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Demand for ecotourism: an assessment of recreation value of lagoon in Sri Lanka

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Abstract
Leisure and Eco-tourism are a significant opportunity and nexus for managing the relationship between habitats and people, particularly urban ecosystems, where people live in an area that often restricts their communication with natural or semi-natural ecosystems. In the face of increasing demand for urban recreational facilities, the Negombo lagoon has proved to be an important recreational site in a larger urban area. This study assesses the demand for recreation for the Negombo lagoon while explicitly defining the status of recreational activities in the Negombo lagoon through monetary signals to inspire and maintain public support for lagoon security and conservation. However, to measure welfare benefits from recreation, the analysis utilizes both the Individual Travel Cost Method (ITCM) and the Zonal Travel Cost Method (ZTCM).

Keywords: ecotourism, recreation, ITCM, ZTCM

Introduction

In several coastal societies that promote coastal land conservation and management, coastal habitats are considered valuable ecological tools to generate substantial tourism and outdoor recreation activities. A growing literature examining the recreational value of coastal habitats has led to evaluate the benefits provided by coastal lands against the costs associated with their conservation and management. A significant opportunity and nexus for managing the relationship between habitats and humans, including habitat, growth, and security, is leisure and tourism. Leisure activities which are related to recreation such as cycling, boating, photography, observing nature and swimming provide many individuals with an opportunity to explore the benefits of ecosystems directly. However, this mainly applies to urban environments, where people living in an environment often have little interaction with natural or semi-natural ecosystems (Siriwardena, & Silva, 2017) [7].

Via aesthetic experience, intellectual stimulation, motivation, leisure, and tourism also have many significant benefits for physical and psychological well-being. In literature, leisure is frequently consolidated and addressed in the form of regular or short-term in nearby green spaces, day, tourism, and overnight tourism. While overnight tourism seems to be recognized and incorporated to some degree, the literature does not mention regular outdoor recreation. Besides, the current coastal recreation literature is almost entirely dedicated to estimating the importance of recreation, but not to understand the trade-off between foreign (Sumanapala, H. D. P., Kotagama, S. W., Perera, P. K. P., Galahitiyawe, N. W. K., & Suranga, D. A. C. S., 2017) [8] and local tourists who often have free access to a range of outdoor recreation activities. This study uses travel cost method (ITCM) techniques to analyse the leisure related recreational demand for the Negombo lagoon in Sri Lanka. The site is symbolic of the many local and international, free-access coastal locations that are alternative destinations to larger, more popular beaches across Sri Lanka. In this context, the present study aims to generate recreational demand in the Negombo lagoon for both local and foreign tourists. Specifically, the study aims to identify the status of recreational activities in the Negombo lagoon at the time of research and, through monetary signals, to inspire and maintain public support for lagoon protection and conservation which is significant for both environmental and the tourism industry.

Review of Literature

Non-market wetland valuation approaches can be narrowly divided into two methods: direct which insist on surveys to request an individual's valuation of products in a hypothetical market for the relevant product and indirect by applying on consumer behaviour in similar markets in the case study area. Via these two categories, the additional recreational value can be calculated under three specific approaches where the single site demand as travel cost(TC) approach, site cost process, which based on choice of random utility (RU)) and stated the method of preference through the contingent valuation(CV). Moreover, preference has also been seen in literature, and preference approaches have been used either individually or to estimate the changes in welfare related to quality changes in recreational sites which is another significant point.

Travel Cost Method (TCM) is a reveal preferred method based on observed actions representing maximization of utility subject to a constraint that is one of the oldest environmental valuation methods developed by Hotelling (Freeman, 1993). TCM tracks Marshallian consumer surplus approximated and bounded by welfare measures of compensating variance (CV) and comparable variation (EV) (Brander *et al.*, 2006). This approach uses the cost of travel as a proxy for the recreation price, assuming reasonable action on the part of the customer, whereas the only decision variable is the number of visits paid by the consumer over some time for a specific recreational location. The cost of travel varies with distance from the recreation site. A curve of surrogate demand can be derived based on varying cost information used as a measure of welfare to estimate the

market surplus (Gunatilake, 2003) [3].

There are two alternatives: (a) the Individual Travel Cost Method (ITCM) for sites with high individual visitation rates; and (b) the Zonal Travel Cost Method (ZTCM) for sites with deficient individual visitation patterns. The benefit of ITCM over ZTCM is that the inherent variance in the data compared with the aggregation is considered and can be calculated using a smaller number of observations. While researchers prefer ITCM over ZTCM for reasons such as statistical performance, theoretical consistency, and increasing heterogeneity among populations within zones, the implementation of the correct TCM depends on the identification of the dependent variable and the reason for the use of both methods in some studies (Rolfe et.al, 2007).

TCM has been widely used in natural recreation, but not so much in the South Asian continent, according to Groot et. al., 2012. There is little evidence as stated by Gunatilake and Vieth, 1998 [4]; Marawila *et al*., (2010), from Sri Lanka, that has not yet been discussed in much more philosophical, theoretical, and methodological aspects. The Ordinary Least Square (OLS) estimation has been used in several studies to estimate the parameters of the recreational demand equation, and the maximum probability approach tends to be more attractive to evaluate truncated samples due to the non-negative values and integer values of trips. Besides, ordinary regression methods require the dependent variable (Creel and Loomis, 1990) [2], to take values over the full spectrum of real numbers because, in the study of recreational demand curves, it leads to skewed coefficient estimates.

In leisure demand analysis, determining the opportunity cost of time is a significant problem because ignoring the time cost will create substantial bias in the analysis. Researchers understand the significance of the opportunity cost of time but are forced to make firm assumptions because a straightforward approach is inaccessible to counter it (Pathmananda kumar, 2017) [6]. The often-used solution is to use a percentage of the salary to calculate the cost of time. Researchers have expanded studies of recreational demand to measure the loss of welfare through wetland disintegration, protection through construction restrictions and public expenditure (McGrath, 2006).

Theoretical Context

Individual preferences for non-market goods are derived as a travel cost tool in correspondence with the travel costs to be obtained. This approach is primarily applied to modelling for outdoor leisure and recreation and they apply to the valuation of some biodiversity and ecosystem amenities. It is also believed that there is an associated cost with leisure experiences as a director opportunity expense. Using the demand function for visiting the site being analysed, the improvement in quality or quantity can be evaluated. There are a variety of problems, including the decisions of the analyst about the treatment of costs, the degree of access (closer sites with a large number of visitors and restricted areas without TCM value), and the challenge of understanding the significance of the specific site.

However, the cost model of travel is based on travelling to a site as an essential component of a visit is full cost and a wide variance in travel costs across any sample of visitors to that site. The utility of the individual "u" depends on the bundle of other resources (x), the number of visits to the recreational site (r), the standard of the recreational site which based on the quality (q) which), and can be expressed by *u*= u (x, r, q) (McConnell, 1992).

As per the budget constraint faces the consumer: M+pw.t w = x+c. r, where "M" is exogenous. Wage rate "pw" is wage rate "t w" is hours of work, and c is a trip's monetary expense. The consumer faces the following time constraint in addition to the above budget constraint: t^*=t w+(t 1+t 2)r, where t^ * is overall discretionary time, t -1 is round trip travel time, and t- 2 is time spent on site. Replacing t w with budget constraint; M+pw.t^*= x+r [c+ PW (t 1+t 2)]. However, the specific equation gives the individual's total income is spent on recreation places and the package. Moreover, there are two facets of overall income, i.e. the exogenous income and the future income gained by allocating all the time available for work. Consumer spending includes the expense of other goods and leisure costs. The recreation price (Pr) [c+ PW(t 1+t 2)] includes the cost of travelling to the site (c), the cost of travelling to the site and the cost of time spent on the site (t 1+t 2)].

Components; the admission fee and the travel monetary cost. If the admission fee is f and the travel monetary cost is given by p-d. d where-d, the travel cost / km and d is the distance travelled. The consumer's utility maximization problem can therefore be expressed as: Max: u(x, r, q); St. M+pw.t^*= x+r[f+p d.d + pw(t -1+t -2)]. The maximization problem's Lagrangian function which based on theory of formalism in classical field 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 revenue. M+pw.t^*=x+r {f+ p_d. d+pw (t_1+t_2) are the required conditions of the utility maximization problem by using the first order. This equation shows the revenue of the user to his expenditure. The solution to the above equations provides a demand function for the 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].

The economic valuation of a recreational site involves estimating the demand for leisure by measuring the related market surplus. The value is calculated using the measurable Marshallian demand curve. It will be expected that those who live near the recreational site will make more visits to the site as the implied price calculated in terms of transport and time cost is lower than the other visitors. The occupancy rate should therefore have a negative relationship to the travel cost according to the law of demand (Bandara, W. M. S. T., 2018) [1]. For the other visitors, the consumer surplus is projected to be lower than for the neighbouring visitors. The recreational demand of local tourists was extracted in this study through the Individual Travel Cost Method (ITCM), where the amount of visits that individuals actually made to the site over a given period of time depended on the cost of travel, time costs, monthly household income and other individual characteristics. The Zonal Travel Cost Method (ZTCM) was then used to derive international visitors' recreational demand, where the site has very low individual visitation patterns.

Methodology

As per the location factor, Negombo is one of Sri Lanka 's foremost towns, situated on the island's west coast and at the mouth of the Negombo Lagoon in the Western Province. After Colombo, Negombo is the fifth largest city and the second largest city in the Western Province. Negombo is also the Negombo Division's administrative capital. With around 128,000 inhabitants within the city limits, it is one of

the key commercial hubs in Sri Lanka. Negombo's economy is largely focused on tourism and the fishing industry. Although the condition of the lagoon surrounding areas are partly owned by the state and partly private. More than 100,000 people live in the lagoon region of Negombo, where most of their livelihoods are focused primarily on fishing and harvesting natural resources, with a minority of residents earning jobs and small-scale trade profits. High levels of poverty characterise the lagoon region. The major threats facing the lagoon are the clearance of mangroves for housing developments, the cutting of mangroves for firewood, and the illegal production of alcohol for poor consumption. However, the estuary is socially viewed by those who want easy access to the international airport and Colombo city as a major tourist destination and an ideal place of luxury and tropical lifestyle. Muthurajawela Marshland, which has a major ecological value with protected mangroves that are home to over 190 wildlife species, is included in the estuary (Guruge, Jayasinghe-Mudalige, Premarathne, & Weerakoon, 2020) [5].

Data Collection and Analysis

Therefore, the study has selected highly dense few leisure recreational and tourist locations, but not reputed hotels or restaurants which have registered with the tourist authority-Sri Lanka, using the inputs of our primary research. Data from those locations within the study area were collected over five months, starting from November 2019 to March 2020. Data were collected from Monday to Sunday in order to identify the demand pattern with difference in weekdays and weekends and also to identify the seasonal variation in visits from the 4th week of November, 3rd week of December, 2nd week of January, 1st week of February, and 4th week of March. Primary data from pre-tested and numbered questionnaires and secondary data from the Tourism Development Authority of Sri Lanka were collected. Data was obtained at the point of entry and only from those over 16 years of age and only one member per party. However, research had 955 questionnaires filled out by local respondents at the end of five months and the deleted all questionnaires filled out by respondents who visited the site from more than 30 km away. This was done to cope with very low visiting rates and trips to various destinations. It is difficult to allocate the cost of travel to various recreational sites visited by several site tourists, and if visitors stay at other sites, the travel cost can be overestimated. But by limiting respondents to 30 Km and within city limits, this was reduced. There were then 890 pre-numbered questionnaires filled out by respondents who visited the Negombo city limit site. To capture the variance by obtaining a representative sample, we then generated random numbers and weighted the sample of 320 visitors. Owing to a lack of communication, recreational knowledge was only obtained from 90 foreigners. As the sample was very tiny, that considered all the respondents. Local visitors' leisure and recreational demand was derived from ITCM and the dependent variable was the number of average trips per month taken by a person to the recreational site. The explanatory variables include the cost of traveling to the location, age, and household income per person. As dummy variables, gender, form of job, educational level, and marital status were used. The cost of travel was extracted by aggregating the cost of the round trip to the site and the cost of the opportunity. Different modes of transport were considered and, using the questionnaire data, the average travel cost per km was determined. By adding round trip time to the onsite time, total time was derived. The cost of time was calculated by multiplying the wage rate as a proxy for the opportunity cost of time by a fixed fraction (0.004 / hr on weekdays and 0.002 / hr on weekends). Poisson regression is the simple count data model that satisfies discrete distribution of probabilities and non-negative integers. Data were then analysed by using negative binomial regression by generalized linear model in generalization of poisson regression. Using the travel cost and average visiting rate, the market surplus of a local individual per year was extracted. Via ZTCM, recreational demand was derived from international tourists. The visitation rate was used as the dependent variable and is derived from the collection of data on the number of visitors and the collection of their country of origin. Only eight countries were considered, and others were omitted as the number of tourists from these countries during the study period was very or very low. The USA, England, Germany, the Netherlands, Australia, Malaysia, Singapore and India are among the countries considered in this evaluation. The explanatory variables were travel costs per person to the site, age, and income, while gender, form of job, educational level, and marital status were used as dummy variables. By aggregating airfare, round trip travel costs to the venue, hotel costs and opportunity cost of the time, travel costs were extracted. Including airfare gives Sri Lanka recreation value rather than lagoon recreation value. A fixed fraction (0.01) of airfare, the cost of lodging at Negombo, and the cost of transport from the hotel to the lagoon were therefore taken as the cost of travel. As a fixed fraction (0.004) of sales, time cost was extracted. Per capita income was used as income for the region. To estimate the market surplus / recreational advantages accrued by foreigners, the same approach was used. The visiting rate was determined by dividing the total number of lagoon tourists from the total number of Sri Lankan visitors obtained from the Tourism Development Authority of Sri Lanka. The OLS regression model was modified for the visitation rate based on standard p-p plots and variance inflation variables.

Results and Discussion

The demographic features of local respondents are shown in the following table, 1 with a minimum of 1, and a median of 7 years and a standard deviation of 1, the average visit rate of the respondents was 2 times as per the data. With a standard deviation of LKR 49,187, the monthly income of the respondents differed significantly. The respondents' average monthly wage was LKR 55,125, while LKR 466, 400 was the highest. Most of the visitors were ranked above the monthly national urban minimum wage. LKR 288, with a minimum and maximum of LKR 40 and LKR 1100 respectively, was the average travel rate. Nearly three quarters (n= 234) of the visitors were male in the study, while about 65 percent of the visitors were married.

Demographic-Local Respondents

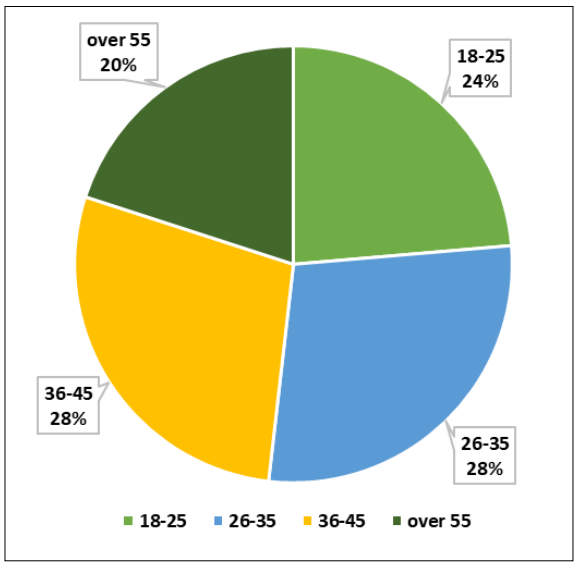

Fig 1: Demographic Factors-Age (Survey, 2020).

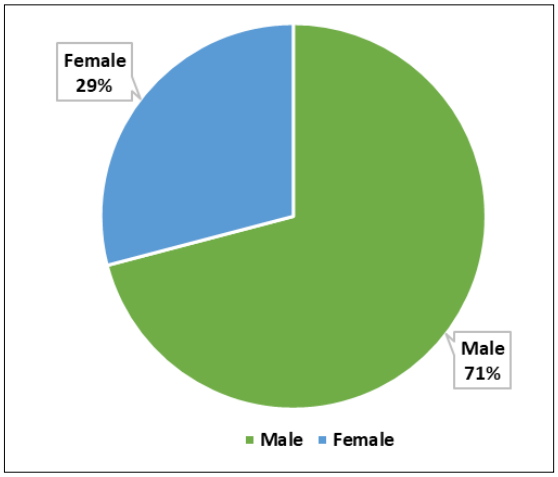

Fig 2: Gender (Survey, 2020).

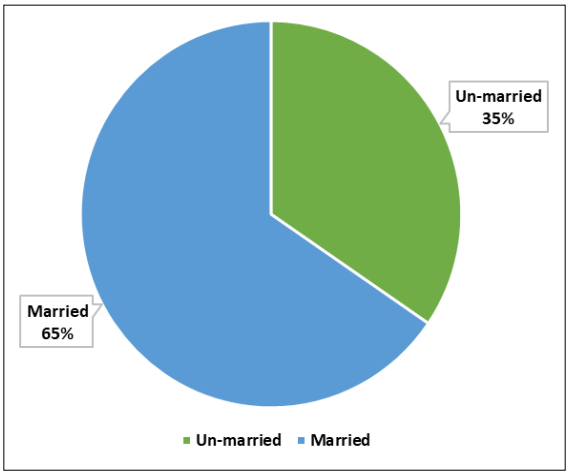

Fig 3: Marital stage (Survey, 2020).

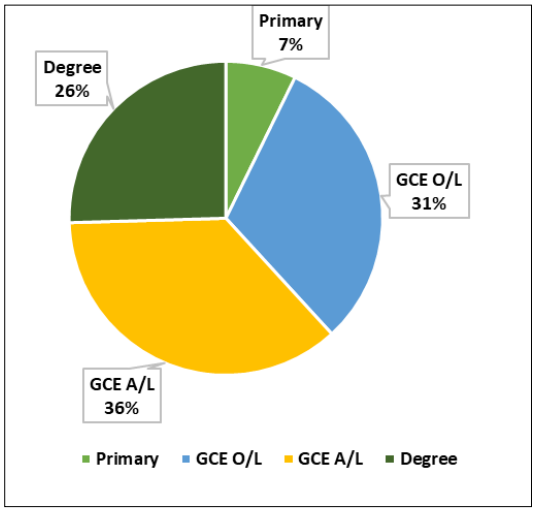

Fig 4: Education (Survey, 2020).

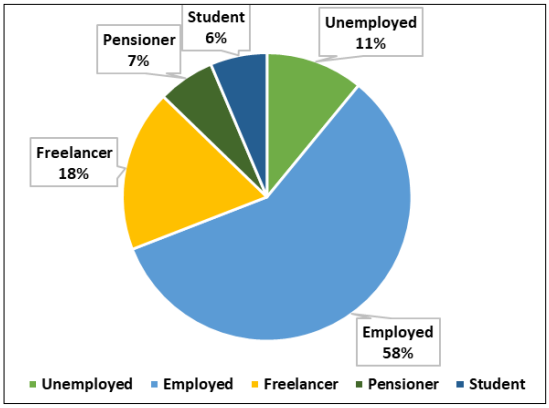

Fig 5: Employment (Survey, 2020).

About 75% of respondents had secondary education, while the number of respondents who were less literate was comparatively poor. Just 17 percent of respondents were family employees or students over 16 years of age who were unpaid.

Demographic - Foreign Respondents

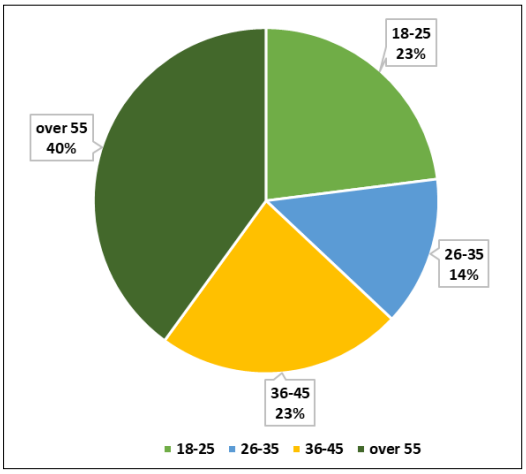

Fig 6: Demographic Factors-Age (Survey, 2020).

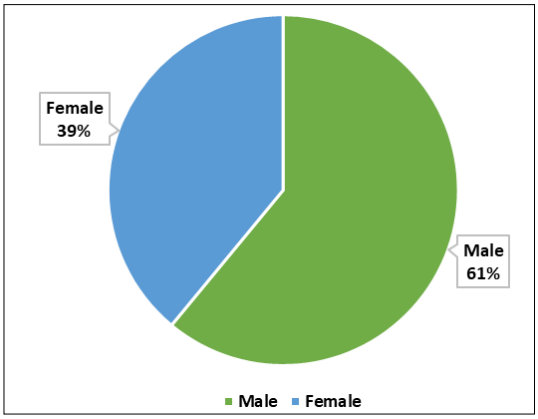

Fig 7: Gender (Survey, 2020).

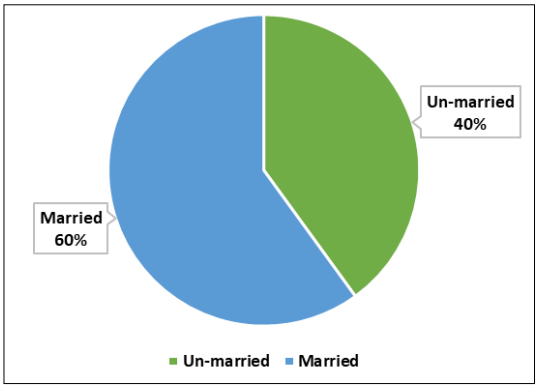

Fig 8: Marital stage (Survey, 2020).

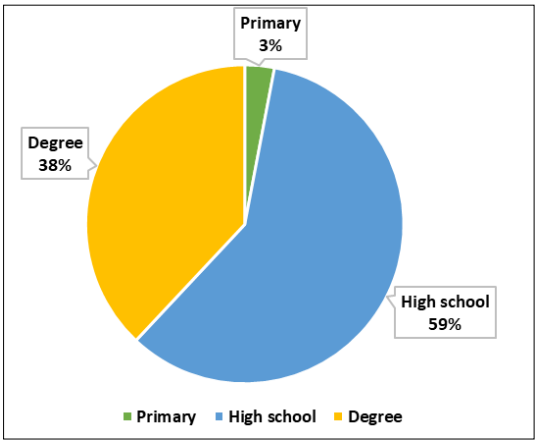

Fig 9: Education (Survey, 2020).

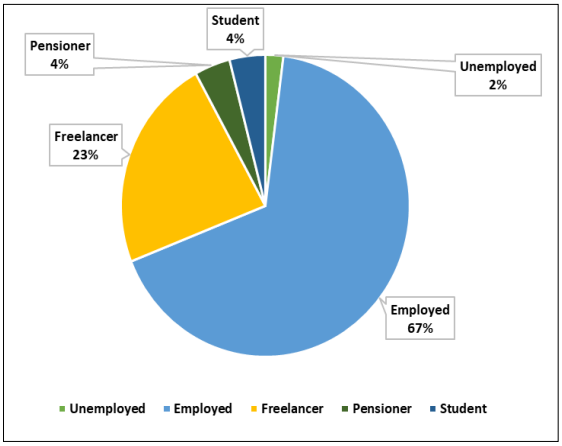

Fig 10: Employment (Survey, 2020).

Centred on the demographic features of global respondents. Only eight countries were considered, and the monthly income of the respondents differed significantly, with a standard deviation of USD 21,641. Nearly three-fifths (n= 61) of the visitors were male in the study, while about 61% of the visitors were married. Just 4 % were below the standard of secondary school education. Only 6 per cent of respondents were family, employees, or students over 16 years of age who were unpaid. For both local and international tourists, the intention of visiting the lagoon has been examined. To make friends, a high percentage of local visitors in the sample visited the site while fishing, swimming, and boating were the other main interactive activities. To see the sunset while boating, swimming, and photography were the other main interactive activities, a high percentage of international tourists in the sample visited the site. Via ITCM, recreational demand for local visitors was extracted and analysed by using negative binomial regression by the generalised linear model in the generalisation of Poisson regression. The negative sign and the importance of the cost variable of travel imply a downward sloping demand curve and show that as the cost of travel rises, the visitation rate decreases. However, by using the travel costs and average visit rate, the market surplus of a local individual per year was derived.

For pensioners and freelancers with the highest effects, all occupational groups have a significant (95% CL) positive impact on the visitation rate. The influence of income has also been essential.

It leads to the inference that a higher percentage of visitation is generated by higher revenue and the availability of more leisure time. The other variables were not relevant and led to the conclusion that the rate of visitation was not influenced by age, gender, marital stage, and educational level. The disparity between the personal willingness to pay and the real expenditure, derived as LKR 6,227/yr/visitor, is presented by the market surplus. The value of social welfare or the net market surplus can be calculated from the cumulative annual visits made by the site's tourist population.

Since there was no official estimate of the yearly population of tourists to the location, it was presumed that the community within the city of Negombo was the tourist population. There were two reasons why the urban population was taken; (a) all respondents in the survey were taken within a distance of 25 km and (b) the majority of sampled visitors were rated above the national minimum monthly urban income. Therefore, we estimated that the overall social welfare of the tourist population was USD 4.8 million.

The demand for international visitors for recreation was extracted by (ZTCM and analysed by OLS regression model) which was adapted to the visitation rate. The visit rate was determined by dividing the total number of lagoon visitors from the total number of Sri Lankan visitors received by the Sri Lankan Tourism Development Authority. The negative sign and the importance of the cost variable of travel imply a downward sloping demand curve and show that as the cost of travel rises, the visitation rate decreases.

The impact of per capita income, education and marital status were also essential. It led to the inference that a higher visitation rate is generated by higher income, higher educated and married aliens.

Table 1: Social welfare from the foreign visitors

Location	Consumer surplus/ visitor/Annual (USD)	The Social welfare approach (A) USD Mil	The social welfare approach (B) USD.Mil
India	522.0633	0.050118	186.2351
Malaysia	911.3167	0.043743	22.53413
England	1169.141	0.252534	219.9844
Australia	1485.667	0.08914	110.6762
Germany	1376.542	0.099111	183.4587
Netherland	1525.747	0.256325	63.12472
USA	1535.815	0.147438	83.32411
Singapore	2220.054	0.159844	42.2543
Total		1.0982	911.5916

Source-Survey (2020).

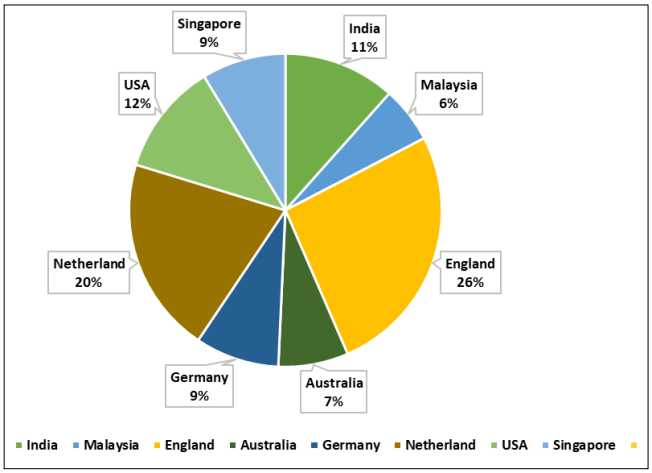

Fig 11: Number of Annual Visits as Per the Sample Approach (A) -Survey (2020).

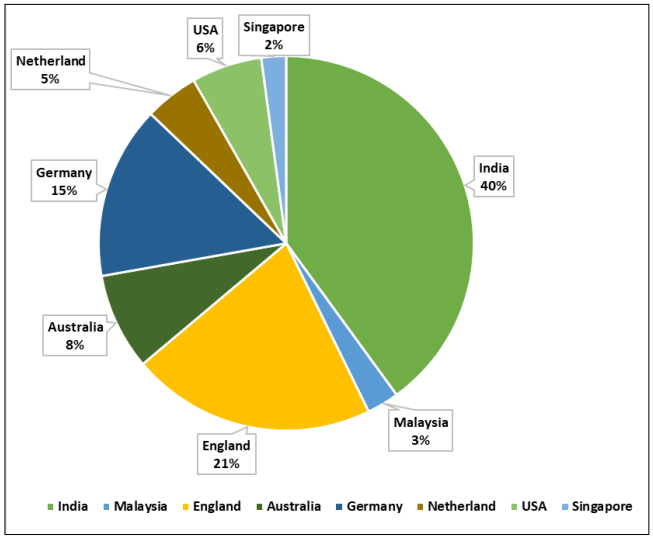

Fig 12: Yearly Visitors to the Sri Lanka Approach (B) Survey (2020).

For each nation, the consumer surplus was estimated (Table 3), and Singapore reported the highest. The importance of social welfare can be calculated by using the total yearly visitors to the site from each country. The official estimate or record of the annual international visitors to the location was not given. Therefore the social welfare benefit or the demand for recreation of the foreigner was extracted in two ways; (a by taking the average study visitors as the population, and (b) by taking the average annual visitors from different regions to Sri Lanka and valued derivatives are USD 1,098 and USD 911,59 respectively.

Conclusion

However, to estimate the recreational demand for Negombo lagoon through welfare derived from tourism and recreational activities in Negombo lagoon, the travel cost model was used. For the total annual tourist visits, the total consumer surplus produced from the wetland for foreigners was higher. It would be much higher for the local community if we were to integrate other values of use and non-use into it. Both ITCM and ZTCM techniques have been used as a revolutionary method to estimate the recreational benefit of both local and international tourists while defining the most influential aspects of the visitor volume. The socio-economic variables used in the study show valuable details for resource managers and planners that should be of concern. The customer surplus illustrates the trade-off and synergies of sharing lagoons for recreational activities derive from both local and international visitorsLagoon as a tourism destination is not compatible with local tourism activity. Still, contributes to the diversification of recreational activities through the conservation and management of the sites. Besides, tourists who want to enjoy natural areas and their cultural services while enjoying lagoons and recreational opportunities can find synergies in mass tourism and ecological preservation. The lagoon has a high potential for development into a significant urban recreational site, although both concern and criticism about the implementation of development are increasing. The research highlights the desire of tourists for improving wetland quality and the willingness of people to pay for the recreational services offered by the wetlands study. As an area witnessing rapid social and environmental changes, Negombo needs to develop coastal ecosystem management capabilities to adapt to changes and build policy directions that can help increase outdoor recreation as well as ecotourism.

The Policy Consequences

For wildlife, coastal environments are critically valuable habitats. They also provide individuals with essential leisure benefits that are further expanded as they are situated in urban areas. This concept is discussed in this report, which highlights two concerns to be considered in terms of policy implications: The preference of tourists to enhance the nature of the view of the lagoon; And the importance of the recreational services offered by the wetlands study, thus proposing that the authorities develop recreational projects with the least natural environment disturbance. Count-development model, models need to be another lagoon as an ecotourism hotspot. Policymakers should map their development projects to balance development policies that

Emphasise economic growth, but do not threaten the sustainability of the lagoon.

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