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Visitors' Preferences and Willingness to Pay for the improvement of Eco-Tourism Destinations in Protected Forest Areas in Kerala

Dr. P. H. Shanavas [1] and Dr. N. Karunakaran [2*]

Abstract: The study is designed to assess the visitor's preferences towards the protection of nature-based tourism destinations in the protected forest areas of Wayanad in Kerala. The tropical evergreen forests of Wayanad, lying on the foothills of Western Ghats, provide a range of unique experiences and attractions, such as hiking trails, nature camps and wildlife viewing that attract visitors from all over the world. These destinations under the protected forest areas are relatively well protected and conserved but the economic value of these services is not fully captured or recognized, and therefore not properly valued. Developing countries are increasingly acknowledged the potential of tourism as a critical source of revenue. A more feasible approach includes identifying the benefits of the services provided by them and attach monetary values to it so that they can be comparable with that of other services which can be traded in the market. Economic valuation provides a way to measure the direct and indirect economic benefits of forest ecotourism services, including employment and income generation; revenue from park fees and taxes, and the multiplier effects of tourism spending on local economies.Identification of such benefits and the quantification of them in terms of a monetary units is not a simple task to perform. Alternative mechanisms are developed to capture the price signals for environmental goods and services. A brief review on the studies related to the recreational value of forests and the contingent valuation methodology adopted for assessing the visitors' preferences and the willingness to pay measurement are presented here. The Contingent valuation scenario is described and a Double-Bounded CV question is framed. The parametric WTP estimates for both SBDC data and DBDC data are calculated using the log-logistic and log-normal models. The non-parametric estimates are also calculated for the scenario.

Key Words: Contingent Valuation; Eco Tourism; Tourist Preferences; Willingness to Pay; Dichotomous Choice; Log-Logistic and Log-Normal Models

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1. Introduction

Forest ecosystem provides a number of tangible and intangible benefits to the society. An important component of the benefits includes the provision of recreational services which would enhance the welfare of the individuals. But, the public good characteristics deny the proper valuation of the services provided by the forests including the recreational benefits. Many of the services are economically opaque and the policies often failed to account for such services. Assessment of this values will reduce the difficulties and challenges to the management of forest ecosystems, and therefore very important for the conservation and enhancement of biodiversity. The job of managing such areas is highly challenging and managers face an uphill task in balancing divergent needs of different stakeholders of national parks and wildlife sanctuaries.

Lack of clear property rights might cause heavy destruction of forest land in the past. Effort to conserve and protect biodiversity will not yield satisfactory outcome, if not supported by adequate funding. This is the biggest concern that should be addressed by the policy makers. Biotic pressure on the India's protected areas is tremendous because of the many difficult issues such as human–wildlife conflicts, encroachments, overgrazing, tourists' pressure and the demand for the conversion of protected areas for development purposes (J. S. Maan & P. Chaudhry, 2019). Afforestation programmes usually enhance the biodiversity of the region and may increase the recreational and amenity value of the forests (Mogas, J., Riera, P., & Bennett, J. 2005.; Buscardo et al. 2008). Most feasible approach is to identify the benefits of the services provided by them and attach monetary values to it so that they can be comparable with that of other services which can be traded in the market. This would be an important prerequisite for allocating state funds to ensure the existence of trees and forests (Garrod and Willis, 1992). Identification of such benefits and the quantification of them in terms of a monetary units is not a simple task to perform. Alternative mechanisms are developed to capture the price signals for environmental goods and services.

Commonly used methods try to identify the maximum willingness to pay by the individuals for safeguarding the benefits they are enjoying, either through observing the individual behaviour or through directly eliciting from them using an appropriate survey method. This would be a benchmark for fixing the user fees to those who enjoy the recreational benefits. Most commonly used method for this exercise is the contingent valuation for valuing environmental benefits under hypothetical settings. It allows the researchers to identify information relevant to policy

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makers and managers in order to take decisions on controlling/rationing the use, fixing user fees and recovering costs. This method is a reliable valid and credible technique for the valuation involving the measurement of use and nonuse values and is employed all over the world (Arrow et al., 1993; Hanemann, 1994; Carson, R. T., & Mitchell, R. C, 2013). There are still unresolved methodological issues starting from the construction of the scenario, creating confidence among the respondents about the reliability of the scenario, measures to get rid of the bias from both ends, are to be tackled. The chances of systematic errors and random errors leading to the biased estimates of the WTP measures and affecting the reliability are reported in many CV exercises (Romano & Viganò, 1998).

2. Contingent Valuation for Assessing Visitors' Preferences and Willingness to Pay.

A large-scale contingent valuation study was used to understand the effects of forest attributes on willingness to Pay for the recreational use (Yao, R. T., et.al, 2000). Education income and destination loyalty is found to be the most significant factors affecting the willingness to pay for amenity values of urban forests (Majumdar, , Deng, J., Zhang, Y, & Pierskalla, C, 2011). The hypothesis that "the protection and restoration of forest ecosystem is an economic good that people are willing to pay for" is confirmed in the context of consumer preferences towards forest ecosystem (Kramer, Holmes, & Haefele, 2003). Tyrväinen & Väänänen, (1998) examine the suitability of CV for assessing the economic value of urban forest amenities in Finland and found that most of the residents are willing to contribute for conservation for keeping the quality of their housing environment. Echeverría, J., Hanrahan, M., & Solórzano, R. (1995) applied Contingent valuation techniques to assess to economic benefits of the Montverde Cloud Forest Preserve in Costa Rica.

Evidences from developing countries shows that the literature on contingent valuation or any other environmental valuation is relatively thin as compared to the developing countries (Ferraro, et.al, 2012). People are willing to pay for preserving environmental amenities, despite being in a low or middle income country like India (Hadker, et.al, 1997). The visitors are willing to pay a premium for ecotourism activities, to estimate the economic value of ecotourism in the Tiger Reserves of Kanha, Corbett and Tadoba Andhari (Lyngdoh, S., Mathur, V. B., & Sinha, B. C. 2017), whale watching in Sri Lanka (Prakash, T. S. L et.al .2019), economic value of ecotourism in the Bazaruto Archipelago National Park in Mozambique (Cunliffe, R., et al. 2001) ecotourism

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in the Sagarmatha National Park in Nepal (Baral, N., et. al. 2017) are few other examples.Tourism's potential to the recovery of use and non-use values and contributing funds towards the conservation is evident from a study conducted in Kufri-Chail-Naldehra Area of Himachal Pradesh in India (Batta, R. N. , 2003). A different opinion is found that the use of contingent valuation is limited among the domestic tourists of India, majority of them belongs to the upper income group families and exposed themselves in parallel economy transactions (Chaudhry & Tewari, 2006). A study done in Nagarhole national park in Karnataka, bordering the present study area estimated the benefits of intangible benefits asserts the use of economic valuation techniques for policy formulations (Ninan, K. N & Kontoleon, 2016).

3. Objective and Methodology of the Study

The main objective of the study is to assess the visitors' preferences and willingness to pay for the recreational benefits of the natural parks and protected forest areas. The study uses the single-bounded and double-bounded elicitation methods. In a single-bounded choice scenario, the description of the valuation scenario is made and the respondents are then requested to reply whether they are willing to contribute for the proposed project or not (Bishop & Heberlein, 1979). A common advantage of using this method is to present the choice scenario as simple as possible and people may feel that they are in a usual market place environment facing tradeoff between the proposed environmental improvement and the cost of such changes. The single-bounded model is the easiest one to administer but prone to some inherent limitations. The cost of conducting such survey is heavier than other models, because of the requirement of large sample sizes to capture the effects of covariates on the choices they made (Hanemann et al., 1991). This problem can be overcome with the help of using additional bids depends upon the responses of the first bid, i.e., every bid is immediately followed with a follow up bid. If the respondents say "yes" to the first bid, a higher bid is immediately presented and if the responses to the first bid is "no" a lower bid is presented. This is an extension to the single-bounded dichotomous choice format (SBDC) and is known as the double-bounded dichotomous choice format (DBDC) (Hanemann, 1985;Hanemann, et.al, 1991). DBDC ensures higher statistical efficiency by limiting the latent WTP bid to a narrower interval than the SBDC responses..

3.1. Experimental Setting: The contingent valuation scenario developed for the experiment is presented in text box 1. The scenario was constructed after reviewing a good number of

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researches and the inputs received from various stakeholders belongs to the study area. The scenario was presented in English and Malayalam. The choice question is immediately provided after the contingent valuation scenario.

Text box1: The Contingent Valuation Scenario

Suppose the Forest Department is sorting out an alternative plan to develop the ecotourism sites under the protected forest areas. The Department will be decided to enhance the role of Vanasamrakshana Samithi with the help of the department of tribal affairs and local self-governments. The purpose of this initiative is summarized below.

- **To protect the ecology, environment and amenity values of the nature based tourism areas from further depletion.**
- **To enhance the capabilities rural poor by giving them employment, training for self-employment and provide them enough social security nets**
- **To improve the water quality, hygiene and sanitation facilities, recreational and amenity services to the visitors without affecting the environmental quality.**

In order to materialize this programme the following strategies and actions are envisaged.

1. **Improved facilities for the Visitors**
   a. **Improvement in recreational facilities and amenities**
   b. **Improvement in the cleanliness and hygiene in the sites**
   c. **Facilities for online booking in advance**
   d. **Facilities for spot premium booking**
2. **There will be more efforts and money to conserve and protect the biodiversity and environmental quality of the site through**
   a. **Removal of the Exotic Plants**
   b. **Restoration of the original forest vegetation and controlling forest fires**
   c. **restriction of quarrying and mining activities in the buffer zone of Protected Forest Areas**
3. **Local people should be benefited from the tourism activities in the protected forest areas through**
   a. **Resettlement of traditional forest dwellers**
   b. **Reducing man-wild conflict and timely compensations to the victims**
   c. **Establishment of forest rights to the traditional forest dwellers**

Thus, a corpus fund will be raised and utilized for meeting the threefold objectives of environmental protection, improvement in the wellbeing of the local poor, and enhancement of the recreational and amenity value to the visitors. The fund shall be supervised by other stakeholders and is open to social auditing.

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Each respondent was given an initial bid amount randomly assigned from the vector (20, 40, 60). If the respondent says "yes" to the first bid, the next bid amount is doubled and repeat the question. If the response was "no", then the bid amount is halved to that of the original bid. For Example, If the respondent gets Rs. 40 as the first bid and his response was "yes", the next bid amount is Rs.80 (two times of the original bid); if the response was "no" to the original bid, the second bid would be Rs.20 (half of the original bid). Therefore, the second bid vector becomes, (10, 20, 30,40, 60, 80.and 120). Responses to the first bid provide a SBDC data and the responses including the second bid gives the DBDC data.

Text box 2: The Contingent Valuation Question

"Would you be willing to pay an amount of Rs. ---- in addition to the usual Entry fee for the kind of programme which I have described here?"

If the answer is "Yes", the follow up bid (BID_H) = Original bid *2

If the answer is "No", the follow up bid (BID_L) = Original bid *1/2

The SBDC response are either "yes" if the respondents vote for it, or "no" if they do not. The true WTP bid may be higher or lower to the bid presented to them. But four possible patterns of responses are elicited from the DBDC data. They are presented in Table 1. while SBDC data gives point estimates and DBDC data gives us the interval data. Appropriate statistical methods are used obtain the point estimates from the DBDC data.

Table 1: Possible Pattern of Responses to the Bids and the Inferences

Responses	Codes	Inferences	Example (if the original bid is Rs.40)
"yes", "yes"	yy	$BID_O < BID_H < WTP$	Rs.40<Rs.80< WTP
"yes", "no"	yn	$BID_O < WTP < BID_H$	Rs.40< WTP<Rs.80
"no", "yes"	ny	$BID_O > WTP > BID_L$	Rs.40< WTP<Rs.20
"no", "no"	nn	$BID_O > BID_L > WTP$	Rs.40<Rs.20< WTP

BID_O = Original Bid; BID_L = Lower Bid; BID_H = Higher Bid

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3.2. Area of the Study: Ecotourism Centers under the PFAs of Wayanad district is chosen as the study area. After consulting with the forest department officials and reviewing literatures on ecotourism activities in Kerala, four tourist locations have been identified. They are Kuruva, Tholpetty, Muthanga and Chembra. The rationale behind choosing ecotourism centers in PFAs is that these areas have a clearly defined property right. While taking considerations on the entry fee structure and location specific characteristics, it has been decided that the Kuruva Island and Tholpetty Forests as the data collection points.

3.3. Description of Data: A total of 320 visitors were approached as part of the survey, of which 220 persons give valid responses. 66.2 per cent of the respondents are males and 46.8 per cent are married. 84 per cent of the respondents are youths under the age of 40. Majority of them employed in private sector (33.8 per cent) and another major category is students, who constitute 28.8 per cent of the respondents. More than half of the respondents are graduates or post-graduates. 76 per cent of the visitors have not visited this place during the last 365 days. 85 per cent of the people responded that they do not have any affiliation with any of the organizations/NGOs related to environmental activism. Majority of the respondents performed short trips of less than two-day duration. The mean days taken for the trip is 2.72 (standard deviation is 1.916). nearly half of the respondents stayed only one day at Wayanad. More than half of the respondents are coming from a distance of less than 300 kilometers. The mean distance travelled is 357.65 KMs and the standard deviation is 341.417. Majority of the respondents (54.2 per cent) chose private tourist carriage or packaged trips to reach the spots whereas 36.8 per cent use their own vehicle to travel. Average travel cost of the respondents was Rs.3975.56 and the standard deviation is 3379.618.

4. Results and Discussion

Willingness to pay can be estimated using both Parametric and Nonparametric methods. Major parametric methods are the “utility difference approach” (Hanemann, 1984) and “bid function approach” (Cameron and James, 1987). The present study adopts the parametric estimation based on the utility difference approach. The study intends to measure the maximum WTP by the individual respondents to the eco-tourism locations. It has been assumed that the WTP figures should be non-negative, therefore models based on log-normal and log-logistic distribution are

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adopted. The bid variable is allowed to enter the model as the natural log. The covariates used for the study are; gender- a dummy variable with 1 = males and 0 = females; Age = Respondents age in completed years, a continuous variable; marital_status = a dummy variable with 1 = married and 0 = others; Education = number of years of schooling, a continuous variable; and two dummies created from the categorical variable overall_exp representing the overall experience of the respondents at the tourist site. Overall_exp1 denote "overall experience – higher" with 1 = "yes" and 0 = "no" and overall_exp2 represents "overall experience – as expected" with 1 = "yes" and 0 = "no". overall experience – lower is kept as the reference level. Income of the individual respondent, and the average travel cost is omitted from the analysis due to lower response rate.

4.1. Parametric Estimation of SBDC data: In both models, the coefficients of intercept are highest and significant at 5 per cent level. Omission of it create biased estimate for the other predictors, therefore decided to retain in the model. The coefficient of gender is negative in both model indicating women are more willing to pay than men. Age did not have a significant influence on the respondent's choice. The coefficient of marital status is negative, indicating unmarried visitors are more willing to contribute to the scenario. The coefficient of education is positive, but did not have a meaningful influence over the choice of the individual. When compared with the reference level, the positive coefficients of evrall_exp1 and evrall_exp2 indicate that people experience a satisfaction level of "higher" or "as expected" will have a clear tendency to contribute more for the project. The estimated bid variable is reported at the bottom of the Table2.

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Table 2: Parametric Estimation of SBDC Data Using Log-Logistic and Log-Normal Models

	Log-Logistic Model				Log-Normal Model			
	Estimate	**Std. Error**	**z value**	**Pr(>|z|)**	**Estimate**	**Std. Error**	**z value**	**Pr(>|z|)**
(Intercept)	3.92114	1.77626	2.208	0.02728 *	2.42615	1.06052	2.288	0.022155 *
gender	-1.16353	0.35879	-3.243	0.00118 **	-0.69741	0.21111	-3.304	0.000955 ***
Age	0.03127	0.02232	1.401	0.16116	0.01905	0.01327	1.435	0.151330
Marital_status	-1.00675	0.43256	-2.327	0.01994 *	-0.59827	0.25635	-2.334	0.019608 *
Education	0.12779	0.07573	1.687	0.09152.	0.07313	0.04505	1.623	0.104493
overall_exp1	1.15606	0.46534	2.484	0.01298 *	0.67689	0.27534	2.458	0.013958 *
overall_exp2	0.83310	0.36570	2.278	0.02272 *	0.48611	0.21794	2.231	0.025714 *
log(bid)	-1.64431	0.35968	-4.572	4.84e-06 ***	-0.99321	0.21024	-4.724	2.31e-06 ***
Distribution: log-logistic Number of Observations.: 216 Log-likelihood: -122.7169 Pseudo-R^2: 0.189 Adjusted pseudo-R^2: 0.1366 LR statistic: 57.347 on 7 DF, p-value: 0.000 AIC: 261.434 ; BIC: 288.436 Iterations: 4, Convergence: TRUE					Distribution: log-normal Number of Observations.: 216 Log-likelihood: -122.8057 Pseudo- R^2: 0.189 Adjusted pseudo- R^2: 0.1360 LR statistic: 57.17 on 7 DF, p-value: 0.000 AIC: 261.611 ; BIC: 288.614 Iterations: 4, Convergence: TRUE			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1								

The Akaike and the Bayesian information criterion and the value of the log likelihood and the likelihood ratio (LR) statistic for the present model is given for both models. Four iterations are requiring to achieve the convergence and the convergent status is reported as "TRUE".

4.2. Willingness to Pay Estimates and the Confidence Intervals from the SBDC data: The WTP figures estimated for the study does not cover the existing entry fee. It is estimated over and above the existing entry fee. Three different mean WTP estimates and one median WTP

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estimates are computed using the log-logistic model and log-normal model, and are presented in Table 3 and 4 respectively. The expected addition in willingness to pay, based on the unmodified error distribution, is 81.269 for the log-logistic model and 66.563 for the log-normal model.

Table 3: Willingness to Pay Estimates and the Confidence Intervals for the SBDC Log-Logistic Model

	Mean	Confidence Intervals			
		Krinsky and Robb Method		Bootstrap Method	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
Mean	81.269	-281.583	528.535	50.166	Infinite
Mean (truncated at the maximum bid)	38.680	34.954	41.983	34.650	42.481
Mean (truncated at the maximum bid with adjustment)	58.623	47.742	73.537	46.391	77.412
Median	40.104	33.425	50.696	32.538	53.978

The truncated WTP for the log-logistic model is 38.68 and for the log-normal model is 38.779. Truncated WTP assumes that the error distribution is truncated at the maximum bid. The adjusted truncated mean WTP is 58.263 and 59.155 for log-logistic and log-normal models respectively. The median WTP 1s 40.104 for the log-logistic model and 40.097 for log-normal model. Log-logistic models and log-normal models gives identical results with respect to the WTP estimates. The difference between the estimates of these two models is moderate in the case of truncated mean WTPs and median WTPs. The upper and lower bounds of the confidence intervals of the WTP are estimated using the bootstrap methods and the Krinsky and Robb method suggested by Bliemer, M. C., & Rose, J. M. (2013). The results are presented in Table 4 and 5.

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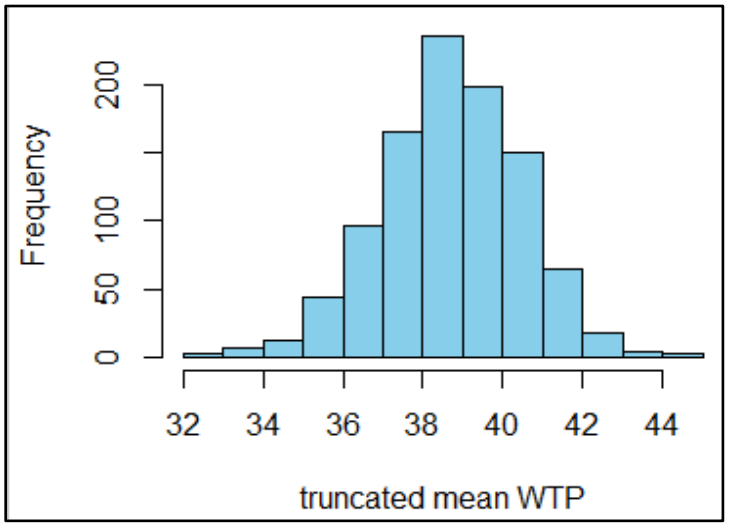
Table 4: Willingness to Pay Estimates and the Confidence Intervals for the SBDC Log-Normal Model

	Mean	Confidence Intervals			
		Krinsky and Robb Method		Bootstrap Method	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
Mean	66.563	47.680	247.300	47.566	250.361
Mean (truncated at the maximum bid)	38.779	35.149	41.986	34.918	42.158
Mean (truncated at the maximum bid with adjustment)	59.155	48.063	74.720	47.824	75.303
Median	40.097	33.133	51.140	32.835	52.607

Figure 1: Histogram Showing Empirical Distribution of the Truncated Mean WTP of the SBDC Data



The empirical distribution of the truncated mean WTP can be presented with the help of a histogram. The histogram constructed for the truncated mean WTP is presented below. The histogram is also reveals that the truncated WTP lies in between Rs.38 and Rs.40.

4.3. Non-Parametric Estimation of SBDC data: Nonparametric approaches to the calculation of willingness to pay are purely empirical, and it does not need the backing of assumptions pertaining to the distribution of the error term (Bateman et al., 2002). The survival probability, corresponding, each levels of WTP is provided by these methods. Two important non-

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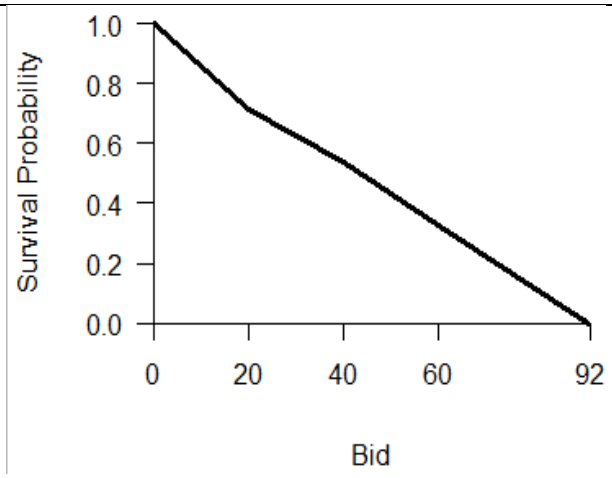
parametric estimation of SBDC data are commonly used. They are, the Kristrom's method and the Kaplan–Meier–Turnbull method.

4.3.1. Kristrom's method: The Survival Probability & WTP Estimates using Kristrom's method is provided in Table 7.7. The willingness to pay is calculated as the area under the probability plot. Carson and Hanemann (2005) estimated Spearman–Karber estimator using the following formula

$$mean\ WTP_{SK} = \frac{1}{2}\sum_{j-1}^{J+1}(\hat{S}\ (t_j) + \left(\hat{S}\ (t_{j-1})\right)(t_j - t_{j-1}).$$

Where $\hat{S}(t_j)$ is the proportion of "yes" responses to a bid t_j and assumes to have a monotonic non-increasing sequence. The mean WTP corresponding to the Spearman–Karber method is Rs.43.486 given as the area under the survival probability plot. The WTP value corresponding to the probability of 0.5 produces the median estimates. It is estimated as 43.396 and is consistent with the Spearman–Karber estimates.

Table 5: Survival Probability & WTP Estimates - Kristrom's Method

	Upper	Probability	Probability Plot
1	0	1.0000	
2	20	0.7159	
3	40	0.5352	
4	80	0.3279	
5	Infinity	0.0000	
WTP Estimates			
Mean(Kaplan-Meier)		31.580	
Mean (Spearman-Karber)		43.486	
Median		43.396	

4.3.2. Kaplan–Meier–Turnbull method: The Spearman–Karber WTP estimate cannot be calculated without the assumption, $\hat{S}\left(t_{j+1}\right) = 0$. Where $\left(t_{j+1}\right)$ is the upper distribution end point. But this endpoint cannot be calculated from the data. A solution can be find in the Kaplan–

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Meier–Turnbull estimator (Carson and Hanemann, 2005) where the survival function between two successive bid levels, $(t_{j-1})$and $(t_j)$is interpolated with the lower of the two probabilities $\widehat{S}(t_j)$ (Aizaki, et.al, 2014). The result is a step function and the mean WTP is the area under the step function and is computed as

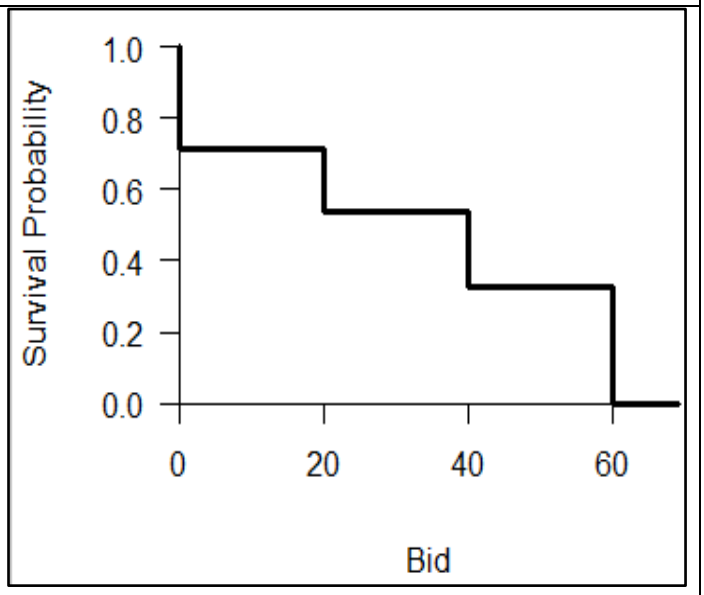
$$mean\ WTP_{KMT} = \sum_{j-1}^{J} (\widehat{S}\ (t_j)(t_j - t_{j-1})$$

The Kaplan–Meier–Turnbull WTP estimate is 31.580, which is lower than Spearman–Karber WTP estimate. The Kaplan–Meier–Turnbull method is not based on point estimate, hence produced an interval estimate to the median. Median WTP falls between Rs.40 and Rs.60.

Table 6: Survival Probability & WTP Estimates - Kaplan–Meier–Turnbull Method

	Upper	Probability
1	0	1.0000
2	20	0.7159
3	40	0.5352
4	80	0.3279
5	Infinity	0.0000
WTP Estimates		
Mean(Kaplan-Meier)		31.580
Mean (Spearman-Karber)		38.301
Median		[40, 60]

Probability Plot



4.4. Parametric Estimation of DBDC data: The estimated log-logistic and log-normal models are estimated using the DBDC data and the coefficients with the relevant inferential statistics such as the standard errors and the z-values are produced in in Table 7. The coefficient of the intercept variable is positive and highly significant. Females have stronger inclination towards willingness to pay for the scenario and the estimate is significant at 1 per cent level. The coefficients of all variables follow the same direction of change as the SBDC data estimate shows. Age and Marital status of the respondents are the two variables which are found to be insignificant. The coefficient of the bid variable is negative and significant at 1 per cent level.

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Table 7: Parametric Estimation of SBDC Data Using Log-Logistic and Log-Normal Models

	Log-logistic Model				Log-normal Model			
	Estimate	**Std. Error**	**z value**	**Pr(>|z|)**	**Estimate**	**Std. Error**	**z value**	**Pr(>|z|)**
(Intercept)	3.95792	1.03340	3.8300	0.000128 ***	2.340259	0.624659	3.7465	0.000179 ***
gender	-0.99079	0.28952	-3.4222	0.000621 ***	-0.576858	0.172294	-3.3481	0.000814 ***
Age	0.01496	0.01824	0.8202	0.412123	0.009838	0.010948	0.8986	0.368865
marital_status	-0.57223	0.35114	-1.6296	0.103176	-0.351726	0.209818	-1.6763	0.093672 .
Education	0.12864	0.06100	2.1088	0.034960 *	0.077186	0.036896	2.0920	0.036441 *
overall_exp1	1.52993	0.39771	3.8469	0.000120 ***	0.884714	0.229283	3.8586	0.000114 ***
overall_exp2	0.97402	0.30916	3.1505	0.001630 **	0.544273	0.182191	2.9874	0.002814 **
log(bid)	-1.64759	0.14916	-11.0455	<2.2e-16 ***	-0.979680	0.082785	-11.8340	<2.2e-16 ***
Distribution: log-logistic Number of Observations: 216 Log-likelihood: -258.657414 LR statistic: 48.513 on 6 DF, p-value: 0.000 AIC: 533.315; BIC: 560.317 Iterations: 45 16 Convergence: TRUE					Distribution: log-normal Number of Observations.: 216 Log-likelihood: -258.715749 LR statistic: 48.501 on 6 DF, p-value: 0.000 AIC: 533.432; BIC: 560.434 Iterations: 49 13 Convergence: TRUE			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1								

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The convergence status of both models is true, indicating that the optimisation converged successfully. Akaike and the Bayesian information criterion and the value of the log likelihood and the likelihood ratio (LR) statistic for both models are identical. The likelihood ratio (LR) test statistic on 6 degrees of freedom is significant at 1 per cent level. The pseudo-$R^2$is not computed in the model.

4.5. Willingness to Pay Estimates and the Confidence Intervals of the DBDC Data: The analysis of both models returns three different mean WTP figures and one median WTP estimate for the DBDC data. The mean WTP estimate based on the unmodified error distribution is calculated as Rs.82.389 for log-logistic model and Rs.68.950 for log-normal model. The truncated WTP estimates are calculated by assuming that the error distribution is truncated at the maximum bid. The Truncated WTP figures for the log-logistic model are Rs.52.432 and for the log-normal model is Rs.52.903. The adjusted truncated WTP is Rs.61.294 and Rs. 61.956 for the log-logistic and the log-normal models respectively. The median WTP for the log-logistic model is Rs.40.793and for the log-normal model is Rs.40.953. The WTP estimates for both models produce identical results except for the WTP calculated on the unmodified error distribution.

Table 8: Willingness to Pay Estimates and the Confidence Intervals for the DBDC Log-Logistic Model

	Mean	Confidence Intervals			
		Krinsky and RobbMethod		Bootstrap Method	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
Mean	82.389	62.816	129.476	58.839	121.143
Mean (truncated at the maximum bid)	52.432	46.882	58.053	46.408	58.792
Mean (truncated at the maximum bid with adjustment)	61.294	52.644	72.169	51.506	72.732
Median	40.793	35.062	47.448	34.586	48.888

The confidence intervals for the WTP estimates are derived using the Krinsky and Robb method and the Bootstrap method. The upper and lower bounds are estimated with 95% confidence intervals. The results are presented in Table 9 and 10. The confidence interval for truncated WTP and adjusted truncated WTP are similar in both models.

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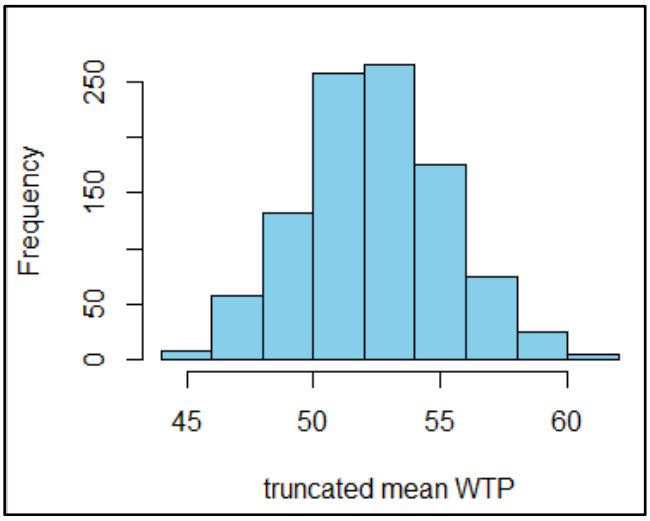
Table 9: Willingness to Pay Estimates and the Confidence Intervals for the DBDC Log-Normal Model

	Mean	Confidence Intervals			
		Krinsky and Robb Method		Bootstrap Method	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
Mean	68.950	55.656	94.493	53.867	90.803
Mean (truncated at the maximum bid)	52.903	47.031	59.423	46.432	58.825
Mean (truncated at the maximum bid with adjustment)	61.956	52.252	75.029	51.302	73.623
Median	40.953	35.201	49.076	34.723	48.167

The truncated mean WTP based on the empirical distribution can be presented with the help of a histogram. The histogram shows that the truncated WTP lies in between Rs.50 and Rs.55.

Figure 2: Histogram Showing Empirical Distribution of the Truncated Mean WTP of the DBDC Data



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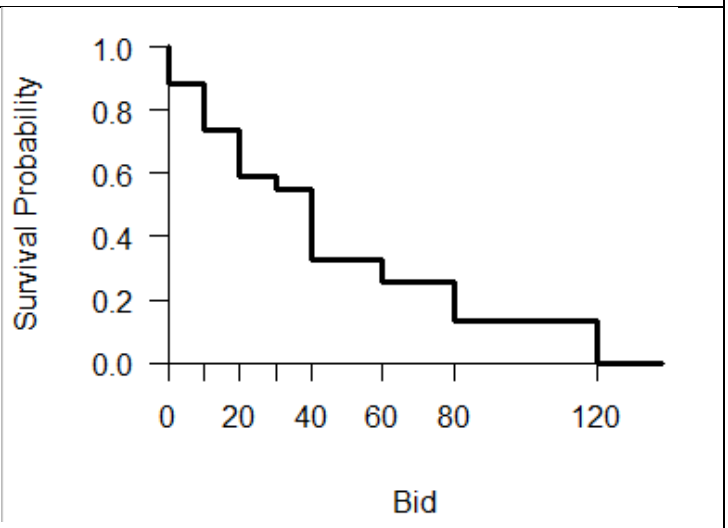
4.6. Kaplan–Meier–Turnbull method for the Non-Parametric Estimation of DBDC data:

The double-bounded data is basically interval data, hence, the Kristrom's method is not produced. The survival probability corresponding each levels of WTP is calculated using a modified version of Kaplan–Meier–Turnbull method (Carson and Steinberg, 1990). The resulting step function probability plot, survival probability and the WTP estimates are given in the Table 10. The Kaplan–Meier–Turnbull WTP estimate for DBDC data is 44.557, which is lower than Spearman–Karber WTP estimate (52.261). Median WTP is not calculated as a point estimate. The estimation says only that the median WTP falls in between Rs.40 and Rs.60.

Table 10: Survival Probability & WTP Estimates of DBDC data-Kaplan–Meier–Turnbull method

	Upper	Probability	Probability Plot
1	0	1.0000	
2	10	0.8838	
3	20	0.7358	
4	30	0.5902	
5	40	0.5472	
6	60	0.3279	
7	80	0.2592	
8	120	0.1311	
9	Infinity	0.0000	
WTP Estimates			
Mean(Kaplan-Meier)		44.557	
Mean (Spearman-Karber)		52.261	
Median		[40, 60]	

5. The Reasons for the Willingness and the Unwillingness to Participate in the Programme

The reason for not willing to participate to the programme is enquired. 68 respondents (47.9 per cent) opined that the they can't afford any addition in the existing user fee. 19 per cent of the respondents expressed that they do not believe that the money actually spend by them will reach the purpose envisioned. 10 per cent off people satisfied with the existing management practices to in the ecotourism destinations. Another 10 per cent believe that the programme is a sole

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responsibility of the local authorities.Majority of the respondents who chose to remain in the programme rather than opting out expressed that the protection of the environment and the natural environment are their duty. Nearly 33.5 per cent of the respondents held this view. 17.34 per cent of the respondents replied that the project described to them will improve the biodiversity of the region and protect the environment and natural resources. More than 12 per cent of the respondents expressed that they are willing to pay because they believe that the program explained to them is really important. Al most same number of people support this program, since they believe that the government alone cannot find sufficient resources for the protection of the region. Similar proportion of respondents opined that they are willing to contribute for this only because of that they want to contribute for a good cause.

6. Summary and Findings

The study is an attempt to measure the visitor preferences and willingness to pay of the tourists who are visiting the ecotourism destinations under the protected forest areas. Parametric estimation of DBDC data and SBDC data shows that women, unmarried, educated people are more willing to contribute to the hypothetical scenario presented. No association is found in between age and the WTP response. If the visitors are found to be more satisfied with their current visit, they are more willing to co-operate with the programme. The study did not find any significant association between the choice of the respondents and age of the respondents. The study also found that married visitors are less willing to contribute to the programme. Education does have a positive effect on the participation of the programme.The visitor's expectations and experiences at the tourist site will have a significant influence over the decision. If people are highly satisfied, they are more likely to participate the WTP bid. The WTP amount estimate using parametric methods for the SBDC data is around Rs.39 and the non-parametric estimation using Kristrom's method Rs.43.50 and the Kaplan–Meier–Turnbull method estimates Rs.31.60. The lower and upper intervals of the median is found in between Rs.40 and Rs.60. The truncated WTP figures estimates for the DBDC data is Rs.52.40 and 52.90 respectively. The improvement in the WTP figures as compared with the SBDC data shows that the inclusion of a second bid question did have a strong impact on the estimation of the WTP amount. But the median WTP figures remain similar to the estimates given by the SBDC question. Hence, it can be concluding that the inclusion of second bid question will influence the mean figures, the median figures

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remain unaffected. The 95% confidence intervals constructed for the mean figures shows that the difference between the upper bound and lower bound is very less indicating the precision of the estimates.

The study also found that majority of the respondents who did not choose the bid amount (the original bid or the subsequent bid) because they think that they could not afford any addition to the existing user fee. Some of them believe that the money actually spend by them would not reach the target, and some other believe that the conservation and protection of the forests are the responsibility of authorities. Some of them are satisfied with the existing management practices.

Majority of the visitors who decided to contribute to the programme expressed that the protection of the environment and the natural resources are their duty. A major proportion of people support to this program because they believe that the project presented to them will improve the biodiversity of the region. Some of them believe that the governments alone cannot find sufficient sources to the fund required for the protection and conservation, therefore, they are ready to contribute to the programme.

7. Policy Implications

The growing importance of ecotourism in nature-based tourism areas necessitated the importance of the use of proper valuation methodologies of the natural areas. An accurate assessment of the preferences of tourists is essential for framing projects and policies for the development of ecotourism destinations. economic valuation has a crucial role in the management of protected forest areas. Maximisation of welfare without hampering the environmental or natural resources could be attained only through a proper valuation of the resources in monetary terms.

The application of economic valuation is challenging if there are significant indirect use values and non-use values involved. The study is based on the basic premise that the protection and conservation of the natural forests is an economic good that the people are willing to pay for. The present study confirm that the premise is consistent with the theory, any conservation efforts in the form of; Removal of the Exotic Plants, Restoration of the original forest vegetation and controlling forest fires, restriction of quarrying and mining activities in the buffer zone of Protected Forest Areas would be welcomed by the visitors.

The study therefore strongly supports and recommends the use of economic valuation techniques in ecotourism locations to make sound decisions in the policy front. An improved version of the

study can be replicated on a wider setting. In order to overcome the common limitations in applying economic valuation techniques, a multidisciplinary approach to the valuation is recommended.

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