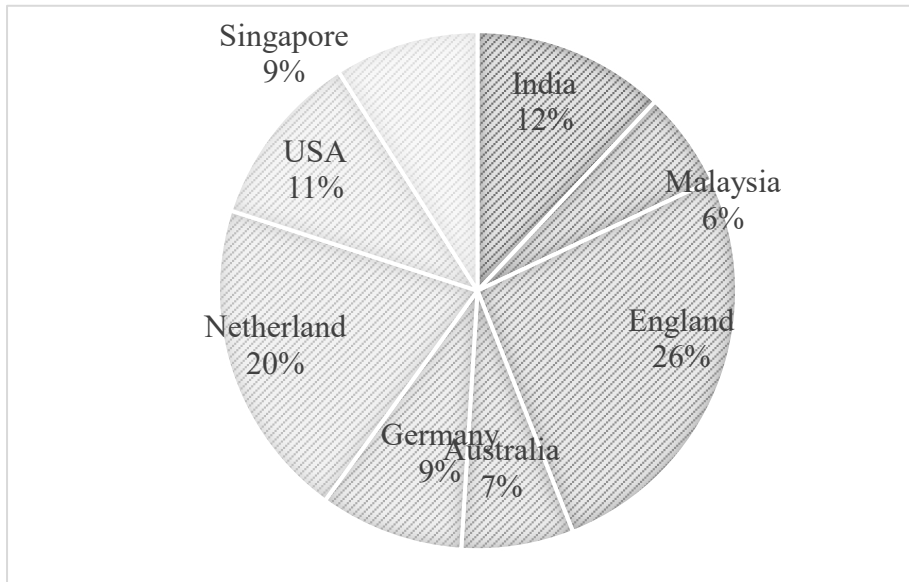
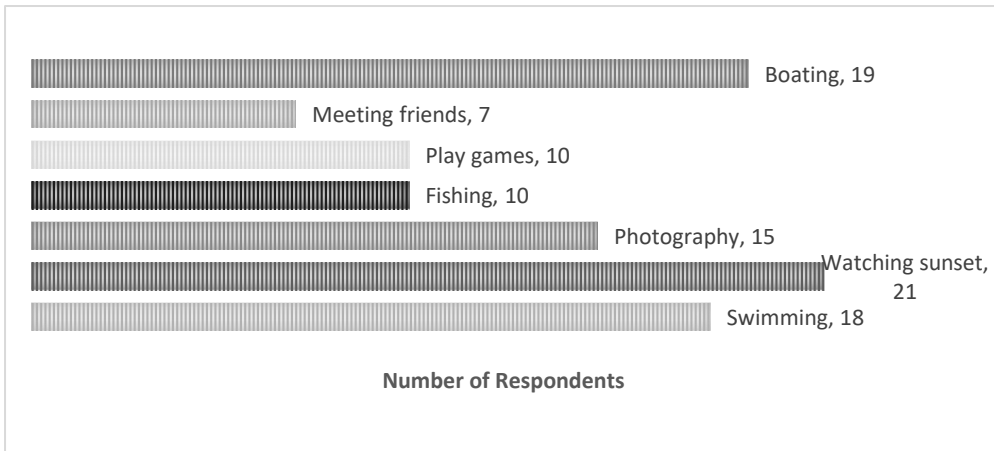Source: Based on the survey data

The purpose of visiting lagoon was examined for both local and foreign visitors. A high percentage of local visitors in the sample visited the site for the purpose of meeting friends while fishing, swimming, and boating were the other major interactive activities (Figure 2).

A high percentage of foreign visitors in the sample visited the site for the purpose of watching sunset while boating, swimming, and photography were the other major interactive activities (Figure 3)

Figure 2 Purpose of visit-Local residents
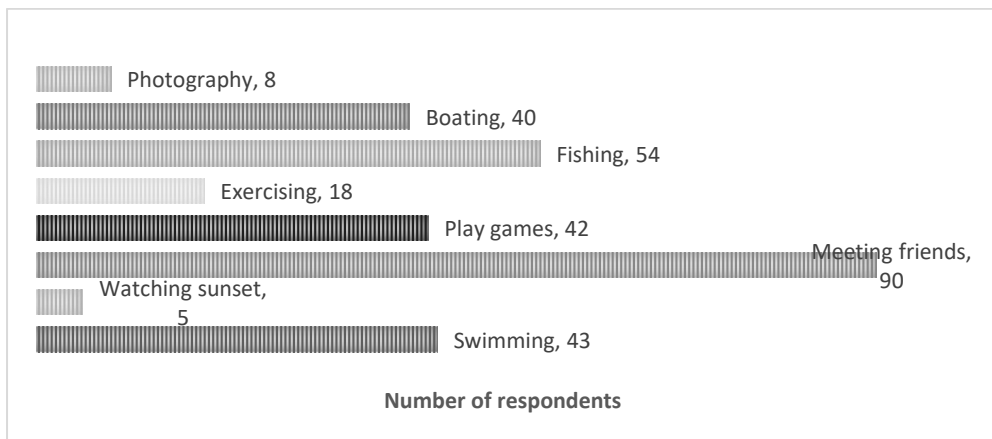
Source: Based on the survey data

Figure 3 Purpose of visit-Foreign residents

Source: Based on the survey data

Recreational demand for local visitors was derived through ITCM and was analyzed by using negative binomial regression in generalization of Poisson regression by generalized linear model. The negative sign and the significance of the travel cost variable suggest a downward sloping demand curve and indicate that the visitation rate decreases as the travel cost increases. Consumer surplus of a local person per year was derived by using the travel cost and average visiting rate.

All the occupational categories show a significant (95% CL) positive impact on the visitation rate with pensioners and freelancers with highest impact. The effect of income was also significant and leads to conclude that a higher income and the availability of more leisure time produce a higher visitation rate. Al the other variables were not significant and lead to conclude that the age, gender, marital stage and educational level has no impact to the visitation rate.

Consumer surplus presents the difference between the individual willingness to pay and the actual expenditure, which was derived as LKR 5,228/yr/visitor. Social welfare value or the aggregate consumer surplus can be derived by using the total annual visits by the population of visitors to the site. Since there was no official estimate of the annual population of visitors to the site, population within Negombo city was assumed as the population of visitors. Urban population was taken due to two reasons; (a) all the respondents in sample were taken within distance of 25Km and, (b) majority of the visitors in sample were ranked above the national urban minimum monthly income. Hence, we estimated the total social welfare for the population of visitors as USD 4.7 million.

Recreation demand for foreign visitors was derived through ZTCM, and was analysed through OLS regression model that was fitted for the visitation rate. Visiting rate was calculated by dividing the total count of visitors to the lagoon from total number of visitors to Sri Lanka that was obtained from the Sri Lanka Tourism Development Authority. The negative sign and the significance of the travel cost variable suggest a downward sloping demand curve and indicate that the visitation rate decreases as the travel cost increases. The effect of per capita income, education and marital stage were also significant and leads to conclude that a higher income, higher educated and married foreigners produce a higher visitation rate.

Table 3 Social welfare from the foreign visitors

Country	Consumer surplus/visitor/Yr (USD)	Number of annual visits according to the sample Method (a)	Social welfare Method (a) USD Million	Annual visitors to the Sri Lanka Method (b)	Social welfare Method (b) USD Million
India	522.0633	96	0.050118	356,729	186.2351
Malaysia	911.3167	48	0.043743	24,727	22.53413
England	1169.141	216	0.252534	188,159	219.9844
Australia	1485.667	60	0.08914	74,496	110.6762
Germany	1376.542	72	0.099111	133,275	183.4587
Netherland	1525.747	168	0.256325	41,373	63.12472
USA	1535.815	96	0.147438	54,254	83.32411
Singapore	2220.054	72	0.159844	19,033	42.2543
Total			**1.0982**		**911.5916**

Source: Based on the survey data

Consumer surplus was estimated for each country (Table 3) and the highest was recorded for Singapore. Social welfare value can be derived by using the total annual visitors from each country to the site. There was no official estimate or record of the annual foreign visitors to the site. Therefore, social welfare value or the foreigner's recreation demand was derived in two ways; (a) by taking the average visitors of study as the population, and (b) by taking the average annual visitors to Sri Lanka from different regions and valued derived are USD Million 1.098 and USD Million 911.59 respectively.

CONCLUSION

Travel cost model was used to estimate the recreational demand for Negombo lagoon through welfare that visitors derive from tourism and recreational activities in the Negombo lagoon. The total consumer surplus generated from the wetland for the

foreigners was higher for the total annual tourist visits and would be far higher for the local community if we were to incorporate other use- and non-use values into it.

Both ITCM and ZTCM methods have been used to estimate the recreational value for both local and foreign visitors as an innovative approach while identifying the most influential aspects on visiting rate. The socio-economic variables used in the study reveal important information that should be of interest to resource managers and planners. The consumer surplus derived for both local and foreign visitors demonstrates the trade-off and synergies of sharing lagoon for recreational activities. Lagoon as a tourism destination is not only compatible with local tourism activity but can also contribute to diversifying the recreational activities through the restoration and managing of the sites. Further, the mass tourism and ecological preservation can find synergies in tourists who want to enjoy natural areas and their cultural services while enjoying lagoon and recreational opportunities.

The lagoon carries high potential for development into an important urban recreational site while both concern and criticism are growing regarding the implementation of development. Study highlights the preference of visitors for to enhance the quality of the wetlands as well as the willingness of people to pay for the recreational services provided by the wetlands. The study therefore recommends that the authorities should develop urban recreational activities with least disturbance to the natural environment which include eco-friendly restaurants on stilts, nature trails, board walks, waterfront snack bars and viewing decks for bird watching and sunset. Negombo, as an area experiencing rapid social and environmental transformations, there is a need to develop capacity for coastal ecosystem management to respond to changes and to develop policy directions that can help to enhance the outdoor recreation as well as ecotourism.

POLICY IMPLICATIONS

Coastal ecosystems are incredibly important habitats for wildlife. They also provide valuable recreational benefits to people that further extends when they are located close to urban communities. This idea is examined in this study that highlights two issues to be considered in policy implications: the preference of visitors for there to be an enhancement in the quality of the lagoon view; and the value of recreational services provided by the wetlands. The study therefore recommends that the authorities should design recreational projects with the least disturbance to the natural environment. Further lagoon as an ecotourism hotspot need to be counted in development models. Therefore, the policymakers should chart their development projects to balance the development strategies which emphasize economic growth but do not jeopardize lagoon sustainability.

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