

**Direct User Preferences on Coastal Ecosystem Services:
Assessing the Case of Adjacent Fishing Households to the Negombo Estuary**

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Background

The natural ecosystems are classified under two main categories, namely: Terrestrial and Aquatic ecosystems, and the latter is further grouped into two classes as: Fresh water and Marine ecosystems. Ecosystems are preliminary valued for their goods and services of fish, timber, and other agricultural products, while they deliver other important services that are often perceived to be ‘free’ and ‘limitless’. Most of these ecosystem services are traditionally absent from society’s balance sheet’ and in consequently, their critical contributions are overlooked in public, corporate, and individual decision making (Wattage and Mardle, 2008; Wattage and Mardle, 2005).

Research Problem and Objectives

Human population growth affects natural resources, particularly for urban space and housing properties. This has caused conversion of urban wetlands to urban use (Barbier and Strand, 1998). Predominantly, the ecosystems adjacent to a densely populated urban area may experience reclamation for housing developments. Although the importance of ecosystems to human society has many dimensions such as ecological, socio-cultural, and financial, lack of valid and reliable information from a comprehensive valuation of ecosystem services in monetary units has created a gap to find favourable solutions to minimize ecosystem degradation.

On this rationale, the general objective of this study was to rank and order the urban coastal ecosystem services by taking into account of the degree of preference of such services to its adjacent community, where the consumption of these ecosystem services are given in monetary units (“*Purchasing stated preference*”). The specific objective of this study was to derive a monetary value for the ecosystem services of the lagoon based on the stated preference given by the adjacent community.

Research Methodology

Negombo lagoon was selected as the case for analysis. A pilot survey was carried out to identify the levels of ecosystem services that are crucial for the households adjacent to “Thotupola”, i.e. the areas where the fishermen can easily launch their fishing boats into the lagoon. Through the pilot survey, it was estimated that they could contribute the ‘minimum’ and ‘maximum’ monetary payment of Rs.

162.50 and Rs.325 per year, respectively, for the lagoon ecosystem conservation activities. Multiphase program of research was planned, where a Choice Experiment (CE) was carried out to assess the consumption of these ecosystem services based on ‘stated preference’, i.e. they are “priced”. The conceptual foundations (Lancaster, 1966; McFadden, 1974) of CE rely on two main theories Lancaster’s Theory of Value and Random Utility Theory.

Ecosystem services and their levels were combined into a limited number of choice sets made up of optimal combinations of attributes and their levels. Orthogonalization procedure was adapted to recover only the main effects, consisting 27 lagoon profiles and these profiles were randomly blocked to nine different versions (Table 1).

The data collection was conducted representing 15 “Thotupola” areas adjacent to the lagoon (n=225) during January to May 2015. Sample was gathered by data collection points that were started with leading fishermans and other community leaders. Focused group discussions were arranged at YMCA, Negombo. Conditional Logistic (CL) Regression was employed to assess the relationships between the dependent variable (choice) and independent variables (ecosystem services, annual payment and socio-economic characteristics).

Table 1. An example of a choice set

Ecosystem Service	Profile 01	Profile 02	Profile 03
Provisioning services (PS)	Fish (PSF)	Crabs (PSC)	Prawns (PSP)
Cultural services (CS)	Conservation of traditional fishing practices (CSC)	An ideal location to gain knowledge & to conduct research (CSA)	Mangrove recreation (CSM)
Regulating services (RS)	Prevention of soil erosion by mangrove (RSP)	Cleaning of polluted lagoon water by mangrove (RSC)	Reduction of flood damage by mangrove (RSR)
Supporting services (SS)	Sediment stabilization by mangrove (SSS)	Nutrient recycling by mangrove (SSN)	Biodiversity around mangrove (SSB)
Annual payment (AP)	Rs. 243.75 per year	Rs. 325 per year	Rs. 162.50 per year

Key findings

The overall implicit price for the desired ecosystem services was estimated by taking the aggregate of all the levels. This is the amount of money that the fishermen are willing-to-pay for the conservation of that particular ecosystem service. The highest MWTP was recorded for the provisioning services provided by Negombo lagoon and the lowest values were recorded for the cultural services provided by the lagoon (See, Table 2). The second highest MWTP was recorded for the supporting services provide by the lagoon. It was found that six out of eight levels of ecosystem services considered in the analysis were significant at 95% significant level (Table 2). The overall implicit price for the ecosystem services of Negombo lagoon was derived as Rs, 608.60 per respondent. Figure 3 describes the MWTP for the each level of the service attribute. According to the context, Conservation of traditional fishing practices (CSC) and Reduction of flood damage by mangrove (RSR) were not significant in developing a pricing scheme for the conservation of lagoon.

Table 2. Choice Experiment outcomes

EcosystemServices		MWTP		
Provisioning Services	(PS)	231.72		
Cultural Services	(CS)	69.89		
Regulating Services	(RS)	76.88		
Supporting Services	(SS)	230.11		
Levels		Coefficient	P-Val (SE)	MWTP
Fish	-	-	-	-
Crabs	(PSC)	1.27	0.003* (0.42)	68.28
Prawns	(PSP)	3.04	0.000* (0.66)	163.44
Conservation	(CSC)	0.45	0.297 (0.43)	24.19
Gain knowledge	-	-	-	-
Recreation	(CSR)	1.29	0.020* (0.56)	69.89
Prevention erosion	(RSP)	1.42	0.045* (0.38)	76.88
Cleaning polluted water	(RSC)	-	-	-
Reduce flood damage	(RSR)	0.40	0.448 (0.54)	21.50
Sediment stabilisation	-	-	-	-
Nutrient recycling	(SSN)	2.23	0.000* (0.41)	120.43
Biodiversity	(SSB)	2.04	0.000* (0.41)	109.68

Note: W = Weight; RW = Relative Weight; GW = General Weight; MWTP in Rs. Per acre per year
 Log likelihood -284.60. Pseudo R² 0.3036, N. Observations 675

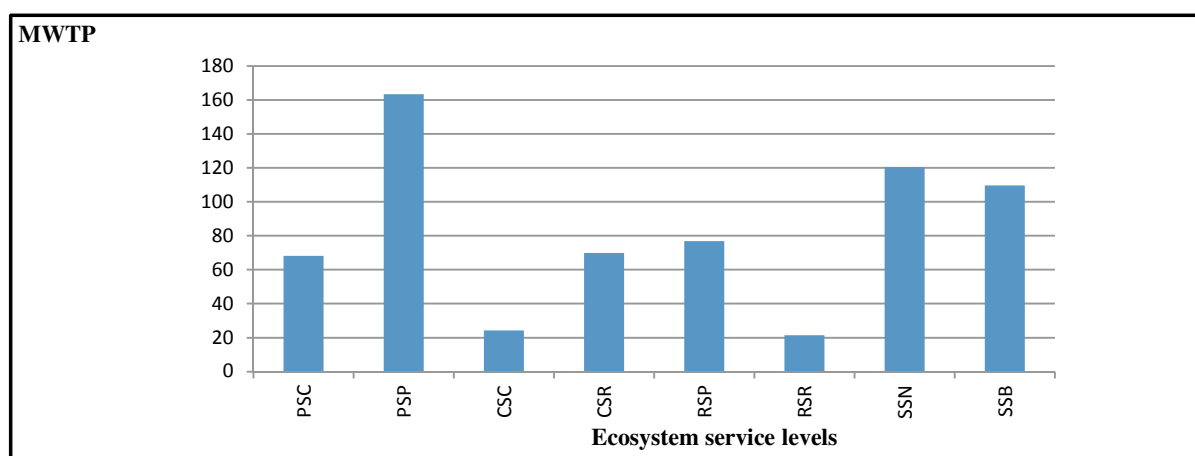


Figure 1. MWTP values of ecosystem service levels

Conclusions

The experiment suggests that identified MWTP values for ecosystem services in monetary terms can provide reliable estimates of household demand for conservation programs with the adjacent community. The expressed MWTP in monetary term may outweigh the benefits generated from the conservation program with respect to the implementation costs of conservation programs.

The fishermen adjacent to Negombo lagoon do not perceive that the conservation of traditional fishing practices and reduction of flood damage by mangrove are worth enough to contribute in an annual payment scheme for conservation program. The adjacent community value the importance of provisioning services as well as the supporting services in preparing a payment scheme for conservation. The lower values expressed for the regulating and cultural services by the respondents suggest that although this can be considered as an activity of national interest, their contribution would be in the form of their 'service' to accomplish this task. The overall implicit price value for the

ecosystem services of lagoon can be extrapolated to the local, national and global scale by assuming an equal distribution of cost and benefit of the conservation of lagoon to the community.

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