Potential of the conservation oriented mangrove based ecotourism; A case study of Kadolkele Mangrove Reserve, Negombo, Sri Lanka

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Abstract

Tourism sector plays an important role in Sri Lanka's economy by providing employments in hospitality industries and tourism related business. This paper reviews the potential for mangrove based ecotourism at Kadolkele Mangrove Reserve (KMR), Negombo, for its sustainability and conservation. Economic valuation of mangrove ecosystem was conducted based on the use and non-use values. However, KMR, which lies within the perimeter of Regional Research Centre of National Aquatic Resources Research and Development Agency, is restricted to use for direct economic activities but limited to study and research activities. Therefore, valuing direct economic uses are challenging. The potential for ecotourism of this mangrove area was estimated using questionnaire, among the eco-tourists, who reside at hotels nearby KMR. A similar survey was conducted among hoteliers in the west coast, who engaged in ecotourism business. Tourists willingness to pay (WTP) for mangrove based ecotourism was about 1-10% of their total travel cost. A tourist was willing to pay on an average USD 17 per visit to a mangrove park. Study reveals that KMR has a great potential for mangrove based ecotourism activities, if developed with appropriate policy measures and management plan. Further, it would significantly contribute to the sustainability of similar mangrove ecosystems of the area and attract investment for mangrove based ecotourism.

Keywords: Negombo Estuary, Ecotourism, Mangrove, Economic valuation

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Introduction

Ecotourism, being the most attractive subset of the tourism industry, contributes extensively to natural resources conservation and local developments. Identification, classification and introduction of ecotourism attractions, as an exclusive capital of a country, are significantly important in national development. In recent years, ecotourism industry began to play a key role in national economy, job creation and environmental conservation of developed countries (Ramzani Gouraei, 2003). Sri Lanka, emerged from a long period of armed conflict in 2009, is aiming at rapid economic development. Tourism is identified as a key sector to accelerate economic growth, emphasizing wise utilization and conservation of natural resources and environments, which is an integral part of sustainable development. The sector is a key foreign exchange generator and provides livelihood for many people, employed in the hospitality industry and other tourism-related ventures, which contributes approximately 2% annually to the GDP. It generates both direct and indirect employment opportunities, the total direct employment was 67,867 in 2013. Gross receipts from tourist arrivals exceeded US $ 1038 Mn (SLTDA, 2013).

Among the various sub-sectors of tourism, nature based tourism was identified as an important sector, possessing great potential for economic development. One of the areas of nature based tourism is ecotourism and it had become a buzzword in many circles (politicians, NGOs, businessmen, academics and environmentalists). Every nation bestowed with some natural resources and historical heritage embarked on developing this area of nature tourism. This is because ecotourism is perceived to be the solution to the adverse effects of mass tourism, which is viewed as unsustainable.

Ecotourism is defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education". Education is meant to be inclusive of both industry staff and tourists (TIES, 2015). In this definition, a certain element of ethics, morality and values involved in ecotourism, i.e. it is expected that people, who take part in an ecotourism excursions are very responsible people, who love the natural environment and would like to contribute towards its conservation. It implies that the eco-tourists are keen to minimize the impacts on wildlife, soil, vegetation, water, and air quality and respect local culture and

traditions. Environment is conserved by the contribution from tourists, while the tourists are benefited from non-consumptive use of the resources (which economists refer to as use value), as it enhances the tourists knowledge on the site visited and their utility level. Eco-tourists generally seek educational experiences to enhance their knowledge on environment. Interpretative programs, especially high quality guided tours promote environmental awareness and cultural understanding.

The local community obviously benefitted by both improvements to the resources (which have been sustaining their life) and new source of income, brought by the visiting eco-tourists. The relationship among the three entities, involved in ecotourism is given in Fig 1.

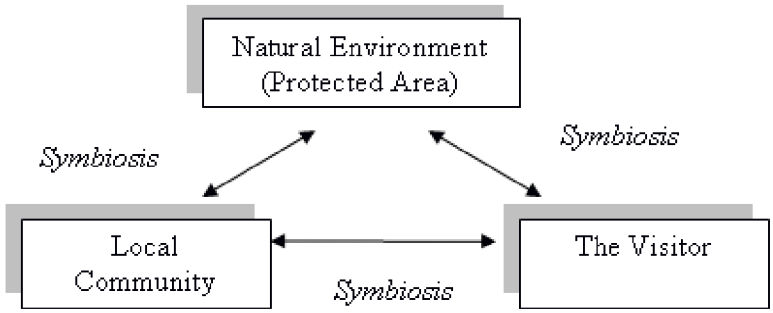

Fig. 1. The relationship between visitor, environment and local people in ecotourism

Tourist arrivals to Sri Lanka

Sri Lanka is an attractive destination of foreign visitors from the historic times. In the post independent era, tourism sector had shown a remarkable development in terms of number of tourist arrivals and increase in hospitality infrastructure. A dedicated ministry for tourism industry in Sri Lanka was established in 1970. Tourist arrival gradually had grown until the commencement of civil disturbances in 1983, and thereafter drastically dropped and unpredictably fluctuated. Table 1 shows that the tourist arrivals between the year 2000 and 2008 had fluctuated from 400,000 to 500,000. The civil disturbances brought to end by 2009, after three decades of conflict, thereafter a significant and steady growth was recorded in the tourism sector. The tourist arrivals in 2009 and 2013 are 447,890 and 1,274,593, an annual increase of 30%.

In the year 2013, revenue received by visiting ecotourism related destination amounts to Rs. Mn. 2532. In total 71.8% tourists are pleasure based and among them 26% preferred to have ecotourism experience (SLTDA, 2013).

Table 1. Annual tourist arrivals

Year	No. of Tourists	Year	No. of Tourists
2000	400,414	2007	494,008
2001	355,794	2008	438,475
2002	393,171	2009	447,890
2003	500,642	2010	654,476
2004	566,202	2011	855,975
2005	549,308	2012	1,005,605
2006	559,603	2013	1,274,593

Source: Annual Reports of Sri Lanka Tourism Development Authority, 2013

Table 2. Revenue from visiting the selected ecotourism destinations in 2013

Destinations	Revenue (Rs. Mn.)
Cultural triangle	1,727.1
Wildlife parks	578.5
Zoological gardens	550.9
Botanic gardens	314.9
Museums	43.9
Total	3215.3

Table 2 shows the revenue received by major ecotourism destinations, estimated by entry fees receipts. However, the impact of the trickle down benefits by boarding, lodging, travelling, etc for the local communities cannot be underestimated.

Table 3 indicates the occupational categories of tourists arrived in 2012 and 2013. Educationalists, Scientists and Technicians and Professionals together constituted 28.1 and 33.4% in 2012 and 2013 respectively, which implies that a potential to extend ecotourism market does exists. It is also reported that coastal ecotourism has tremendous potential for further expansion of ecotourism sector in Sri Lanka (Rajasuriya *et al.*, 1995).

"Mangrove ecotourism" may not be defined as a new "branch" of coastal ecotourism, however it reveals the type of the site visited by the tourists. Mangroves are a woody forest that lies at the interface between the land and the sea at tropical and subtropical latitudes. The environment is saline, inter-tidal, and windy with anaerobic muddy soil. The present study evaluates the ecotourism potential of KMR by applying economic valuation principles.

Table 3. Percentage of tourist arrivals as per occupation category

Occupation	Arrivals (in %)	
	2012	2013
Educationalists/ Academics	6.8	9.2
Retired persons	8.1	9.4
Scientists and Technicians	9.9	6.7
Professionals	17.5	17.5
Businessmen	19.9	29.5
Executives	16.8	7.4
No occupation	13.0	10.1
Others	19.2	10.2

Source: Annual Report of Sri Lanka Tourism Development Authority, 2013

Materials and Methods

Study site

Kadolkele Mangrove Reserve belongs to National Aquatic Resources Research and Development Agency (NARA), is located at the right bank of Northern part of Negombo Estuary (Fig. 2). KMR expands to an area of 10 ha with a rich biodiversity. It remains as a habitat for 30 mangrove species, where 19 of them are considered as true mangroves, while 32 other types of vegetation also exists at this reserve (Dahanayaka and Sumanadasa, 2007). Families with highest abundance of mangroves are Rhizophoraceae, Avicenniaceae and Combretaceae, which are distributed successively towards inland. *Lumnitzera racemosa* and *Avicennia marina* are dominated in Combretaceae and Avicenniaceae families respectively. *Rhizophora apiculata* and *R. mucronata* are the most abundant species in Rhizophoraceae family while other species, include *Bruguiera gymnorhiza*, *B. sexangula* and *Ceriops tagal*. Mangrove associates are found distributed towards land with high abundance of *Premna integrifolia*, *Derris scandens* and *Acanthus ilicifolius* (Dahanayaka and Sumanadasa, 2007). In total, 44 bird species belonging to 38 genera of 22 families (Udagedera and Dahanayaka, 2013) and 35 species of fish belongs to 27 families (Gammanpila and Dahanayaka, 2008) recorded within the reserve. The ecological value of the mangroves is not adequately valued by the nearby community, thus the mangrove patch is under threat, especially due to high demand and

value of the land in the area. However, the mangroves within the KMR are left untouched, while the adjacent mangrove patches are cleared for anthropogenic activities. Mangroves are very important as nursery grounds for fish and crustaceans and provide nutrients to the lagoon. This study aimed at evaluating the value, identifying the strategies for conservation and estimating the ecotourism potential of KMR.

Valuation of direct and indirect uses

Valuation of direct and indirect uses of mangrove reserve was conducted using methodology, developed by Hambrey (1996); Janssen and Padilla (1996); Sivakumar *et al*., (1997); Batagoda (2003); Pahalawattaarachchi and Amarasinghe (1997), Ranasinghe and Kallesoe (2006), IUCN (2007); Jayakody *et al.,* (2008) (Table 4). Visitor information was collected using log book of the KMR to analyze visitor profiles.

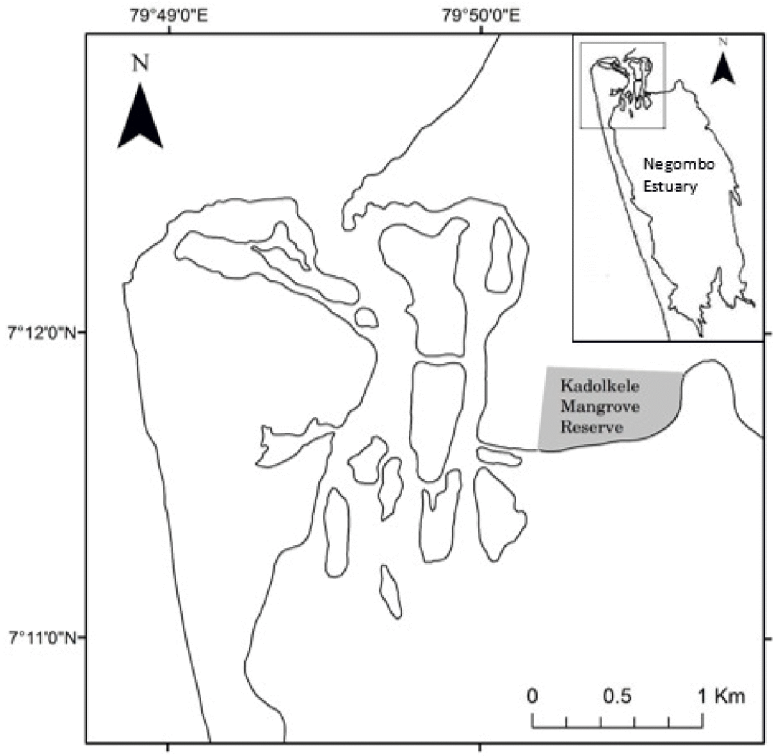

Fig. 2. Location map of Kadolkele Mangrove Reserve

Table 4. Mangrove ecosystem valuation approaches adapted in the study

	Type of use	Source/ Method of estimates
Indirect Uses	Providing breeding ground Erosion control benefits Storm protection benefits Pollution treatment benefits	Batagoda (2003)
	Carbon sequestration benefits	Pahalawattaarachchi & Amarasinghe (1997) Jayakody *et al.*, (2008)
	Biodiversity value	IUCN (2007)
Alternative Uses	Conversion in to shrimp Farm	Hambrey (1996)
	Conversion in to milkfish farm	Janssen & Padilla (1996)
	Conversion in to housing developing lands	Hedonic pricing method
Direct Uses	Non-timber forest products	Sivakumar *et al.*, (1997)
	Providing mangrove saplings for replanting	Market price method
	Recreation benefits	Batagoda (2003)

Tourists willingness to pay (WTP) for mangrove based ecotourism

KMR is open for non-use values such as enjoying scenic beauty, research and study tours. The potential for ecotourism of this mangrove area is estimated using a questionnaire survey conducted among the foreign tourists at suburb hotels. Ranweli Holiday Village Hotel at Waikkal is mainly selected for questionnaire survey, primarily due to its proximity and well established operational mangrove ecotourism. Visitors to the Ranweli Hotel have an inclination for ecotourism based pleasure activities. Structured questionnaire survey was conducted among 120 foreigners during year 2008-2009.

Results

The study reveals that the foreign tourists, who visit to the Negombo and suburbs are willing to pay about 1 - 10% of their total cost of travel for mangrove based ecotourism. They were stated that about 2% of the travel cost is expected to spend on mangrove based ecotourism. A tourist was willing to pay on an average USD 17 per visit for mangrove based ecotourism.

Fig. 3. shows the changes in visitors of KMR according to log data on year 2008, 2009, 2013 and 2014. The major regions are represented as percentages of the total visitors.

According to Fig. 3, foreign visitors to the site were insignificant as one in 2008 and two in 2009, because of Kadolkele mangrove area is not open for extract of direct tourism activities as it owns by NARA regional research center and currently use for study and research activities. Although, number of foreigners increased as 26 in 2013 and 16 in 2014 in Kadolkele Reserve, may be due to the significant growth of the tourism sector after the finishing of three decades conflict of Sri Lanka. The results of the analyzed values on KMR are shown in Table 5.

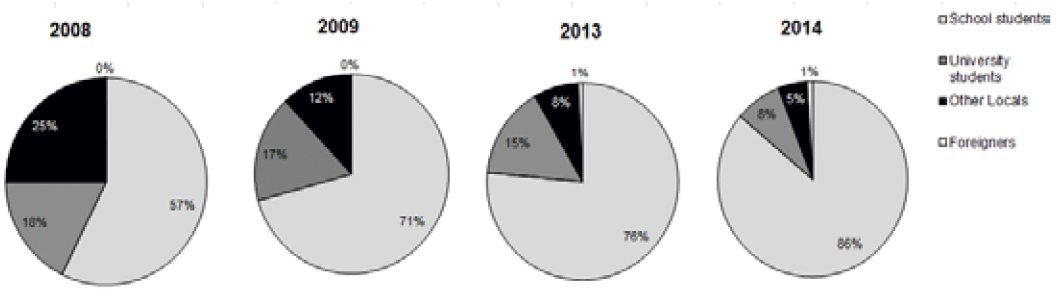

Fig. 3. Different categories of visitors (in percentage) to the KMR (Total visitors in 2008: 1593, 2009: 2483, 2013: 2771 and 2014: 1480)

Table 5. Valuation results of indirect, alternative and direct uses on KMR

Indirect Uses	**Value (USD per year)**
Breeding ground	3,052
Erosion control	50
Biodiversity value	252
Carbon sequestration	2,100
Storm protection	10,75
Pollution treatment	44,940
Alternative uses (especially for conversion to)	
Shrimp farm	12,000
Milk fish farm	6,270
Housing lands	800,000
Direct Uses	
Mangrove saplings for replanting	1,668
Non timber forest products	40,000
Housing construction	10,000
Recreational benefits (Foreigners)	11,960
Domestic recreational benefits (locals)	9,330

Table 6. SWOT matrix for Kadolkele Mangrove Reserve for ecotourism.

STRENGTHS	OPPORTUNITIES
• Well established tourist market in Negombo • Closely located to International Air Port • High scenic beauty • Research Centre of NARA • Guided tours by well trained staff • Rich in biodiversity	• Partnerships possible with tourism establishments • Promote student tourists through academic links of NARA • Attract local tourist and students
WEAKNESSESS	**THREATS**
• Limited extent of mangrove reserve • Board and lodging facilities not available	• Increased unplanned tourism establishments in the area • Encroachment of mangrove reserve by surrounding community

Discussion

Research and education are identified as major services, drawn from KMR. Further, the present study is focused on the valuation of KMR and investigates its potential for the development of a mangrove based ecotourism site. Ecotourism is the fastest growing sector under tourism industry of Sri Lanka. To ensure success of such an endeavor, however, there has to be a strategic plan, which should consider the environmental attributes/bases of the given resources and its limits to acceptable changes or its carrying capacity and the varying interests of the eco-tourists, including their willingness and abilities to pay.

Valuing tourists' satisfaction from ecotourism

It is necessary to consider the satisfaction or "utility" to be derived by visitors, including tourists from eco-tourism. Tourists are willing to spend a substantial amount of money to visit an ecotourism site, which include transportation, accommodation, food, and entrance fee. In return, for these expenditures they expect to enjoy (or gain utility from) the visit, by indulging in acts that give them satisfaction, including swimming, diving, snorkeling, bird watching, sun-bathing, gazing at beautiful and unique scenery, fishing, trekking, etc. If one is interested in finding out whether visitors have enjoyed their visit

to a mangrove site, a simple survey can be conducted by a random sampling among visitors. Several aspects of the visit can be evaluated, such as the quality of the interpretation session, the friendliness of the tour guide, punctuality of the organizers in the various schedules, quality of food served during the trip, the entrance fee charged, opportunities to ask questions, clarity of the answers, etc. The main purposes of such a survey are to identify strengths and weaknesses of a service provider and then to capitalize on the strengths and rectify weaknesses for future tourism activities. One can relate the ratings with demographic variables such as age, gender, education level, ethnicity, and income class, etc. (Garrod and Willis, 1999). If the site is promoted as an ecotourism site, periodical questionnaire surveys are recommended for the evaluation of tourist satisfaction, targeting future developments.

During this study, the potential for ecotourism of KMR is estimated using a questionnaire survey among the tourists, who arrived at suburb hotels for ecotourism based pleasure activities. Results of the questionnaire survey further revealed that eco-tourists are willing to contribute directly and/or indirectly to research and conservation activities, by voluntary contribution of their expertise and resources.

Likely visitors' expectations

Eco-tourists expectation by visiting a mangrove site depends on their interest and educational background. First-timers to a mangrove site generally expect to know the outer appearance of mangroves, habitat and associated life, including birds. While others may enjoy "trekking" on the boardwalks along the mangrove reserve, observe muddy dwelling invertebrates, while listening to the songs of birds. Others may look forward a boat ride at the nearby lagoon and channels, lying between small islands and may wish to experience Brush Park harvesting in the lagoon. Very few would want to wade in the mud of the mangroves; hence random walks are just not part of the enjoyment in mangroves, or other ecotourism. After an eco-trail, visitors look forward to a sumptuous meal, preferably seafood, harvested from the mangrove environment itself. Some enthusiastic eco-tourist had shown interest to meet with the local community to experience their way of life and their dependency on mangroves for their livelihood.

NARA may play a vital role in making ecotourism trail more enjoyable at KMR, shall put in place the required infrastructure; the boardwalks, automatic listening devices, an interpretative center, jetty, clearing the clogged channels, establishing landing places along the boating route, etc. The private sector may strengthen tourism services by organizing visits to various spots of eco-interests, providing guided tours. These guides shall be motivators and possess extra-good sense of humor to make the visit an exciting experience to the tourists. If the infrastructure and/or services are in place, the tourist is likely to feel he or she is getting value for money. This kind of tourism would be best described as nature based tourism. Another vital of the government is to monitor the operators so that they comply with the principles of true ecotourism. This kind of resource use assures minimization of negative impacts to the environment and to local community and increases the awareness and understanding of an area's natural and cultural systems and the subsequent involvement of visitors in issues affecting those systems.

Fee to enter the reserve

Visitors are currently permitted to enter into KMR free of charge. In general, the primary objective of the ecotourism is to conserve nature and restore the degraded environment, resulted due to mass tourism. Should these tourists be made to pay a small sum (entrance fee) to enjoy nature? If it is not, "Nature" a public property to be enjoyed by all and sundry? There is an economic basis for charging tourists a token fee to cover maintenance costs of infrastructure built by the government, especially if the purpose is conservation. Politically, a fee may not be possible to be charged to general public (local visitors). However, people do not mind paying a reasonable sum of money to undertake outdoor recreation if they convinced that the money is for a good cause. Foreign tourists may afford to pay a small fee, which shall be used for conservation and restoration of the KMR. A two-tier system shall be tried, whereby foreign tourists may pay slightly more than that of natives. The role of the private sector in ecotourism is to provide accommodation near the site, to conduct the tours, and collect the entrance fee, which can be built into the cost of the tour package. They may also engaged in operating presentable eateries outside the mangrove areas, and shall serve locally available food, preferably from the brackish water where the mangrove thrives.

Research limitations

In general limited studies have been conducted on the variables of indirect use and non-use values, thus availability of primary data and appropriate peer studies are scarce. Further, it is a short term study and insufficient records, mainly due to the limited access to foreign eco-tourists, since no accommodation facilities for the foreign tourists exist at the proximity of the KMR. Estimation of values of direct uses of the mangrove such as, fishery, wood collection and mangrove saplings are considered to be accurate, however the indirect and non-use values need to be verified by applying different methodologies. Some of the assumptions are adopted from previous studies. Therefore, this study shall be considered as a preliminary work, thus the results, especially those of the indirect usage variables need to be verified by a contingent valuation survey.

Economic benefits of mangroves extend to an array of goods and services, which shall be evaluated individually. Relevant variables for KMR shall be divided into direct, indirect use and alternative values. Moreover, it is necessary to consider the distribution of the costs and benefits that are to be generated by the ecotourism activity, and how these may change over time, depending on the amount and nature of the visitors, and the kinds of facilities/services made available to the visitors. However, development of the tourism and research sector may increase awareness and in effect the value of mangroves in Sri Lanka.

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