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INVESTIGATING INFORMATION BIAS IN CONTINGENT VALUATION: A SURVEY OF WILLINGNESS TO PAY TO PRESERVE THE CULTURAL HERITAGE OF MAJULI ISLAND

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Abstract

Research purpose. Satras of the river island Majuli form an indispensable part of Assam's cultural heritage. However, despite their tremendous importance, floods and flood-induced erosion severely impact the Satras. This study aims to explore the perceptions of the residents of the world's largest riverine island, Majuli, regarding the importance of the cultural heritage of Majuli by incorporating their Willingness to Pay (WTP) for the preservation and conservation of Satras in Majuli.

Design/methodology/approach. A structured interview was conducted with 370 individuals using the Yamane formula from different areas adjoining Satras. The Contingent Valuation method (CVM) was used to grasp the objective of the study, and the Censored regression was used to identify the determinants of Willingness to Pay (WTP). A split-sampling technique was used to detect the presence of information bias. The chi-square test of association and the Mann-Whitney U test were used to detect the presence of information bias.

Findings. The study found that most people expressed their willingness to protect and safeguard their cultural heritage from floods and erosion that occur every year. The Karl Pearson chi-square test and Mann-Whitney U test showed an absence of information bias. Variance inflation factors (VIF) indicate the absence of multicollinearity. The variances were homoscedastic. The results of the censored regression showed that income, age, and threat significantly affected the respondents' WTP. While family size negatively impacted the Willingness to pay of the respondents. The income of the respondents positively affected their WTP, which was significant at the one per cent level of significance. Financial Burden also negatively affects the WTP of the respondents and has a marginal effect of INR -0.015. Education was not found to significantly affect the WTP decisions of the respondents in the study area, although education was one of the significant variables affecting Willingness to Pay.

Originality/value/practical implications. A detailed understanding of the benefits and the need to preserve age-old heritage can thereby contribute to decision-making, planning, and protection of the cultural heritage of Majuli, as floods are a yearly phenomenon on the island. This study adds to the existing literature by providing meaningful insights into the economic valuation of heritage, particularly cultural heritage.

Keywords: Cultural heritage; contingent valuation; Satras; Majuli; willingness to pay

JEL codes: A1; Z1

Introduction

Heritage is a property that is or may be inherited, valued things such as historic buildings that have been passed from future generations and related to things of historic or cultural value that are worthy of preservation (United Nations Educational, Scientific and Cultural Organization,). Heritage refers to

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traditions inherited from the past, the present, and probable chances of inheritance in the future. International Council on Monuments and Sites (ICOMOS) simply defines cultural heritage as the expression of ways of living developed by a community. Article 1 of the World Heritage Convention defines cultural heritage as monuments, groups of buildings, sites, works of monumental sculpture, works of man, or combined works of man and nature, all of which have outstanding universal value from the perspective of history, art, or science. Cultural heritage is the legacy of physical artefacts and intangible attributes of society inherited from past generations (Willis, 2014). Cultural heritage, which bridges the gap between the past and the future and is developed as a result of complex historical processes, is continuously evolving.

Cultural Heritage comprises both tangible heritage, which includes historic building monuments, and intangible heritage, such as customs, culture, and beliefs. The 1972 World Heritage Convention is responsible for protecting natural and cultural areas of great importance to mankind by including them in the World Heritage Site (WHS) list. As of April 2024, there were 1199 heritage sites in 168 countries. Of these, 933 were included in the cultural list and 227 were included in the natural list. The remainder (39) are included in the mixed sites containing both cultural and natural amenities. This study is primarily concerned with the built cultural heritage of the largest riverine island, Majuli, although it is not included in the UNESCO WHS list. Numerous efforts have been made to include it on the World Heritage List. Cultural heritage acts as a catalyst to attract tourists and boost the region's economic development. Heritage as capital has captured the attention of various researchers and policymakers for the multiple values that heritage incorporates. There is growing interest among researchers to justify the importance of heritage and the need to preserve and conserve heritage.

Decision-making related to heritage site preservation is a complicated task. The importance of built heritage is associated with various typologies on the one hand and multiple use and non-use values such as historical, cultural, aesthetic, social, and scientific values on the other (Merciu et al., 2021). The non-market value of heritage consists of both use and non-use value. Use value accrues to direct users whereas non-use value accrues to indirect users. During the last few decades, there has been a switch to valuation techniques that can aid decision-makers in preserving heritage. As cultural heritage embodies an expansive range of values, it is impractical to express it in monetary terms. Therefore, a valuation technique is required to place value on the built heritage. Historical properties inherited from the past are customary to the public good by nature. Owing to their non-excludable and non-rival nature, preservation and conservation efforts have become dubious. Specified by its public nature, an economic valuation of cultural heritage can help in its finer management of the cultural heritage. A joint study by Baitalik and Bhattacharjee (2024) to measure the economic value of the terracotta temple town in Bishnupur, West Bengal, showed interesting findings of tourists willing to pay more to preserve the temple town. Similar studies related to heritage preservation have been conducted in India, but very few have concentrated on heritage in a regional context, despite the plethora of studies on ecosystem valuation. This study aims to fill the existing gap in the literature by conducting a valuation study of the largest river island in the world.

This study focuses on assessing the economic valuation of cultural heritage with particular reference to Northeast India. Although plenty of research has been conducted on the economic valuation of ecosystem services worldwide, very few studies have concentrated on the economic valuation of cultural heritage specific to India and the northeastern region in particular. This study is unique in that it attempts to draw the attention of policymakers and thinkers by conducting a study on the economic valuation of the built heritage of Majuli, the largest riverine island, using the Contingent Valuation method. Income, age of the respondent, and threat were variables that significantly affected the respondents' WTP.

Literature review

A review of non-market valuation methods in environmental economics, marketing, and transportation has been the subject of considerable research in recent decades (Yung et al., 2013). Most of the literature is confined to the economic valuation of ecosystem services, whereas there is only a sporadic amount of

literature on the economic valuation of cultural heritage. Non-market valuation techniques are widely used in environmental economics; however, Navrud and Ready (2002) applied the Contingent Valuation method to value historic buildings. A study to measure passive use value in old-growth forests in Alberta by Boxall et al. (1996) used the Choice Experiment, an extension of contingent valuation. Alberini and Longo (2006), in their joint study, applied the Contingent Valuation method to place a value on the built heritage sites in Armenia (Alberini & Longo, 2006).

In recent years, urban planners in developed countries have recognized the merits of preserving the past. This realization has been greatly influenced by recent attempts by developed countries to conserve heritage in several innovative ways. Attempts have been made to preserve the beauty of cultural heritage in developing countries in various ways. Using dichotomous choice-based questions and bivariate probit regression of inhabitants in Valvadia, Chile (Baez-Montenegro et al., 2012), it was found that educational qualifications mostly impact willingness to pay for preserving cultural heritage. Pakdeeburee et al. (2011) conducted a study on the economic valuation of Ayutthaya Historical Park to understand the major threats faced by historical parks. The results of the analysis state that people are willing to pay (WTP) to preserve and conserve the park, and tourists are willing to pay more than the local residents. (Sanz et al., 2003) studied the National Museum of Sculpture in Valladolid, Spain, using a semiparametric and non-parametric statistical technique to estimate willingness to pay (WTP) for cultural goods. The estimates showed a greater WTP to preserve, and they were willing to donate to preserve the museum. Furthermore, the frequency of visiting Ayuttha and the time spent visiting had an impact on donations. Using a two-step approach and reaffirming questions to reduce hypothetical bias, the CVM was applied to estimate the value of preserving the Gama Ssaum, an endangered folk game. The value of preserving the folk game was set at KRW 7, 259 (Choi et al, 2021). According to Kaluthanthri and Edirisinghe (2016), CVM was used to value a public library in Sri Lanka. Tobit regression reveals that variables such as annual income, social position, and membership significantly affect the willingness to pay for the conservation of church forests in Ethiopia (Endalew & Wondimagegnhu, 2019). A study of the five historical sites in Assam by Borah (2024) using Contingent valuation and Travel cost methods summarizes that the Willingness to pay for Rang Ghar, the first Amphitheatre in Asia, is the highest amongst all the historical sites. The willingness to pay was higher among foreign tourists than among domestic tourists.

Riverine islands are prone to natural hazards and provide a rationale for superintending a study because built heritage sites, commonly called monasteries, are affected by floods every year. Grid analysis shows that the total area of the island was 629.2 km2 in 1975, 602.95 km2 in 1990, 567.9 km2 in 2005 and 487.5 km2 in 2017, respectively. The annual rate of erosion in Majuli was 1.75 km2 per year from 1975 to 1990, 2.33 km2 per year from 1990 to 2005, and 6.7 km2 per year from 2005 to 2017, respectively (Roy et al., 2020). Existing data show that, out of 65 monasteries, the number reduced to a mere number of only 22 after floods and erosion washed away their land and buildings (Bharasa & Gayen, 2020). Here, we surveyed direct users of cultural heritage to elicit their willingness to pay (WTP) for protecting cultural heritage using the Contingent Valuation method, because of its simplicity (Hanemann, 1994).

Sampling technique and Sample size

The majority of the Satras are concentrated in Majuli, Lakhimpur and Barpeta districts of Assam, but Majuli, which is designated as the World's largest riverine island, is known to be the cultural capital of Assam; therefore, to economize on resources and time, only one district, Majuli, was selected. Thus, district selection is ideal for deepening the knowledge of the flood situation on the island, particularly Satras. This study adopted a multistage sampling technique to collect data. In the first step, Majuli was selected from among all the districts of Assam. In the second step, from a total of thirty-six Satras or monasteries in Majuli, ten Satras were selected according to the number of annual tourists they received. In the third step, 20 villages adjacent to Satras were selected. In the last stage, three hundred seventy (370) samples were selected using the Taro Yamane formula (Yamane, 1973).

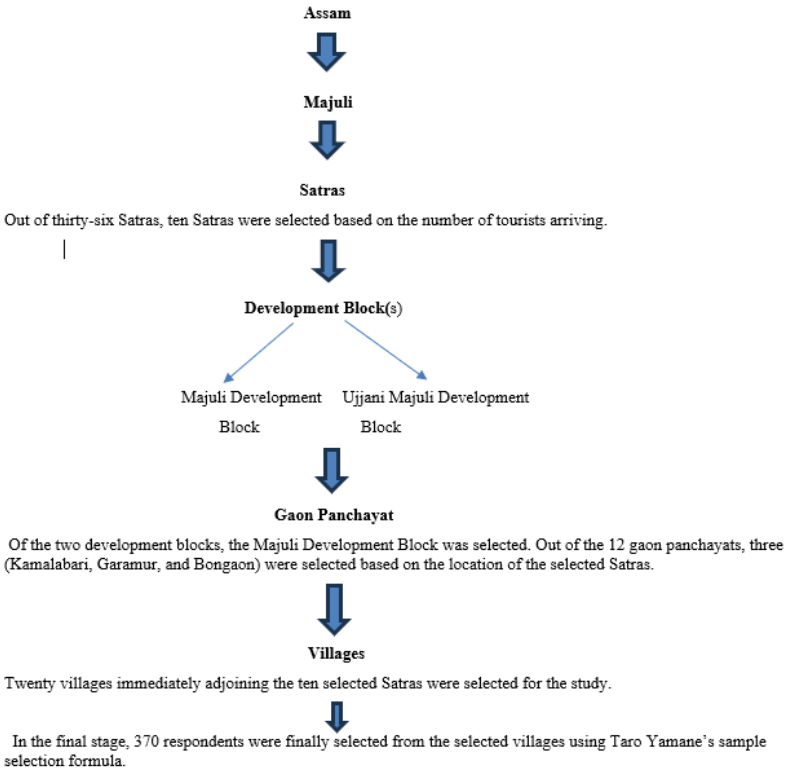

Fig. 1. Multistage sampling technique for sample selection

Research methodology

Data were collected using a questionnaire prepared according to the recommendations of the National Oceanic and Atmospheric Administration (NOAA) Panel (Arrow et al., 1995). Face-to-face interviews rather than mail or telephone interviews were conducted. A well-defined survey instrument or questionnaire is necessary for Contingent Valuation scenarios. Following Bateman et al. (2002) and Carson (2000), the questionnaire was divided into three parts. The first part dealt with knowing and assessing the attitudes of the respondents concerning the preservation and protection of cultural heritage. The second part is based on a hypothetical scenario. The last part primarily dealt with the socioeconomic information of the respondents. Among WTP and WTA, WTP was considered a conservative choice according to the NOAA guidelines. The survey was conducted between May and July 2023.

Following the standard practice in the literature, bids were selected based on a pilot survey using an open-ended question. The present study used two elicitation methods, namely Single Bounded Dichotomous choice questions or referendum approach and open-ended questions, following the recommendations of Tolley and Fabian (1998).

Contingent Valuation Method

The Contingent Valuation method (CVM) is used to estimate the economic value of Majuli's cultural heritage. The present study attempted to minimize anomalies associated with CVM.

A split-sampling technique was used to detect information bias. Samples were divided into two groups: treatment (B) and control (A). The respondents were asked to choose one lottery chit from two identical chits. If one chooses Chit A, he/she is included in the control and treatment groups if Chit B is selected.

This is how the grouping is performed. Respondents were unaware of the additional information provided. Both groups received the base information, which included the current status of Satras, floods every year, and the havoc created by floods. Additional information was provided such that it contained only additional information, not any necessary information, which in any case may not affect the valuation of cultural heritage. The presence of information bias may have resulted in the different WTP values in the two groups. The group receiving additional information is expected to have a higher WTP than that of the group without additional information. Finally, 326 samples were obtained, out of which 170 were selected in the treatment group and 156 were selected in the control group. The sample size was set at 370. To determine the difference between true and protest bids, respondents were asked why they were unwilling to pay. Thus, the protest bids can be identified. However, after excluding protest bids, the sample size was 326. To maintain the reliability of the estimates, protest bids were excluded, because their WTP may differ from zero. Pearson's chi-square and Mann-Whitney U tests were used to detect the presence of information bias. Keeping in mind the nature of the variable, which is continuous, the Mann-Whitney U test was used for open-ended responses.

Table 1. Distribution of responses to offered bids between the two groups (Source: Author's calculation from the Field survey)

Answer type	A(Control)	B(Treatment)	Total
Yes	92 [48.4%] (59%)	98 [51.5%] (57.6%)	190 [100%]
No	64 [47%] (41%)	72 [52.9%] (42.4%)	136 [100%]
Total	156 (100%)	170 (100%)	326

Note: Figures within [] and () are percentages within the Answer type and Group, respectively

According to the definition of information bias, there must be differences between the WTP values of the control and treatment groups. Table 1 shows that of the 326 yes responses,98 (51.5%) were from the treatment group, and 92 (48.4%) were from the control group. The table also shows that within the treatment group, 57.6% reported yes and within the control group, 59% reported yes. To examine whether there was a statistically significant difference, the Karl Pearson chi-square test was performed. The reasons for adopting Pearson's chi-square test were adopted because the ordinal nature of the data did not permit parametric testing.

Ho: There was no significant difference in WTP between the two groups.

H1: There is a significant difference between the two groups.

Table 2. Pearson chi-square test results of responses between the groups (Source: Author's calculation from Field Survey)

	Value		Asymp.Sig.
Pearson Chi-square	6.201	1	0.84
No. of valid cases	326		

Table 2 paves the way for rejecting the alternative hypothesis that claims the existence of a significant difference, thereby accepting the null hypothesis of no significant difference. Therefore, the null hypothesis of no difference cannot be rejected. The acceptance of the null hypothesis indicates the absence of information bias. The WTP values reported by respondents in the two groups did not differ. The absence of information bias implies that the additional information provided to one group does not affect the respondents' WTP decisions. Moreover, the adoption of a reality check to minimize hypothetical bias may also minimize the presence of information bias.

It is equally mandatory to check the presence of information bias in the case of open-ended responses, as was done in the case of DC questions. For open-ended questions, respondents were asked to state their Maximum Willingness to Pay (MWTP) for the good in question. The variables were considered continuous. The Mann–Whitney U test was used to test if there was any significant difference in the MWTP values between the two groups. The null hypothesis was that there would be no significant difference between the groups.

Ho: There is no significant difference between the mean ranks of the exact MWTP responses of Group A and Group B

Table 3. Mann-Whitney U test Statistic between MWTP and Group (Source: Authors' compilation from field survey)

Mann-Whitney U	12739
Asymp	0.62
Grouping Variable: Group	

Table 3 shows the results of the Mann-Whitney U test. Table 3 indicates that the null hypothesis cannot be rejected. This leads us to accept the null hypothesis and reject the alternative hypothesis, defining the existence of a significant difference between the MWTPs. The null hypothesis of difference establishes our claim that open-ended responses in the present study were not affected by the presence of information bias. The Mann-Whitney U test results are consistent with our findings. The results of the chi-square test and Mann-Whitney U test led us to conclude that the estimates were bias-free.

Econometric Analysis

A single-bounded dichotomous choice format, followed by an open-ended question, was used to produce continuous dependent variable values including zero. In such cases, the standard ordinary least squares (OLS) technique results in biased and inconsistent estimates. An appropriate method to deal with this is the Tobit maximum likelihood estimate, which estimates the impact of explanatory variables on maximum Willingness to Pay.

In this context, the regression model used in this study was

$$MWTP* = \beta_0 + \beta_1 INCOME + \beta_2 EDUC + \beta_3 FIN\ BUR + \beta_4 FS + \beta_5 GEN + \beta_6 AGE + \beta_7 THREAT + u$$

Table 4. Potential determinants and their expected signs used in the study (Source: Author's compilation from relevant literature)

Variables	Definition	Expected sign of coefficients
Income	Total monthly income of the respondent	+
Education	Educational level of the Household head	+
Financial Burden	Financial burden of the respondent	_
Family Size	Number of family members in the household	_
Gender	Gender of the respondent	-/+
Age	Age of the respondent in years	+
Threat	Satras is currently under threat.	+

Research results

Socio-demographic characteristics of the respondents

Males represented the majority, with 82.4% of the total sampled population. The majority of participants were in the middle-aged group, comprising–41-60 years of age. Very few respondents were found in the age group 20-40. The results indicated that almost half of the surveyed individuals were graduates and there were very few illiterates in the population surveyed. Almost every household had a basic amenity. The average household size is four. Of the sampled respondents, 32.97% were employed in government services. The lowest income earners were from daily wage earners, and the maximum of the individuals fell under the 50,000-1,00,000 category.

Predictors of Willingness to Pay (WTP)

The Tobit or censored regression is the most suitable method for estimating Willingness to pay in the case of WTP studies. The dependent variable was the maximum willingness to pay for Satras preservation. The dependent variable was affected by several socio-demographic and attitudinal variables. In this study, seven explanatory variables were used based on an extensive literature review. Family size, that is, the total number of family members, was taken as the independent variable, and family size and WTP were negatively associated. A one-unit increase in family size leads to a decrease in the respondents' WTP. Many family members have lower surplus money (Kaluthanthri & Edirisinghe, 2016). The respondents' educational attainment was positively related to their WTP. An educated individual is a responsible citizen who attempts to safeguard a region's heritage. Therefore, the respondent's education level was included as an explanatory variable (Baez-Montenegro et al., 2012). As per the literature, there is a negative relationship between the financial burden and WTP. There can be no a priori assumption regarding the relationship between WTP and age, as studies have found a blend of both positive and negative relationships between the two. Elderly people are more willing to pay than younger people are (Baez-Montenegro et al., 2012). A positive relationship exists between income and WTP (Islam, 2021). An increase in income may lead to an increase in WTP (Baez-Montenegro et al., 2012; Dutta et al., 2005). Therefore, the respondents' income was included as an explanatory variable. According to the literature, the existence of a threat creates greater awareness among people to protect heritage sites from further deterioration. A positive relationship is expected between threats and WTP (Islam, 2021). Women and men have different attitudes towards the protection of cultural heritage. There is a negative relationship between gender and WTP (Choi et al., 2021;

Jin et al., 2019). Gender was included as an independent variable. However, no a priori assumptions were made regarding gender or the WTP.

Before running the model, multicollinearity and heteroscedasticity were assessed. Multicollinearity was estimated using the variance inflation factor (VIF). The table below shows the VIF values.

Table 5. VIFs of the explanatory variables (Source: Author's calculation from the survey)

Variables	VIF
Income	1.214
Education	1.146
Financial Burden	1.031
Family size	1.08
Gender	1.06
Age	1.067
Threat	1.052

VIFs greater than five represent the presence of multicollinearity as a rule of thumb. However, the VIFs were below the limit, implying that the data were free from the problem of multicollinearity. The presence of heteroskedasticity was checked using the B-P test. The results are as follows:

Ho: Constant variance

Table 6. Results of the Breusch-Pagan test for heteroscedasticity (Source: Author's calculation using field survey data)

Chi-square (7)	218.3
Prob > chi-square	0.106

The results of the Tobit estimation model are summarized as follows:

Table 7. Tobit regression results

Constant	270.95 (0.16)
Income	87.34 *** (6.46)
Education	1.87 (1.46)
Financial Burden	-41.86 *** (-3.83)

Family Size	-66.70 *** (-6.58)
Gender	-7.85 (-2.13)
Age	1.10 *** (0.89)
Threat	132.51 *** (5.51)

*Note: The figures in parentheses are t-values. *** indicates significance at 0.01 per cent, respectively*.

No. of observations = 370

F (34,292) = 27.61 ***

The F-statistic, which is significant at 0.01%, indicates that the model has a good fit. The results showed that income, financial burden, family size, age, and the existence of a threat have a statistically significant influence on the willingness to pay (WTP) for Satras. While income and the existence of threat positively impact the willingness to pay, financial burden and family size negatively impact the willingness to pay.

Education was not found to be significant, which implies that the respondent's level of education had no impact on their MWTP for the preservation of Satras. A respondent with a higher level of education is said to be more responsible and rational towards the protection of heritage. This finding is inconsistent with those reported in the literature. The aforementioned reasons for this divergence between education and WTP may be due to the remote location of the island; the extent of awareness of heritage preservation is lagging. In addition, some residents living near the river had basic education in the study area. Gender was not significant, and a negative relationship was found between WTP and gender. This negative relationship has been reported in several studies. Generally, there is no defined relationship between gender and the WTP. Studies have shown both positive and negative relationships between WTP and gender. The negative relationship implies that the respondent's gender, the state of being male or female, has no effect on the willingness to pay for the preservation of Satras. This negative relationship in the study is in consonance with studies earlier (Choi et al. 2021; Jin et.al.,2019). Income is significant at the 0.01 level of significance, implying that both have a positive relationship. Income was found to significantly impact the willingness to pay. It is expected that people with higher incomes will be more likely to pay more for preservation. This implies that respondents with higher incomes are willing to pay more than those with lower incomes. A negative relationship exists between the burden and WTP. As expected, the financial burden and MWTP were found to be significant but negatively related. When an individual's financial burden increases, they are less likely to pay for the preservation of the Satras. Financial burden in any form can lead to less surplus money. In the context of the study area, if family members increase, it will result in less willingness to pay because of the increased expenses to support the family. Family size is negatively related to MWTP and is significant at the 0.01 level. The results of the present study coincide with those in the literature (Kaluthanthri & Edirisinghe, 2016) which also implies that a negative relationship exists between the number of family members and MWTP. The threat was found to be statistically significant at a 0.01 level of significance, and a positive relationship was found between MWTP and threat. This means that when an individual perceives a problem associated with the concerned heritage, their WTP for preserving particular goods increases. Therefore, as the threat increases, the MWTP for protecting Satras in the region also increases. The results of this study support previous findings that WTP to protection increases as threat increases (Islam, 2021).

Table 8. Marginal effects of significant independent variables (Source: Author's calculations)

Variable	Marginal Effects
Income	0.032 ***
Financial Burden	-0.015 ***
Family size	-0.024 ***
Age	0.004 ***
Threat	0.054***

Table 8 presents the marginal effects of the significant variables. The marginal effect in Tobit regression is used to show how a unit change in the explanatory variable affects the dependent variable. Income is significant at the one per cent level, and its marginal effect is 0.032, which means that other things remain constant, an additional increase in income increases the mean value of the MWTP by INR 0.032. Similarly, for financial burden, an additional increase in burden results in a fall in the MWTP by INR -0.015, considering the negative relationship between the financial burden and WTP. An increase in family size decreases MWTP by INR -0.024, justifying the negative relationship between family size and WTP. Age and WTP are positively related, and the marginal effect is 0.004, which implies that, as age increases, the responsibility to protect heritage increases by INR 0.004. People in the study area who were aged and had gained experience were willing to pay to preserve the Satras. The findings are in line with an earlier study by Baez-Montenegro et al. (2012). Finally, the threat perceived as a significant independent variable is significant at the one per cent level of significance, and the marginal effect is 0.054, which highlights that as the threat of heritage damage increases, the payable amount to protect heritage increases by INR 0.054.

Conclusions

Although the application of Contingent Valuation to heritage sites is scant in the northeast and Assam, the study made an effort to make an economic valuation of Satras. This study uses the Contingent Valuation technique, covering 370 respondents, the direct beneficiaries of Satras, using primary data from 20 villages in Majuli, where the villages are immediately adjoining the selected Satras. The world's largest river island is prone to flooding annually. The findings clearly show that the majority of the people were concerned about the preservation plan of Satras and expressed an affirmative willingness to pay for the proposed scenario. In the wake of serious threats of flood and flood-induced erosion, the preservation value estimated from the factors influencing Willingness to pay decisions for respondents in Majuli justifies the responsibility and sense of belonging to protect the heritage of the region. The affirmative willingness to pay justifies the fact that the respondents are aware of and sensitive to preserving the Satras of the island. This also raises the scope of budgetary allocation and measures taken by the government to protect Satras and the island, in general.

The results of the Tobit regression also revealed that income and threat positively and significantly affected respondents (WTP) of the respondents. Family size negatively affects Willingness to Pay (WTP).

Thus, with the efficient interplay of both the public and private sectors of the economy, resilient and better measures of flood control can be developed to cope with the perennial problem of floods every year. This may include innovations in mitigating natural hazards and upgrading the existing measures. Proper monitoring of the existing programs and schemes related to the development and protection of Satras may

be necessary. This study is expected to contribute to the empirical use of contingent valuation to minimize information bias. Based on the current study, it is further expected that the policymakers will be able to frame policies to preserve the Satras.

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