SYNERGISTIC EFFECT OF ECOTOURISM ON ENVIRONMENT IN KOVAI KUTRALAM

D.V. Kavigeedha
Research Scholar
Department of Agricultural Economics
Tamil Nadu Agricultural University,
Coimbatore

S. Varadha Raj
Assistant Professor
Department of Agricultural Economics
Tamil Nadu Agricultural University,
Coimbatore

***Abstract*— Ecotourism is a vehicle for economic prosperity, ecological stability and social equity. It involves community based ecosystem services and zero negative effects to the environment. Ecotourism centre was officially established by Forest Department with local tribal members at KovaiKutralam, Bolampatti Forest Range (BFR) in 2009. This article demonstrate about the recreational value of KovaiKutralam Ecotourism Centre (KKEC) and willingness to pay (WTP) for improving the quality of ecosystem services in the KKEC. KovaiKutralam was purposively selected for the study and it was conducted in during the month of April and May in 2016. 0.3 per cent of the total visitors in the month of April and May (2015) were selected as sample tourist respondents to the tune of 95 as total sample size. This study would revealed that an increase in total travel cost by one rupee over the mean value, c*eteris paribus* the number of visits would decrease by 0.2 per cent and also implied that an increase in travel distance by one kilometre over the mean value, c*eteris paribus* the number of visits would decrease frequency of visit by 1.5 per cent. The value of individual consumer surplus per visit was about ₹ 215 and total consumer surplus of the KKEC was nearly ₹ 79 lakhs per year. The existing entrance fee for a person was ₹ 50 for adult and ₹ 20 for non-adult. Generally, the change in income of the ecotourists has more effect on the WTP for improving the quality of ecosystem services in the KKEC, whereas the effect of household income has lesser impact on WTP than the educational status of the respondents.**

Keywords*— KKEC, Recreational Value, ceteris paribus, WTP.

I. INTRODUCTION

Ecotourism is an innovative concept which is *de facto* derived from two words viz. ecosystem and tourism. Ecotourism is *mutatis mutandis* the tourism involving travel to natural areas, typically under the guidance of a naturalist, for the purpose of observing scenic beauty and learning about the environment. It considers the integrity of the ecosystem, while creating economic opportunities that make conservation and protection of natural resources which will be beneficial to the local people(Christ *et al.,* 2003 & Honey, 2006).

The ecotourism policy of Tamil Nadu is an impregnable policy to involve the local communities without adversely affecting their cultural ethos in the natural forest areas. The activities and facilities are developed in consultation with the communities without transgression into community's cultural sovereignty. The main strategy is to involve the local communities by way of employment in all tourism related activities. It furnishes the strategic directions to engage local communities, tourists, forest officials, government and other stakeholders in promoting effective ecotourism activities in the state resulting in conservation and preservation of resources. Ecotourism destinations in Tamil Nadu are delineated for the development of tourism in an eco-friendly manner.

Ecotourism centre was officially established by Forest Department with local tribal members at KovaiKutralam, Bolampatti Forest Range (BFR) in 2009. Henceforth, it is called as KovaiKutralam Ecotourism Centre (KKEC). The entry fee for an adult is ₹ 50, while it is categorized as ₹ 35 for ecotourism and ₹ 15 for forest department and also a separate fee for vehicle parking.The main objective of the KKEC is to attain zero pollution, preserving the forest nature and maximizing ecotourists' satisfaction.

II. MATERIALS AND METHODS

Travel Cost Method (TCM)

This method has been applied to estimate the demand and consumer surplus for ecotourism at the

recreation site. The demand for a park is estimated by determining the change in visits and also changes in the cost per visit (Aznor, 2009). TCM studies resulted that the increase in the price of access or cost of travel would affect the rate of visits to the site (Garrod and Willis, 1999). The TCM simple model is usually estimated as a trip generating function such as the following,

$$V = f(C, X) \quad (1)$$

Where,

V = Number of visits to a recreation site,C = Costs per visit,X = Other socioeconomic variables which significantly explain V.

There are two types of travel cost methods viz. Zonal and Individual TCM. For the first one, the visitors are grouped into different categories or zones based on certain similar characteristics such as geographical origin. This is the oldest form of the TCM (Timah, 2011). The second was the precise number of site visits made by each visitor over a specific period. The ITCM (Individual Travel Cost Method) uses survey data from individual visitors in the statistical analysis, rather than data from each zone. However, the ZTCM has been under serious criticism for its vagueness as a non-market valuation tool. For this reason, the most researchers and economists have now turned to the ITCM as a better option (Bell and Leeworthy, 1990). In this study, the ITCM was applied to evaluate the recreational value of the study area.

The Equation a can be rewritten as,

$$V_{ij} = f(C_{ij}, X_i) \quad (2)$$

Where,

V_{ij} = Number of visits made per year by the individual (i) to the recreation site (j),

C_{ij} = Visit cost by the individual (i) to the recreation site (j),

X_i = All other socioeconomic variables determining individual visits.

The demand curve produced by the ITCM relates individual's annual visits to the costs of the visit. Integrating under this curve gives the Consumer Surplus per Individual (ICS). Multiplying the ICS by the number of individuals visiting the site annually helps to estimate the consumer surplus for the recreation site (Bekkay*et al.,* 2013).

$$TCS = N_j.\int f(C_{ij},X_i).dC_{ij} \quad (3)$$

Where,

TCS = Total Consumer Surplus (₹ per year),

N_j = Number of individual visits to the recreation site (j) per year,

C_{ij} and X_i are defined as in Equation (2) (Bateman, 1993).

Individual Consumer Surplus could be obtained with the help of the following formula (Willis and Garrod, 1991).

$$ICS = - 1 / \beta_{ij} \quad (4)$$

Where,

ICS = Individual Consumer Surplus (₹ per head per trip),

β_{ij} = Coefficient of travel cost C_{ij}.

The total annual consumer surplus obtained from the recreation site can be calculated by multiplying the ICS with the number of visits made in a year.

A. Contingent Valuation Method (CVM)

Contingent Valuation Method is a technique that allows the value of environmental goods or services to be estimated. Bateman and Turner (1993) noted that the CVM required the individuals' preferences according to some environmental resources or change in resource status, by answering the questions about hypothetical choices.

Generally, as the environmental goods and services have no prices in the markets, the Willingness to Pay (WTP) method for improving the quality of ecosystem services in the KKEC has been used as an alternative substitute price. If there is no WTP in a given respondent to a certain price, then refused, the proposed amount was to be reduced by a certain percentage. The procedure was repeated until the respondent provided a positive answer. Among many different formats used for this method, the bidding game format was used in this study. The values ranged from zero to 100 for improving the quality of ecosystem services in the KKEC.

The WTP was estimated with the inclusion of the variables described as below,

$$WTP_i = f(X_i) \quad (5)$$

The dependent variable in the model was the actual amount stated by the respondent as his / her WTP. The independent variables were age, education, household income, earlier visits made to the KKEC and distance travelled from home to ecotourist spot. Ordinary Least Square (OLS) was employed to estimate the coefficients of the respective explanatory variables.

III. RESULT AND DISCUSSION

Recreational Value of the KKEC

The recreational benefits are estimated using Travel Cost Method (TCM). This method is widely used to estimate the demand and consumer surplus of the recreational sites. In

this study, the expenditure incurred on visiting a site is treated as a revelation of the consumer's preference for the environmental services produced by it and derives the value placed on those services.

Estimation of Recreational Value of the KKEC

The travel cost model is a demand-based model for use of a recreation site. The purpose of this research is to determine the use value of recreation site of the KKEC through the consumer surplus approach. The semi-log function was used by specifying the number of visits per head per year, which is the dependent variable. Total expenses of the trip per visit, age, education, income and distance travelled to visit the KKEC are the independent variables. The estimates of TCM to the KKEC are presented in Table I

TABLE I
ESTIMATES OF TCM AND WTP TO THE KKEC

Variables	**TCM**		**WTP**	
	Coefficients	**t-Stat**	**Coefficients**	**t-Stat**
Intercept	2.316***	9.15	79.356***	4.29
TTC	-0.002***	3.93	-0.460	1.59
AGE	-0.004	0.76	7.309**	2.32
EDN	0.129**	2.33	0.200***	15.37
INC	7.74	0.30	1.177	0.41
DIS	-0.015***	9.76	0.114	0.97
R-square		0.76		0.89
Adjusted R-square		0.75		0.88
F-Value		58.17		144.93
N		95		95

****significant at p < .01 and **significant at p < .05*

It could be inferred from the table V that the coefficient of multiple determination (R^2) was 0.76, which would indicate that 76 per cent of the variation in the dependent variable was explained by the selected relevant explanatory variables. The calculated F value was 58.17 and significant at one per cent level of probability that indicated the goodness of the fit of the model of the study.

The variables such as the total travel cost (TTC) and the travel distance were negatively significant at 1 per cent level of probability, whereas education was positively significant at 5 per cent level. This implied that an increase in TTC by one rupee over the mean value, *ceteris paribus* the number of visits would decrease by 0.2 per cent. An increase in travel distance by one kilometre over the mean value, keeping all other variables held as constant, the number of visits would decrease by 1.5 per cent. If the educational status is improved from one year over the mean value, *ceteris paribus*, the number of visits would increase by 13 per cent.

The functional form of the model is written into the equation VI,

$$\text{Ln V} = 2.316 - 0.002\ \text{TTC}^{***} - 0.004\ \text{AGE} + 0.129\ \text{EDN}^{**} + 7.74\ \text{INC} - 0.015\ \text{DIS}^{***} \quad (6)$$

(0.252) (0.000) (0.005) (0.055) (0.000) (0.001)

(Figures in parenthesis indicate Standard Error)

The sign of the coefficient of the variable "total travel cost" (TTC) was negative and therefore, it was inversely proportional to the number of annual visits, which was consistent with results of Individual Travel Cost Method (ITCM) found in the literatures.

Bell &Leeworthy (1990), Willis &Garrod (1991), Connel (1992), Englin&Shonkwiler (1995), Heyes&Heyes (1999), Sohngen (2000) and Gurluk&Rehber (2008) estimated the recreational value of the ecotourism sites using the travel cost method. The above mentioned studies reflected the similar findings of this study.

Consumer Surplus of the KKEC

The correcting the model of the demand curve in order to maintain the TTC as a main explanatory variable, the equation VI was modified into equation (7)

$$\text{Ln V} = 1.8917 - 0.00465\ \text{TTC}^{***} \quad (7)$$

(0.144) (0.000) R^2 =0.73

(Figures in parenthesis indicate Standard Error)

Firstly, consumer surplus per person per visit was estimated then, the total consumer surplus was estimated by using the formula referred to the equation (4).

Individual Consumer Surplus (ICS) = - 1 / (- 0.00465) = ₹ 215.05

The total annual consumer surplus obtained from the site visitors (KKEC) could be calculated by multiplying the individual of consumer surplus by the number of visitors to the KKEC (the triennium average number of visitors in the KKEC was 183249 per year and number of visits per head was 1.91).

Total Consumer Surplus (TCS) = 215.05 x 183249 x 1.91 = ₹ 75268976.

The value of individual consumer surplus per visit was about ₹ 215 and total consumer surplus of the KKEC was nearly ₹ 7.52 crore per year.

Griffiths & Southey (1995) and Buren *et al.* (1996) estimated an individual and total consumer surplus in the same procedure and got the similar type of the results.

The linear regression model was used to assess the factors influencing the willingness to pay in the form of a higher entry fee to overcome these problems towardsimproving the quality of ecosystem services in the KKEC. It could be noticed from the table V that the coefficient of multiple determination (R^2) was 0.89. It indicated that 89 per cent of variation in dependent variable was explained by the variation of explanatory variables in the model. The F-test revealed that the overall goodness of fit of the model was significant at 1 per cent level. The explanatory variables such as education and household income were positively significant at 5 and 1 per cent level. This could be implied that an increase in education by one year over the mean value, *ceteris paribus*, the WTP for improving the quality of ecosystem services in the KKEC would increase by ₹ 7.31 and also indicated that an increase in household income by one rupee over the mean value, c*eteris paribus*, the WTP would increase by ₹ 0.20. The estimated coefficient of travel distance was positively significant at 5 per cent level. If travelling distance of the visitor gets increased by one km over the mean value, *ceteris paribus*, the WTP for improving the quality of ecosystem services in the KKEC would increase by ₹ 0.11. Generally, the change in income of the ecotourists has more effect on the WTP for improving the quality of ecosystem services in the KKEC, whereas the effect of household income has lesser impact on WTP than the educational status of the respondents. It is testified that the educational status plays a major role in improving the quality of ecosystem services in the KKEC.

Worku (2013) and Limaei*et al.* (2014) revealed that the visitors were more willing to pay for improving the quality of ecosystem services in the sites. The finding is line with the above mentioned study.

IV. CONCLUSION

There is no recreational demand for the KKEC. The results indicated that 52 per cent of ecotourists visited the KKEC mainly for the recreational purposes. The total number of visitors and average frequency of visit to the KKEC was 183249 and 1.91 times in a year. The individual consumer surplus was ₹ 215 per head per trip. The total consumer surplus of the KKEC was nearly ₹7.52 croreper year. The average distance of the ecotourists was 51.81 km per trip and mostly they spent 4.26 hours per trip in the KKEC. This study rejects the null hypotheses of no recreational demand for the KKEC. This study concludes that it creates a huge demand from the ecotourists all around the district and nearby districts with the radius of 50-60 km. The individual consumer surplus was more than the entry fee. This is also reflecting the vast recreational demand of the site.

Ecotouristsare not willing to pay for improving the quality of ecosystem services in the KKEC. The results indicated that 92 per cent of ecotourists were willing to pay more than the existing entry fee (₹ 50 per head per trip) for improving the quality of ecosystem services in the KKEC. The estimated average WTP of the ecotourists was ₹ 104 per head per trip, whereas the individual consumer surplus was ₹ 215 per trip. The individual already derived an additional ₹ 165 worth of pleasure per trip in the KKEC. Hence, the null hypothesis of this study is rejected. It is concluded that the ecotourists have a high WTP and education and income level of the ecotourists are positively affecting the quantum of WTP for improving the quality of ecosystem services in the KKEC.

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