Ecotourism Value of Muthurajawela Wetland: An Application of Travel Cost Method

W. K. T. R. JINADASA[1], A. M. T. P. ATHAUDA[1] and Y. DE SILVA[2]

[1]*Department of Agribusiness Management, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Makandura, Gonawila (NWP)*
[2] *Department of Commerce, 4th Floor, 'Rakshana Mandiraya' Vauxhall Street, Colombo 02.*

ABSTRACT

Ecotourism is a new concept in the field of tourism that accounts for a significant portion of the income earning of the tourism industry. It is nature based tourism with environmental conservation and it contributes for the improvement of the well being of local community by providing much of socioeconomic benefits. It can be practiced in a lot of natural places such as sanctuaries, natural forests and plantations. Therefore, it has a timely need to assess the value of this kind of ecotourism sites with a view of enhancing them as ecotourism sites.

The purpose of this study is to estimate the recreational value of Muthurajawela wetland in order to decide the worthiness of Muthurajawela as an ecotourism site. Further, the study determines the optimum entrance fee to the site in local currency. The socio-economic data gathered through a sample survey of local visitors in different zones of Sri Lanka were analyzed to estimate the annual recreational value of Muthurajawela wetland.

The study revealed that the annual recreational value of the Muthurajawela wetland is approximately 2.12 million Rupees. The study concluded that when compared to other similar ecotourism sites of the country, the annual recreational value of Muthurajawela is low due to fewer turnovers of local visitors.

KEYWORDS: Ecotourism, Recreational Value, Total Travel Cost

INTRODUCTION

The tourism in Sri Lanka is one of the industries which has been fast growing and earning higher foreign exchange for the country. In the year 2005, the foreign exchange earning from the tourism sector was $ 329 million providing 52,085 direct and 72,919 indirect employment opportunities (Anon, 2005a).Therefore it is necessary to develop the tourism industry in a sustainable manner that would provide positive results to the society and environment while minimizing negative effects.

The new phenomenon called 'Ecotourism' has developed during the last few decades. In developing countries the governments are frequently in difficulty to find resources to protect, conserve and make optimum use of natural resources. In this kind of situation, compared to ordinary tourism ecotourism can play an important role in emphasizing and establishing natural resource conservation (Khan, 2004). The definition of ecotourism defined by the Sri Lanka Tourist Board (SLTB) is "Responsible travel to cultural and natural areas that conserves the environment and improves the well-being of local communities". Therefore the concept of ecotourism is very important in conserving natural resources and sustaining the welfare of local people.

Today, when consider the overall situation for tourism in Sri Lanka there is a high potential for development of ecotourism due to some heritages such as biodiversity, ecological diversity and our culture characteristics in Sri Lanka (Kotagama and Vidanage, 1995).

Muthurajawela is one of the most important wetland sites. Being situated so closely to Colombo and also lying sufficiently close to tourist hotels between the Bandaranaike international airport in Katunayake and Colombo this wetland is very important in promoting tourism (Seang, 2005). It covers 3100ha of marshland and mangrove forest, located inland from the ocean and directly to south of the Negombo lagoon. Out of 3100ha a land of 100ha has been declared as a sanctuary and it a is a seasonal home for many migrant birds. Muthurajawela marshland is a very valuable place with a high biodiversity in both flora and fauna (Anon, 2004).

Due to all these potentials of this wetland, as an ecotourism site it could create higher foreign exchange earnings for Sri Lanka. Therefore, it is very important to realize the true value of this kind of sites

Recreational valuation is one method of evaluating this wetland monetarily. In developing countries park entry fees are low or non-existent resulting in little revenue. As a result maintenance and management problems of the site frequently occur. Unless we know the exact value of the site, it will be difficult to make proper allocations of finance and other resources for the maintenance and management of the site (Khan, 2004). On the other hand, the valuation of the site is very important for policy recommendations on how overall benefit of the site can be improved. When information regarding the value of wetland is lacking, misallocation of resources occurs and it generates futile expenditures on site improvements. Therefore this study of valuing Muthurajawela wetland was carried out to facilitate decision making in resource allocation and policy making regarding overcoming mismanagement of the site and preventing overuse of resources. In this study annual recreational value of the Muthurajawela wetland was estimated using the Zonal Travel Cost Method and an entrance fee was calculated for the site.

METHODOLOGY

Data collection

Primary data were collected by using a pre-tested structured questionnaire. A total of 64 local visitors from different zones were interviewed to gather information on various aspects of their visits such as travel distance, mode of transport, travel cost incurred in visiting the park, educational level and level of income of the respondents.

Secondary data such as adult population in each region, average income and wage rate were collected from the Department of Census and Statistics and total number of visitors to the site during the survey conducting period was collected from the visitor centre in Muthurajawela.

Data Analysis

To estimate the recreational value of Muturajawela wetland, Travel Cost method was used.

The basis of Travel Cost method was as follows.

An individual tries to maximize following utility function.

$$\text{Max: } u(X, r, q) \quad (1)$$

Where,

X = Bundle of other commodities
r = Number of visits to the site
q = Quality of the site

$$M + p_w \, .t_w = X + c.r \quad (2)$$

Where,

M = Exogenous income
p_w = Wage rate
t_w =Hours of work
c = Monetary cost of a trip

$$t^* = t_w + (t_1 + t_2).r \quad (3)$$

Where,

t^* = Total discretionary time
t_w = Hours of work
t_1 = Round trip travel time
t_2 = Time spent at site

Assumptions,

1. r and q are compliments in the utility function.
2. individual is free to choose the time spent at work and does not convey utility or distillate directly
3. Monetary cost to the site has two components. Namely, the admission fee and the monetary cost of travel. (cost is p_d . d where p_d is per-kilometer cost and d is distance)

Substituting (3) to (2)

$$M + p_w t^* = X + [c + p_w.(t_1 + t_2)]r \quad (4)$$

Equation (4) shows that the individual income is spent totally on consuming a bundle of other commodities and a visit to the recreation site. The income has two components, exogenous income and the potential income, which could be generated by allocating all the available time for work.

So the utility maximization problem of the individual can be shown as;

$$\text{Max: } u(X, r, q)$$

$$\text{St: } M + p_w t^* = X + [f + p_d.d + p_w(t_1 + t_2)] \quad (5)$$

The Lagrangain function of the maximization problem is:

$$L = u(X, r, q) + \lambda\{M + p_w t^* - [X + r\{f + p_d.d + p_w(t_1 + t_2)\}]\} \quad (6)$$

Where,

f = Entrance fee
p_d = Cost per kilometer
d = Travel distance in kilometers

The first order necessary conditions are;

$$\delta u / \delta X = \lambda \quad (7.a)$$

$$\delta u / \delta r = \lambda[f + p_d.d + p_w(t_1 + t_2)] \quad (7.b)$$

$$M + p_w t^* = X + r\{f + p_d.d + p_w(t_1 + t_2)\} \quad (7.c)$$

Where, λ is marginal of money income.

The maximization of utility equation subject to the constraint equation results in the individual's demand function for visits.

$$r = r(p_r(f, p_d, d, p_w, t_1, t_2), M, q) \quad (8)$$

This model was derived to estimate individual's recreational value. To estimate this demand function it is required time series data regarding the number of visits of each visitor. Due to the fact that it was difficult to collect such data within the study period, an alternative method, Zonal Travel Cost method was used (ZTC) (Gunathilaka, 2004). The regional visit rate (VR) was assumed as a proxy for the quantity demanded for recreation of the site. Visitors from nearer region to the site were expected to have a higher visit rate than visitors from a farther regional distance since the travel and the time cost is lower for closer regions.

a. Estimation of the recreational value

A demand function was developed by regressing VR as dependent variable and Total Travel Cost (TTC) as independent variable. It was

Model 1: $VR = \beta_0 - \beta_1$ TTC

The VR and the TTC have a negative relationship. The estimated demand function was

used in calculating consumer surplus in each zone. (It was assumed that demand functions of each zone are straight lines).

Total Travel Cost (TTC) mainly consist of

- Transportation cost (Direct cost)
- Opportunity cost of time (Time Cost)
- Other Cost (Indirect Cost)

$$VR = \frac{\text{Total number of Visitors from the Zone} * 10000}{\text{Zonal adult population}}$$

b. Calculation of the optimum entrance fee

Another demand function was developed by regressing estimated total number of visitors (V) as dependent variable and hypothetical entrance fees (ef) as independent variable. Estimated function was

Model 2: $V = \beta_2 - \beta_3 ef$

An entrance fee was calculated at the point where Total Revenue (TR) is maximized

$TR = V.ef$

RESULTS AND DISCUSSION

1. Characteristics of visitors

1.1. Distribution of educational level

Visitors with different educational levels had come to the Muthurajawela wetland. According to the information gathered 55% of visitors interviewed possessed an education higher than Advanced level (figure 1). Therefore it is revealed that people who have high educational level frequently visit this site, because they are well aware of the importance of the natural places and prefer to experience sceneries.

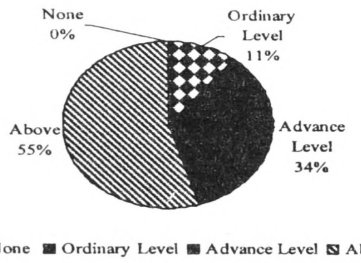

Figure 1 - Educational level of visitors

1.2. Urban and rural visitors

The number of visitors from urban areas was higher than the visitors from rural areas. That may be due to urban people having less chance to experience the natural environment and therefore they wish to visit this kind of places to have the experience of the nature.

1.3. Visitor's purpose of the visit

The result showed that the visitors have three purposes for their visits recreational, educational and other purposes such as photography. 60 percent of visitors had visited Muthurajawela to have a boat trip, to watch birds, other animals and mangroves for their recreational satisfaction. Further, university and school students had visited this site for their educational purposes (30%) such as researches and projects. Fewer visitors had come for other purposes.

1.4. Number of visitors and visit rate

Colombo and Gampaha districts showed higher visitation and Jaffna and Matale districts showed low visitations. The visit rate is also high in Colombo and Gampaha district. Because Gampaha and Colombo districts are located close to this site and therefore travel cost to this place is low (Table 1). .

Table 1 - Annual distribution of visitors among zones and relevant visit rates:

District	Number of Visitors	Visit Rate (VR)
Colombo	8892	66.33
Gampaha	7560	60.98
Kegalle	2316	49.50
Kandy	1836	24.05
Polonnaruwa	360	16.70
Kalutara	756	11.88
Matale	240	9.04
Rathnapura	504	8.33
Matara	252	5.52
Jaffna	50	1.70
Total	22766	

2. Estimation of the recreational value

Jaffna, Matale and Matara had the highest TTC. Because of the long travel distance and travel time. Colombo and Gampaha showed the lowest TTC values due to the fact that it has low travel distance and time to the site (Table 2).

Developed demand function (Model 1) was VR = 86.3 - 0.0824 TTC

Table 3 - Result of the Regression analysis:

Predictor	Coefficient	t-value	p
Constant	86.3	6.43	0.000*
TTC	-0.0824	-4.77	0.000*

* significance at 1% level R^2 (adj.) =70.7 %.

TTC was negatively related with VR. TTC has significant effect on VR and this model was taken as the demand function for Muthurajawela (Table 3).

Colombo district has the highest consumer surplus that followed by Gampaha district. Jaffna showed low value of consumer surplus. Out of total number of visitors, highest numbers of visitors were from Colombo and Gampaha. In Jaffna the numbers of visitors were very low and therefore, consumer surplus value was consequently low. Total consumer surplus was calculated by adding relevant consumer surplus values of each zones and it was Rs. 2, 122,043.38 (Table 4).

Table 2 - Estimated total travel cost (TTC) for each zone:

District	Transport Cost (Rs.)	Time Cost(Rs.)	Indirect Cost (Rs.)	Total Travel Cost (Rs.)
Colombo	116.52	88.45	250.74	455.70
Gampaha	112.31	59.86	279.55	451.72
Kegalle	119.25	43.75	355.00	518.00
Polonnaruwa	326.67	45.46	285.00	657.12
Rathnapura	371.75	45.93	395.00	812.68
Kandy	178.59	60.47	267.00	506.06
Jaffna	500.00	93.15	525.00	1118.15
Matara	500.00	59.65	440.00	999.65
Matale	307.69	78.47	625.00	1011.16
Kalutara	183.67	62.51	610.00	856.17

Table 5 - Estimated number of visitors at hypothetical entrance fee rates:

Districts	Number of visitors for increasing entrance fee (Rs.)									
	00.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0
Colombo	6535	6314	6093	5873	5652	5431	5210	4989	4768	4547
Gampaha	6084	5880	5676	5471	5267	5063	4858	4654	4450	4246
Kegalle	2041	1964	1886	1809	1732	1655	1578	1501	1424	1347
Polonnaruwa	693	657	622	586	551	515	480	444	409	373
Rathnapura	1170	1070	970	871	771	671	572	472	372	272
Kandy	3405	3279	3154	3028	2902	2776	2650	2524	2399	2273
Matara	179	104	29	0	0	0	0	0	0	0
Matale	79	35	0	0	0	0	0	0	0	0
Kalutara	1003	898	793	688	583	478	373	268	0	0
Total visitors	21189	20202	19223	18326	17458	16589	15721	14853	13821	13058

Table 4 - Calculated consumer surplus of each district:

District	Consumer Surplus (Rs.)
Colombo	882,486.54
Gampaha	756,816.00
Kegalle	201,869.51
Kandy	163,992.44
Kalutara	39,798.11
Rathnapura	28,054.40
Polonnaruwa	24,854.40
Matara	11,417.49
Matale	10,726.44
Jaffna	2,028.05
Total	Rs2,122,043.38

3. Calculation of the optimum entrance fee

Entrance fee (ef) was negatively related with number of visitors (V) (table 5). The developed demand function (Model 2) was V = 20368 – 37.8 ef.

Table 6 - Result of the regression analysis:

Predictor	Coefficient	t-value	p
Constant	20368	123.59	0.000*
ef	-37.8	-61.55	0.000*

* significance at 1% R^2 (adj.) = 99.4%.

Entrance fee (ef) has significant effect on V and this was taken as the demand function (table 6). An entrance fee including boat fee was calculated at the point where total revenue is maximized and it was Rs.**391.64** per visitor.

CONCLUSIONS AND RECOMMENDATIONS

The study revealed that the estimated recreational value of the Muthurajawela wetland is Rs. 2122,043.38 and it is very low compared to the other sites such as Bopath-Ella, Polhena beach mainly due to unawareness of people result in less turn over of local visitors to the site and less availability of expenditure avenues to the visitors. It is concluded that even though Muthurajawela has potentials for ecotourism still it is in the development stage which can be developed further as a competent ecotourism site. Therefore policy makers should pay attention to allocate more resources to develop infrastructure, to make people aware by using effective mix of marketing tools with the intention of making a competent ecotourism site. As well as expenditure avenues such as food services, shops for buying souvenirs, booklets, photographs, facilities for accommodations should be offered to the visitors with the intention of increasing indirect cost component which leads for high consumer surplus value.

It is concluded that even though people gain less recreational benefit they gain comparatively much more than they pay to visit because they pay lesser amount than the estimated entrance fee. But in this place there are number of activities such as bird

watching, viewing sceneries, boating, nature walk which can be practiced. Therefore the current fee should be increased up to the estimated entrance fee including boat fee, Rs.391.64. But this would result in a decrease of turn over of visitors. Therefore to overcome this, the facilities such as sanitary and security should be improved with the intention of attracting more visitors.

ACKNOWLEDGEMENT

Authors wish to thank. Mr. W. P. A. S. Weerasinghe, manager, visitor centre of the Muthurajawela and his staff for granting approval to conduct this study at the visitor centre of the Muthurajawela wetland. And also the authors wish to offer their sincere thanks to Mr. J. C. Edirisinghe, lecture, Department of Agribusiness Management.

REFERENCES

Anon,(2005b). Income and Expenditure survey in 2003. Department of Census and Statistics.

Anon, (2005a). External sector development and policies. Annual report, 2005.Central Bank of Sri Lanka Colombo. 88-89

Anon, (2004). An Ecological Distribution. Annual Conference. Sri Lanka Ecotourism Society.

Gunathilaka, H.M. (2003), Environmental valuation-Theory and applications

Khan, H. (2004). Estimate of the recreational benefits from the Margalla Hills National Park in Northern Pakistan. pp:1-3

Seang, S (2005). Importance of Wetlands in Sri Lanka.South-South Exchange program phase 2. Available:at:http://www.ebc.org.ph/ssep2/read.php (Retrieved March.2006).

Vidanage S. P., H. B. Kotagama and P. Abeygunawardana (1995). Potential and Factors affecting Ecotourism in Sri Lanka, Forestry for Development-proceeding of the Annual Forestry Symposium 1995, and Sri Lanka: pp239-242.