Agro Business Management

Demand for Saving Turtles at Rekawa Sanctuary

R.M.W. Rathnayake

Department of Tourism Management, Sabaragamuwa University of Sri Lanka, Sri Lanka
warath1@gmail.com

INTRODUCTION AND RESEARCH PROBLEM

Marine turtles have been roaming the oceans for about 190 million years although only seven species are known to be living today. Of these, Sri Lanka is host to five endangered species that regularly visit its sandy beaches. The Rekawa wildlife sanctuary is the prime habitat for turtle nesting. Turtles at Rekawa are under threat due to ongoing illegal activities such as killing turtles for meat, collection of eggs for sale, and the use of turtle shells to make products. There is a niche market for 'turtle watching' among both local and foreign tourists, and that potential has been underutilized by the policy makers as well as the local community as a revenue-generating initiative. At present some non-government organizations are involved in improper 'turtle watching initiatives' and only a few people get benefits by charging tourists for the service. These self-appointed "nest protectors" also steal turtle eggs to meet their daily consumption needs. This study employs a basic non-market valuation technique, viz., the Contingent Valuation Method (CVM), to estimate the benefits of a sea turtle conservation program taking into consideration the multidimensional nature of conservation benefits. Accordingly, the objective of this study is to estimate the WTP (willingness to pay) as an entrance fee for turtle watching at the sanctuary the revenues that could be used to compensate fishermen who depend on sales of turtle eggs and turtle products as their livelihood.

METHODOLOGY

We carried out a CVM study at the Rekawa sanctuary and two national parks in close proximity to Rekawa sanctuary, Bundala and Yala, which were treated as off-site study sites. In the present study, we have developed two alternative management scenarios: scenarios 1 and 2. The question of whether turtles should be fully protected, or whether they should be conserved while providing recreational facilities to the general public, is one that is currently garnering much attention among conservationists. We developed Scenario 1 focusing mainly on visitor services to be established at Rekawa, while Scenario 2 focused on both visitor services and conservation initiatives to be establishedat Rekawa. Both scenarios included economic incentives for the local community. The payment vehicle was the bid value in terms of proposed entrance fees.

To estimate the WTP, we follow the estimation approach given in Lopez-Feldman (2012). In this approach, WTP is modeled as a linear function

$$WTP_i(z_i, u_i) = z_i\beta + u_i$$

where z_i is a vector of explanatory variables, β is a vector of parameters and u_i is an error term. In our study, the following are explanatory variables:

educ:	Education in number of years
age:	Age of respondents in years
gender:	Respondents' gender (1= male and 0= female)
hhinc:	Household income (LKR/USD)
marital:	Marital status (1= married, 0= others)
entow:	Working in tourism or environment-related field (1=yes, 0= no)

turtseen: Seen turtles (1=yes, 0= no)

nestseen: Seen turtle nesting (1=yes, 0= no)

site_dum: Survey site (1=Rekawa, 0=Yala and Bundala)

rekawavi: Knowledge of Rekawa or visited Rekawa (1=yes, 0= no)

grsize: Group size

Each individual is offered a single bid value (t_i) and is expected to answer yes or no. Denote $y_i = 1$ if the answer is yes and $y_i = 0$ if the answer is no. The individual would answer yes when his/her WTP is greater than the offered bid amount ($WTP_i > t_i$). The probability of $y_i = 1$ is a function of the explanatory variables and can be written as:

$$\Pr(y_i = 1 \mid z_i) = \Pr(WTP_i > t_i) \quad (2)$$

$$\Pr(y_i = 1 \mid z_i) = \Pr(z_i\beta + u_i > t_i)$$

$$\Pr(y_i = 1 \mid z_i) = \Pr(u_i > t_i - z_i\beta) \quad (3)$$

Researchers commonly use probit and logit models when the dependent variable is binary (Capps and Cramer, 1985; Bishop and Heberlein, 1979; Seller, Stoll, and Chavas, 1985). In this study, the outcome is binary and we apply the probit model for data analysis. Hence, we assume that the error term u_i has a normal distribution $N(0, \sigma^2)$. In this case, Equation (3) can be written as

$$\Pr(y_i = 1 \mid z_i) = \Phi\left(\frac{z_i\beta}{\sigma} - \frac{t_i}{\sigma}\right) \quad (4)$$

where Φ (.) denotes the standard cumulative normal distribution function. Note that, in Equation (4), the probit model has t_i in addition to z_i as explanatory variables. There are two ways in which one could estimate this model. The first one is to use Equation (4) and apply maximum likelihood estimation to solve for β and σ. The other option, which we use in this study, is to directly estimate the probit model with z_i and t_i as explanatory variables, which can be estimated in STATA statistical package. In this case, we obtain estimates of β/σ and $-1/\sigma$ after estimating the probit model. For the results of probit model, denote $\hat{\alpha} = \hat{\beta} / \hat{\sigma}$ (the vector of coefficients associated to each one of the explanatory variables) and $\hat{\delta} = 1/\hat{\sigma}$ (the coefficient for the variable capturing the amount of bid).

The expected value of WTP can be estimated for individuals with certain characteristics or at the average of explanatory variables as

$$E(WTP \mid \tilde{z}) = \frac{\tilde{z}\hat{\alpha}}{\hat{\delta}} \tag{5}$$

where, $\tilde{z}$ is a vector with the values of interest for the explanatory variables.

The sample size was 894 and we surveyed both foreign and local visitors under the two scenarios at different bid values. In each scenario, we proposed six bid values for local visitors and four entrance fees (or bid values) for foreign visitors, interviewing them under each bid value and asking them about their willingness to accept it as the proposed entry fee for visiting Rekawa. In addition, we collected information on the socio-economic conditions of the local community, interviewing a selected crowd including the relevant Divisional Secretary and Grama Niladhari, and referring to secondary data.

RESULTS AND FINDINGS

We found that with an increase in the bid value in the form of the entrance fee, the number of visitors who were willing to visit Rekawa and pay for the scenarios went down gradually. The main reasons for WTP for both scenarios being "I can afford this amount", "This initiative helps to conserve turtles at Rekawa", "I will enjoy improved visitor facilities", "It will help the local community" and "I will be able to see turtles/turtle nests". Meanwhile, some of visitors mentioned "the entrance fee is high", "do not like to watch turtles" and "do not trust the government" as their three main reasons against WTP.

More than 90 percent of the respondents accepted that the proposed initiatives would lead to better protection and conservation of turtles, at the same time providing economic incentives for the local community. The estimated mean WTP values per visit of locals were LKR 93.08 and LKR 142.61 for scenarios 1 and 2 respectively, while the mean WTP values of foreign visitors were USD 15.33 and USD 19.16 for scenarios 1 and 2 respectively. These values are comparable to the WTP values for other species culled from studies in the Asian region. At present, only foreign visitors pay an entry fee, amounting to LKR 1000 (USD 8) and resulting in an annual revenue of LKR 2.44 million. These findings show that there will be annual revenue increase of 2043.82% and 2855.65% respectively, if we implement the scenarios are implemented.

A majority of people in the area do not have access to basic needs such as drinking water and electricity, with the percentage of poor, with a daily household income of less than LKR 100, at approximately 33 percent. This lack of livelihood opportunities is a major threat to the survival of marine turtles on the Rekawa beach. Our field studies showed that some local youth earn up to LKR 1000 per day working as nest protectors while the egg collectors earn up to LKR 300 per day from selling the stolen turtle eggs. Though the

majority of the local community can be classified as substing below the poverty line and as either unemployed or under-employed, they do not have access to work as nest protectors or as guides in the existing turtle watching trade because of the monopoly held by those currently working as nest protectors and guides. One of the major concerns expressed by the local community was their exclusion from turtle conservation initiatives, a concern shared by administrators, policy makers and community leaders of the area. Therefore, if we are able to attract more visitors to Rekawa and charge entrance fees, we would be able to employ local youth as nest protectors or interpreters, and allocate a percentage of those earnings for daily wages. We found that the local level hoteliers, restaurant operators and boutique owners too were ready to provide visitor facilities including accommodation and meal services if the government becomes directly involved in providing tourism-related operations at Rekawa. Then the local community will be able get involved in tourism related activities, and find new economic incentives through the proposed scenarios.

CONCLUSION AND IMPLICATIONS

The results indicate that the majority of visitors were willing to pay an entrance fee which would go towards protecting turtles and improving visitor facilities at Rekawa, and that a successful entrance fee program could thus be designed for Rekawa sanctuary. If we promote the above scenarios we will be able to attract more visitors to Rekawa and employ poachers and egg collectors as the nest protectors and interpreters. Further we will be able to allocate a certain amount of earnings from entrance fees as their salaries to compensate for their previous earnings from turtle poaching and egg collection. It also means that policy makers would be able to get the local community involved in turtle conservation through the 'turtle watching' initiatives.

The study recommends therefore that the following policy directions be adopted, in order to help both turtle conservation and the provision of economic incentives for the local community: (i) streamlining and promoting 'turtle watching' at Rekawa; (ii) introducing a new fee structure for turtle watching; (iii) proposing a proper incentive/compensation scheme for the local community to get involved in turtle conservation; and (iv) establishing a village-level welfare fund using a percentage of the gate collection to improve basic infrastructure facilities in Rekawa village that would benefit the entire community, thus providing an incentive for everyone in the community to support the initiative.

Acknowledgement: This study was funded by the South Asian Network for Development and Environmental Economics (SANDEE).

REFERENCES

Bishop, R. C., and Heberlein, T. A. 1979. Measuring Values of Extra market Goods: Are Indirect Measures Biased?. *American Journal of Agricultural Economics*, 61 (Dec.), 926-30.

Capps, O., and Kramer, R. A. 1985. Analysis of food stamp participation using qualitative choice models', *American Journal of Agricultural Economics,* 67 (1), 49-59.

Lopez-Feldman, A. 2012. Introduction to contingent valuation using STATA. *MPRA*

Paper No.41018 (Online at http://mpra.ub.uni-muenchen.de/41018/). (Accessed 4, September 2012)

Seller, C., Stoll, J. R., and Chavas, J. P. 1985. Validation of empirical measures of welfare change: a comparison of nonmarket techniques, *Land Economics*, 156-175.