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Recreational and Preservation Value of Charaideo Maidams of Assam, India

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Abstract: Historical monuments serve as profound connections to the past, embodying cultural, architectural, and societal significance. Historical tourism has played a very important role in generating income and employment in North-East India, especially Assam, as the region is blessed with distinct natural and archaeological resources that attract a huge number of domestic as well as foreign tourists every year. These sites possess both use and non-use economic values, similar to environmental resources, and are valued not only for their direct recreational and educational benefits but also for their option, bequest, and vicarious values. The challenge in determining their true value stems from their non-market nature, where conventional economic mechanisms fall short. This study examines how socio-economic and demographic factors influence visitation to historical sites, using regression analysis, and the recreational benefits enjoyed by visitors at a historical heritage site are estimated employing both revealed and stated willingness to pay (WTP), specifically through the Travel Cost Method (TCM) and the Contingent Valuation Method (CVM). The analysis shows that the distance travelled and the costs they incur have a significantly negative impact on how often they visit a site, while higher income and education levels positively influence visit frequency. The estimated recreational benefits, based on both revealed and stated WTP for the site's preservation and enhancement, suggest that increasing recreation charges through policy changes could be justified.

Keywords: non-market valuation; cultural heritage tourism; travel cost method; contingent valuation method; recreation benefit; willingness to pay.

JEL Classification: Q01; Z32; Q20; Q51; Q26; Q31; R11.

Introduction

Historical monuments are vital links to the past, representing cultural, architectural, and societal significance. These structures not only preserve the heritage and traditions of bygone eras but also serve as valuable repositories of knowledge, offering insights into ancient craftsmanship, beliefs, and lifestyles. The monetary worth of historical, cultural heritage and archaeological sites, similar to environmental resources, is reflected in individual's willingness to pay (WTP) for their recreational or educational experiences. This intrinsic value aligns with the concept of cultural ecosystem services, emphasizing the contribution of these sites to cultural identity and experiences. As pointed out by Xiang and Clarke (2003), the value of historical sites is evident in people's willingness to allocate financial resources for guided tours, educational trip, and other recreational activities linked to these sites, illustrating the intangible yet substantial worth attributed to preserve and experience historical heritage (Garrod *et al.* 1996, Grosclaude & Soguel, 1994).

Historical resources are unique and irretrievable, and their economic worth includes use value, option or choice value, and existence value. This option value acts as a safeguard against uncertainties concerning these resources' future availability. It comprises of three dimensions: the value of preserving the monument for an individual's future use, termed ***future use value*** - the ***bequest value***, ensuring its availability for future

generations; and the ***vicarious value***, securing accessibility for others. The comprehensive economic worth of a natural resource or an environmental asset is the culmination of its actual use value, option value, and existence value combined (Banerjee, 2003). These attributes align with the notion of irreversibility in environmental economics, where once altered or destroyed, these resources cannot be restored to their original state (Solow, 1993). Given that market mechanisms often fail to capture the full recreational value of such non-market goods, understanding the diverse motivations of visitors and their socio-economic factors is crucial. Furthermore, the social, economic and demographic attributes of visitors significantly influence their desire to visit a historical site, thus impacting its perceived value (Carrus *et al.* 2015).

This study aims to investigate the effect of different socio- economic and demographic factors on the visit frequency to the chosen site, estimate the visit demand function, WTP derived from the projected visit demand function, and finally evaluate of the recreational benefits derived by the visitors and tourists. It's important to acknowledge that some visitors may have additional motives beyond recreation, introducing the challenge of valuing multiple attributes or goods obtained from the site. This inherent issue in evaluating historical resources is addressed thoughtfully in this study to isolate and minimize the error of estimation, focusing specifically on the recreation value.

The novelty of this study lies in the estimation of existence value along with the valuation of recreation and cultural importance of the first UNESCO cultural heritage of the region, the ***Charaideo Maidams***, which are often referred to as the ***"Pyramids of Assam".*** Visitors' willingness to pay for the preservation of the sites over and above the current recreation/cultural benefit obtained by ZTCM is estimated by prudent application of CVM and appropriate econometric technique.

The Study Area

The rapid expansion and significant contribution of the tourism sector towards income and employment generation in India, particularly in the northeastern region, is well-recognized. In India, the tourism sector has made significant strides over the years. As per the Travel and Tourism Development Index (TTDI), 2024, report by the World Economic Forum (WEF), India ranks 39th out of 119 countries. This represents a significant improvement from its 54th place ranking in the 2021 index.

Assam, in North-East India, is rich in historical and natural attractions. One of its most notable sites is the ***Charaideo Maidams***, often referred to as the ***"Pyramids of Assam"***. These royal burial mounds of the Ahom dynasty, nestled in the picturesque landscape, are a testament to the region's rich cultural heritage. Despite their significance, tourism in Assam contributes only a small portion to the state's net domestic product. Assam witnessed 98.12 lakh domestic and 18,946 overseas visitors in 2023. This represents a significant rise over the 17.02 lakh domestic and 1,231 foreign visitors in 2022 (India Tourism Statistics, 2023). The Charaideo Maidams, housing of about 42 tombs of kings and queens atop a hill, mirrors the grandeur of the Egyptian pyramids and showcases the exemplary craftsmanship of medieval Assamese masons. It was decleared as a World Cultural Heritage Site by UNESCO in July 2024. North East India's Charaideo Maidam is the 43rd World Heritage Site and the first cultural heritage site from this region.

There is a pressing need for a comprehensive study to assess the recreational benefit along with the preservation worth associated with this site. This is to understand people's WTP for the gratification and conservation of these resources. Such an assessment would greatly assist planners and policymakers in making informed decisions to ensure the sustainable conservation of this historically significant site.

The next section provides a brief review of the relevant studies. Sections 3 and 4 include objectives of the study, and data and methodology followed in the analysis. Section 5 deals with observation and discussion. It is followed by concluding remarks on the whole study.

1. Research Background

Studies on the valuation of recreation benefits attained from natural and semi-natural tourist sites have evolved significantly since the mid-20th century, employing methods such as the Travel Cost Method (TCM) and Contingent Valuation Method (CVM). These approaches have become increasingly popular due to their ability to estimate the monetary value of natural and cultural resources, tourism resources and conservation efforts, despite encountering limitations (Santagata & Signorello, 2000; Freeman, 2003). These studies demonstrated the economic impact of conservation and provided a foundation for refining these methodologies to reduce estimation errors and improve accuracy (Knetsch & Davis, 1965; Navrud & Mungatana, 1994).

Empirical research on the benefits linked to cultural heritage assets began in the 1980s, with studies focusing on theatres, historical sites, and museums (Pearce & Ozdemiroglu, 2002; Noonan, 2003). Subsequent

research expanded to include a wide range of cultural and historical assets, employing various valuation techniques to measure both tangible and intangible benefits. For example, Montenegro *et al.* (2009) explored the evaluation of historical heritage sites in Valdivia, Chile, using regression analysis and TCM, while Voltaire *et al.* (2017) employed Zonal Travel Cost Method (ZTCM) to Mont-Saint-Michel to assess the economic worth of cultural world heritage sites. These studies highlight the complex interplay between economic valuation and cultural preservation, emphasizing the need for nuanced approaches in assessing historical sites.

In India, valuation studies have focused on both natural and cultural sites to help conservation and tourism management. Research by Hadker *et al.* (1997) and Chopra (1998) utilized CVM and TCM to estimate the monetary worth of parks and reserves, revealing substantial willingness to pay of public for conservation. Recent studies have explored the economic worth of heritage sites and their post-lockdown recovery, employing a combination of valuation methods to assess visitor satisfaction and willingness to pay. These studies contribute valuable insights into the economic importance of cultural and natural sites in India, guiding policy decisions and conservation strategies (Dutta *et al.* 2007; Islam, 2021; Bizuneh, 2021; Baitalik & Bhattacharjee, 2023). Baitalik & Bhattacharjee (2023) estimated WTP for the improvement of heritage temples in Bishnupur area of West Bengal by using CVM. Overall, these studies collectively enrich the understanding of diverse valuation methodologies, challenges, and applications in the context of resource conservation and recreation values. Gómez-Zapata, Herrero-Prieto and Arboleda-Cardona (2024) used choice experiment methodology to obtain the value allocated to different attributes like natural landscape, elements of tangible historical heritage and intangible technological knowledge by various groups of visitors, according to their origin or type of stay. Several other studies help in decision-making in cultural and tourism policies that directly impact local development (McLennan *et al.* 2012; Schuhmann *et al.* 2023; Wright & Eppink, 2016). Zhao *et al.* (2024) employs a multi-value interpretation framework to the utility of reuse of heritage sites in the urban Xi'an of China. Utilizing a comparative case study method, they specifically examine the burgeoning phenomenon of heritage parks. The findings show how the reuse of heritage intertwines with urbanization processes, by considering the environmental, economic, social, and cultural values.

2. Objectives of the Study

In this study, the initial focus lies on examining the impact of different socio- economic and demographic aspects on the visit frequency to the chosen site. Subsequently, the study delves into the estimation of visit demand function (VDF) or trip generation function (TGF). Following this, the visitors' maximum WTP is derived from the estimated VDF, representing the consumer surplus (CS) that signifies the recreational benefits derived by the visitors and tourists. Finally, the revised recreation benefit is calculated based on contingent valuation method to unearth the preservation or existence value of the site.

3. Materials and Methods

Both primary and secondary data were utilized for the analysis. Secondary data included information on the population of various regions from which tourists visited the selected site, per capita NSDP, level of education, holidays and festivals, as well as data on domestic and international tourist arrivals. These data were gathered from various secondary sources such as reports from the Ministry of Tourism, Government of India, Basic Statistics of the North-Eastern Region and different states of India, Census of India, and the Archaeological Survey of India.

Primary data were gathered through a survey method involving direct interviews using structured questionnaires. A total of 300 tourists, including 45 international visitors, were surveyed during 2021-22. It was observed that the majority of both domestic and foreign tourists visited the site during the peak tourist season, from October to April, due to favorable weather conditions and official holidays in their regions of origin. The sample respondents were selected through simple random sampling. Information was collected on their socio-economic and demographic profiles, frequency of site visits, purpose of travel (whether solely for recreation or combined with other activities), mode of transportation, travel expenditures, accommodation and food costs, loss of working days and their monetary value (opportunity cost), local transportation and other expenses such as parking and entry fees, as well as their willingness to pay additional fees for the maintenance and enhancement of the site.

4. Research Methodology

Using individual travel cost technique, the regression of the frequency of visits onto the key explanatory factors is applied to analyse the effects of different socio-economic features on the visit frequency by the surveyed tourists.

Since semi-log model provides better results (Bann, 1998), it is considered for the chosen site. The equation can be written as:

$$V_i = \alpha_o + \alpha_1 \ln TC_i + \alpha_2 \ln Y_i + \alpha_3 \ln DT_i + \alpha_4 \ln (A_i - \mu)^2 + \alpha_5 EQ_i + \alpha_6 E_i + \alpha_7 \ln FS_i + \alpha_8 DG_i + \alpha_9 DM_i + e_i \ldots \ldots \quad (1)$$

Here, V_i = number of times i^{th} individual visited the site (if multiple visits are observed in plenty).
TC_i = total cost for one round–trip to the site for i^{th} individual
Y_i = total monthly household income of i^{th} respondent (INR/month)
DT_i = one-way distance covered by i^{th} respondent to visit the site
A_i = age in years of i^{th} individual, and μ = average age in years of the surveyed respondents,
EQ_i = educational level of i^{th} respondent
E_i = nature of employment of i^{th} respondent (E_i = 1 for public sector employee, 0 otherwise)
FS_i = family size of i^{th} respondent,
DG_i = gender of respondent; (DG_i = 1 if male, 0 otherwise)
DM_i = marital status of respondent; (DM_i =1 if married, 0 otherwise)

With the typical features of classical linear regression, e_i is the random disturbance term. The logarithmic value of the visit rate is not considered here as for many of the tourists this was their first visit to the site. Since the number of visits is limited, count data modelling would be appropriate. Hence Poisson regression method is applied here.

Reviewing the existing literature on the valuation of historical sites, it is found that valuation studies are mostly conducted by one or a combination of TCM and CVM, depending on the specific objective of the particular study. Since the present study attempts to obtain the recreational value of a UNESCO-recognized cultural-historical heritage site in the North-Eastern Region, TCM (looking at the suitability of Individual and Zonal travel costs) has been used to assess the 'demand curve' for the monument. Also, CVM has been applied to examine WTP for the preservation and up-gradation of recreational facilities and other infrastructure associated with the site. This method attempts to measure the worth of a non-marketed good holistically. CVM would utilize the contingent valuation questions either of dichotomous choices, open-ended referendum, iterative bidding, and payment cards, each of which has some merits and demerits.

To mitigate various biases, such as starting point bias, dichotomous choice bias, part-whole bias, or embedding effects, iterative bidding was employed during the survey through direct interviews of the respondents. The process began with a significantly high bid (more than double the current fee), and respondents were asked if they would be willing to pay this amount. If they agreed, the bid was progressively increased until they declined to pay the proposed amount. Conversely, if they initially refused to pay the quoted amount, the bid was gradually reduced until they agreed to the proposed sum.

After completion of the primary data collection, the tabulation was made through the organized distribution of surveyed tourists based on their originating place/zone. Additionally, the socio-economic and demographic characteristics of the tourists were categorized by zone and presented in tabular form. The surveyed tourists came from the major twenty-five states and union territories of India, which were grouped into seven zones based on their central distance from the site. Foreign tourists, who came from various countries of diverse distances were consolidated into Zone 8.

Subsequently, the effect of various parameters on the number of visits made by the surveyed tourists was investigated using regression analysis. Specifically, individual TCM was utilized for this purpose. For those visitors whose primary purpose was recreational, total expenses encompassing travel and other expenditures were taken into account. While, if the tour is completed jointly with any business-related activity (for making profits) or joining conferences sponsored by other organizations, just local travel expenses as well as opportunity cost associated with additional time spent is considered. Very few tourists were found to visit in packaged tours, their primary motive was to visit nearby Kaziranga National Park and the chosen site *i.e.* the Charaideo Maidams and hence the travel expenses to visit Charaideo Maidams and the relevant expenditure on accommodation, meals, and opportunity costs incurred were accounted for at this particular site.

To estimate the demand curve of the visitors, Clawson's ZTCM was applied. Most visitors from zones other than Zones 1 and 3 visited the site only once, resulting in minimal variation in individual visit frequency. The process involved the following steps:

(i). Classification of sampled visitors by their zone of origin (political boundary/state-based).
(ii). Calculation of number of visitors from each zone and their proportion of the total sample.
(iii). Estimation of annual visits per zone by multiplying relative share and total annual visits.
(iv). Computation of the average visit rate by dividing the annual visits by the zonal population.

(v). Estimation of demand function, average consumer surplus, and total recreational benefit.

The area under the estimated demand curve, when compared to the average expenditure per visit, provides an estimate of the recreational value a tourist derives from visiting the site. This value can be extrapolated to estimate the total recreational benefits for the visiting population. The following structural equations in implicit form are used for this estimation:

$$V_i = f(ATC, Y, ADT, E, EQ, A, Error) \ldots \ldots \quad (2)$$

$$ATC = g(ADT, Y, V_i, Error) \ldots \ldots \quad (3)$$

where, V_i = visit rate, ATC = average total cost for a round–trip to the site/tourist, Y = per capita State Domestic Product (PCSDP), ADT = average distance from the zone to the site, E = employment type (E = 1 for public sector employee, 0 otherwise), EQ = educational qualification of the respondent (Illiterate = 0, Literate but Less than Secondary = 1, Secondary but less than HS = 2, HS but less than Graduate = 3, Graduate but less than Master = 4, Master and above = 5), A = age of surveyed tourist, Error = random disturbance term with characteristics of classical regression.

The system of simultaneous equations, represented by equations 1 and 2, addresses the endogeneity of both ATC and V_i, which are interrelated. Notably, the inverse demand function, represented by the second equation, is over-identified. Additionally, V_i in this second equation is correlated with other exogenous explanatory variables, leading to issues of multicollinearity. While factors such as infrastructure (transport and communication networks), purpose of visit, and availability of information also influence tourists' decisions, these variables were not included as explanatory factors due to insufficient usable data. Their effects, therefore, are assumed to be captured by the error term.

To obtain consistent and reliable estimates, the two-stage least squares (2SLS) method was employed. In explaining individual travel costs, all the variables in the first equation, as derived from survey data, were included. However, in the estimation of the demand function using zonal travel costs, only three observed explanatory variables—distance, literacy rate, and per capita NSDP—were incorporated, with the visit rate being regressed on these available variables. The predicted visit rate was then substituted for the actual rate and used to estimate both the demand curve and consumer surplus.

Unlike the approach taken by Gillig *et al.* (2003), this study estimates the visit demand function separately using both revealed willingness to pay (WTP) from travel cost data and stated WTP from contingent valuation data. This dual estimation allows for the identification of visitors' maximum WTP for the preservation and enhancement of the scenic beauty of the UNESCO cultural heritage site in North-East India.

5. Research Results

The assessment of recreational benefits of the site was done based on data collected from a survey of 240 tourists. It was found that most of the tourists visited the site either with family members or in groups of friends or colleagues, with significant variation in the size of the groups. To standardize data collection, only one senior member (or leader) from each group was interviewed. Consequently, although there were 240 respondents, the total number of tourists represented in the sample was 1074, which included both domestic and international visitors. For the purpose of analysis, only the socio-economic characteristics of the individual respondents were considered, as each respondent was deemed to represent their group in all relevant aspects.

5.1 Socio-Economic and Demographic Characteristics of the Surveyed Tourists

The socio-economic and demographic features of the surveyed tourists are considered to be important for any recreational valuation study. Since the present study attempted to calculate the visitation rate and examined the factors influencing it, it was felt pertinent to observe the socio-economic profile of the tourists surveyed. The study of the socio-demographic and economic profile of the visitors includes information on age, gender, marital status, educational attainment, household size, nature of employment, monthly household income, distance of travel of an individual to reach a particular site and the availability of recreational activities in that concerned site.

5.2 Distribution of the Surveyed Tourists According to their Zone of Origin

Distribution of respondents based on the distance travelled by them is shown in the Table 1. It indicates that of the 300 respondents among the total 1074 tourists included in the sample, 31.67 percent were from zone-1, 7.33 percent were from other states of NER excluding Assam and Sikkim (zone-2), and only 3 percent and 3.67 percent were from zone-7 and 6 respectively. Largest number of respondents were from zone 1 and the second largest (19.67 percent) from zone 3 *i.e.*, West Bengal, Orissa and Bihar that was followed by zone-5 *i.e.* the

states of Chandigarh, Delhi, Haryana, Punjab, and Rajasthan sharing 10.67 percent of the sample. 9 percent of the respondents were from zone-4 that comprises of Chhattisgarh, Madhya Pradesh, and Uttar Pradesh. Lastly, 15 percent were foreign tourists (zone-8).

Table 1. Distribution of the Surveyed Tourists According to their Zone of Origin

Zone	States Included in the Zone	Distance of the Zone from Sivasagar (Km)	Number of Respondents	Total Number of Sample Tourists
			Charaideo Maidams	
Zone-1	Assam	Less than 500	95 (31.67)	301 (28.03)
Zone-2	Arunachal Pradesh, Manipur, Tripura, Meghalaya, Mizoram, Nagaland	501-1000	22 (7.33)	110 (10.24)
Zone-3	Eastern Region: Bihar, Orissa, Sikkim, West Bengal	1001-1500	59 (19.67)	167 (15.55)
Zone-4	Central Region: Chhattisgarh, Madhya Pradesh, Uttar Pradesh	1501-2000	27 (9)	133 (12.38)
Zone-5	Northern Region: Chandigarh, Delhi, Haryana, Punjab, Rajasthan	2001-2500	32 (10.67)	154 (14.34)
Zone-6	Western Region: Gujarat, Maharashtra	2501-3000	11 (3.67)	55 (5.12)
Zone-7	Southern Region: Andhra Pradesh, Karnataka, Kerala, Tamil Nadu	3001-3500	9 (3)	43 (4)
Zone-8	Foreign Countries	3501-15000	45 (15)	111 (10.34)
Total			300	1074

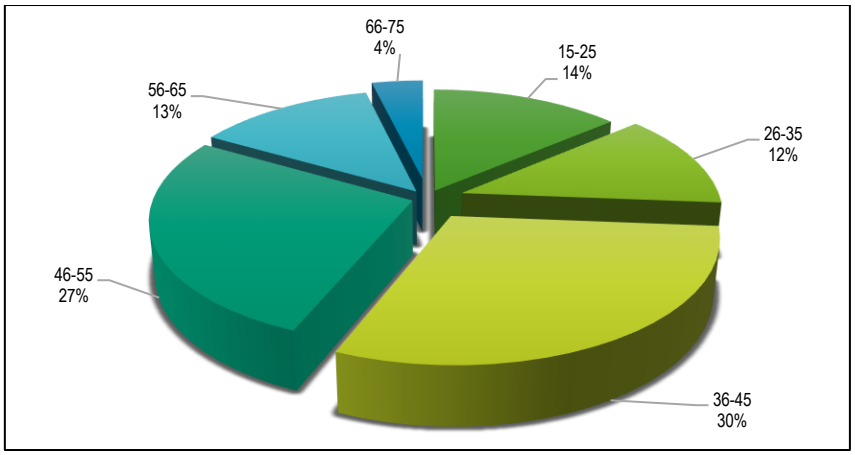
Source: Field Survey by the researcher during 2021-22.
Note: Figures in the parentheses represent percentage to total.

It is noticed that the percentage of the surveyed tourists varies inversely with the zonal distance. Table-1 also indicated the distribution of the 1074 surveyed tourists, a part of which (300) was included in the sample respondent for the collection of relevant information. The distribution shows almost a similar pattern of distribution as observed in case of the respondents across the zones. Largest percentage of sample tourists was from zone-1 and 3 and then declined in order of the distance.

5.3 Age-Distribution of Surveyed Tourists

The distribution of the respondents according to their age group is shown in Figure 1. It shows that 30 percent of the surveyed tourists were in the age group of 36-45 years, which was followed by 27.08 percent respondents from age group 46-55 years. Age groups 26-35 and 56-65 years shares 12.5 and 12.92 percent respectively of the sample respondents; while age group 66-75 constitutes of very small 3.75 percent. Age-group 15-25 constitutes 13.75 percent they were mostly from zones 1, 2 and 3.

Figure 1. Age-Distribution of Surveyed Tourists



Source: Field Survey by the researcher during 2021-22.

5.4 Distribution of Tourists According to their Gender

Distribution of respondents according to their gender (Table 2) indicated that 132 individuals (43.75 percent of the samples) were female and 168 respondents *i.e.* 56.25 percent were male. Here the distribution is found to be marginally in favour of male.

Table 2. Distribution of the Surveyed Tourists According to their Gender

Zone	Female	Male	Total
Zone-1	44 (46.67)	51 (53.33)	95
Zone-2	9 (40.91)	13 (59.09)	22
Zone-3	27 (45.24)	32 (54.76)	59
Zone-4	10 (37.04)	17 (62.96)	27
Zone-5	15 (46.88)	17 (53.13)	32
Zone-6	4 (36.36)	7 (63.64)	11
Zone-7	4 (44.44)	5 (55.56)	9
Zone-8	19 (43.24)	26 (56.76)	45
Total	132 (43.75)	168 (56.25)	300

Source: Field Survey by the researcher during 2021-22.
Note: Figures in the parentheses represent percentage to total.

5.5 Distribution of Surveyed Tourists according to Their Marital Status

The distribution of respondents according to their marital status reflects that, 59.17 percent of the sample visitors were married, and the 40.83 percent were unmarried (Table 3).

Table 3. Distribution of the Surveyed Tourists According to their Marital Status

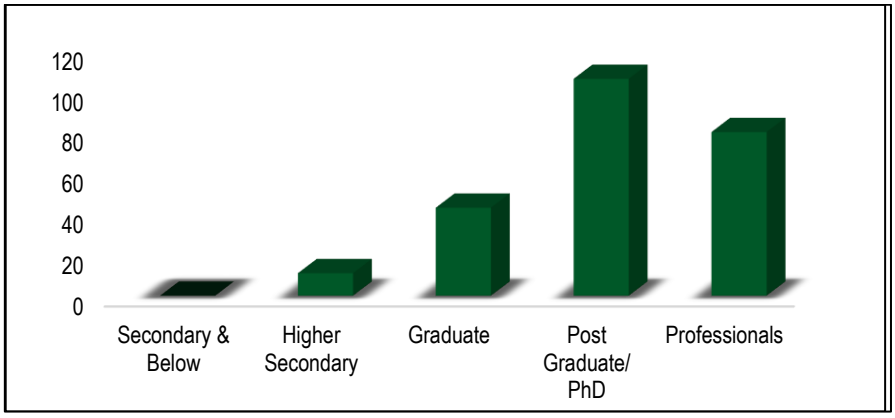
Zone	Married	Unmarried	Total
Zone-1	35 (36.67)	60 (63.33)	95
Zone-2	12 (54.55)	10 (45.45)	22
Zone-3	48 (80.95)	11 (19.05)	59
Zone-4	19 (70.38)	8 (29.63)	27
Zone-5	19 (59.38)	13 (40.63)	32
Zone-6	8 (72.73)	3 (27.27)	11
Zone-7	7 (77.78)	2 (22.22)	9
Zone-8	24 (53.33)	21 (46.67)	45
Total	142 (59.17)	98 (40.83)	300

Source: Field Survey by the researcher during 2021-22.
Note: Figures in the parentheses represent percentage to total.

5.6 Distribution of Surveyed Tourists according to their Educational Qualification

The distribution of respondents according to their level of education has been displayed in Figure 2. Only 4.58 percent had the lowest educational qualification of Higher Secondary level and 17.92 percent were Graduates. The largest 44.17 percent had Post Graduate or Doctoral degrees. The second largest 33.33 percent have professional qualification.

Figure 2. Distribution of the Surveyed Tourists According to their Educational Qualification

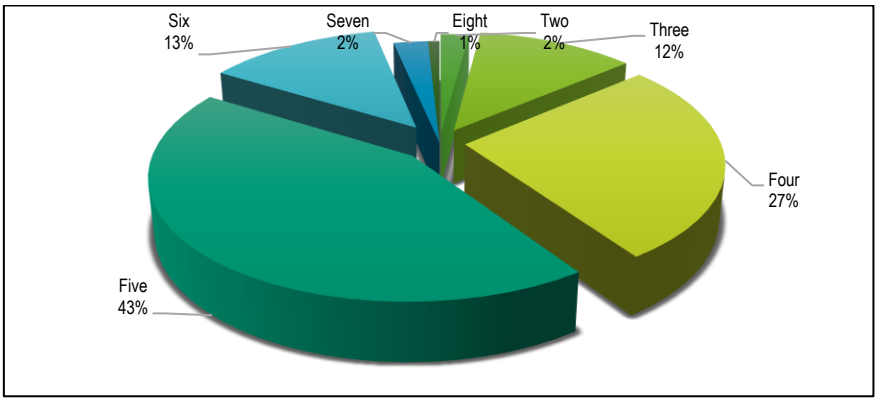


Source: Field Survey by the researcher during 2021-22.

5.7. Distribution of the Surveyed Tourists According to their Family Size

Distribution of sample tourists according to their family size is shown in Figure 3. Only 2 percent of the sample respondents reported to have the smallest family size of 2, while 12 percent have family size of 3 and 27 percent of them have family size of 4. The biggest group constituting 43 percent of the sample have family size of 5 members. 13 percent reported to have family size of 6 members, and 2 percent had family size of 7 members.

Figure 3. Distribution of the Surveyed Tourists According to their Family Size

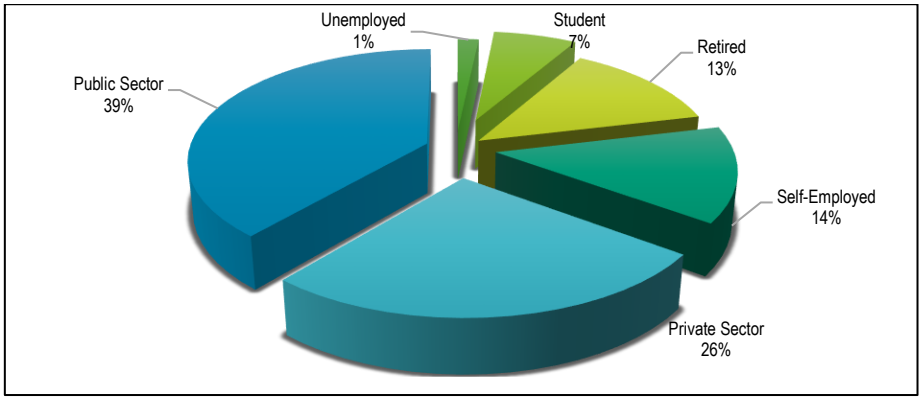


Source: Field Survey by the researcher during 2021-22.

5.8 Distribution of Surveyed Tourists according to their Nature of Employment

Figure 4 displays that, of 300 respondents, only 1.67 percent was unemployed and 6.67 percent were students, while 12.92 percent were retired individuals. Maximum 38.75 percent of the sample respondents were public sector employees and 26.25 percent were private sector employees and 13.75 percent were self-employed visitors. The employment-wise distribution pattern is almost identical for all the zones under study.

Figure 4. Distribution of the Surveyed Tourists According to their Employment



Source: Field Survey by the researcher during 2021-22.

5.9 Distribution of Surveyed Tourists According to Their Total Monthly Family Income

Zone-wise distribution of the 300 as per the total monthly family income is shown in table 4. The table reveals that 20.33 percent of respondents belong to the income range of INR 60001 to 70000, which was followed by 18.33 percent of the responds having monthly income more than INR 90000 where most of tourists are from zone-8 *i.e.* foreign tourists. The intra- zonal distribution however reflects that percentage of respondents in the higher monthly family income was positively associated with the distance of the specific zone. More percentage of respondents in the low level of income from the neighbouring zones was in parity with the level of expenditure required and the distance of the zone and hence the result.

Table 4. Distribution of Surveyed Tourists According to their Total Monthly Family Income

Zone	Up to 20000	20001-30000	30001-40000	40001-50000	50001-60000	60001-70000	70001-80000	80001-90000	Over 90000	Total
Zone-1	2	10	24	18	20	6	7	5	2	95
Zone-2	0	0	3	11	5	2	1	0	0	22
Zone-3	0	0	0	8	14	22	5	7	3	59
Zone-4	0	0	0	2	8	7	6	3	1	27
Zone-5	0	0	0	0	0	18	12	1	1	32
Zone-6	0	0	0	0	0	5	2	2	2	11
Zone-7	0	0	0	0	0	1	3	4	1	9
Zone-8	0	0	0	0	0	0	0	0	45	45
Total	2 (0.83)	10 (3.33)	28 (9.17)	39 (12.92)	47 (15.67)	61 (20.33)	36 (12)	22 (7.33)	55 (18.33)	300 (100)

Source: Field Survey by the researcher during 2021-22.
Note: Figures in the parentheses represent percentage to total.

6. Impacts of Socio-Economic Factors on the Visit Frequency of the Tourists

The frequency of visits to tourist sites is expected to be influenced by a range of factors, including disposable income, leisure time, and demographic features such as age, gender, marital status, and household size. High disposable income and ample leisure time generally increase the likelihood of frequent visits to recreational sites. Geographical aspects, such as the distance to the site and the quality of tourism infrastructure also impact travel decisions. Increased travel distance in general reduces frequency of visit due to higher travel expenses, time requirements, and opportunity costs (often assessed by using a minimum daily wage set by the Government of India) as a proxy for lost income during travel.

Distance covered by tourists to reach a spot plays a crucial role in determining how often they visit that particular destination. Taking other factors constant, there is an expected inverse relationship between the distance covered from the origin of tourists to the spot and their number of visits.

Educational level and income significantly influence visit frequency. The educational level of tourists is a key component that is likely to positively influence individuals' earning proficiencies. An upper educational qualification is also correlated with increased awareness, curiosity, and a desire to learn more about archaeological heritage sites, especially among those involved in history, architectural intelligence, archaeological preservation, photography, and historical enthusiasts. Thus, educational level of visitors is deemed to have a significant positive impact on the visit rate to a certain location. Similarly, a higher income level amplifies an individual's ability to spend, providing a feeling of financial stability. Consequently, it is expected to have a notable positive impact on the visit frequency of the tourists.

Additionally, government employees in India benefit from travel incentives such as Leave Travel Concessions (LTC) and greater job security, making them more likely to travel compared to self-employed individuals and private sector workers who face higher opportunity costs. Therefore, employment type is expected to influence travel decisions, with public sector employees likely to travel more for recreation. To account for this, a dummy variable (DE) is introduced in regression analysis, taking a value of 1 for public sector job holders and 0 for others. Age also impacts travel behavior, with individuals between 36 and 55 typically engaging more in travel due to stable finances and better health, whereas younger and older individuals may travel less frequently due to financial and health constraints (Uprety & Sharma, 2012). Consequently, when plotting the number of visits by

tourists against their age, it is likely to observe a trend resembling an inverted U-shaped curve. It follows that the absolute difference in tourists' ages from the mean age is expected to negatively impact their visit frequency.

The travel preferences of individuals are also influenced by gender. In many regions, women are often restrained to domestic responsibilities, with limited influence on decision-making regarding travel. Additionally, many women tend to avoid jobs that require extensive travel. Thus, the demographic of tourists is expected to exhibit a bias towards males. To assess this, a dummy or binary variable, DG, is introduced, that takes value 1 for male respondents and 0 for others. Marital status is another crucial factor affecting travel plans. Generally, young couples are observed to travel more frequently than single individuals. Similarly, older individuals typically tend not to travel solo, with the majority of travelers being senior married couples, as indicated by survey results. To evaluate the impact of gender on the frequency of visit, another dummy variable, DM, is introduced, that takes value 1 for married respondents and 0 for others.

The two-way correlation among the relevant explanatory variables is presented in the Table-5 for all the sample tourists (N = 300). The result displays that there exists a statistically significant positive correlation between a visitor's total monthly family income from all sources, distance covered, and the travel cost incurred by the tourist. Consequently, a segment of the effects of distance covered is already taken into account by the travel costs.

Table 5. Two-Way Correlation among the relevant Explanatory Variables for *Charaideo Maidams*

Charaideo Maidams N=240	Gender	MarStat	Edu	Age	Dist.(km)	FSize	TC (INR)	Income	Employment
Gender	1								
MarStat	-.117	1							
Education	.309**	.083	1						
Age	.159*	-.265**	-.115	1					
Distance (km)	.079	.219**	.182**	-.042	1				
Family Size	.070	.250**	.205**	-.067	-.272**	1			
TC (INR)	.156*	.234**	.271**	.005	.939**	-.218**	1		
Monthly Income	.142*	.275**	.256**	-.019	.796**	-.178**	.862**	1	
Employment	-.092	.208**	.125	-.374**	-.139*	.191**	-.198**	-.118	1
No of Visits	.164*	.121	-.007	.113	-.394**	.321**	-.321**	-.105	.076

Note: Correlation is significant at the 1% (**) and 5% (*) level of significance (2-tailed).

Moreover, the strong correlations between monthly income and both education and travel expenses emphasize the importance of income in shaping tourists' spending habits. Additionally, the correlations involving distance travelled and travel cost highlight that longer distances are linked to higher travel expenditure. These findings provide a foundation for informed decision-making in the tourism industry, enabling stakeholders to tailor their strategies and services to the distinct characteristics and preferences of diverse tourist groups.

Table 6. Estimated Results of Poisson Regression (Individual Travel Cost)

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test	
			Lower	Upper	Wald Chi-Square	Sig.
(Intercept)	.309	.2873	-.255	.872	1.154	.283
Ln Family Size	-.157	.0518	-.258	-.055	9.141	.002
Ln Cost of Single Journey	-.051	.0265	-.103	.001	3.667	.055
Ln Family Income	.107	.0306	.047	.167	12.195	.000
Ln Distance	-.235	.0227	-.279	-.190	106.946	.000
Ln Age	.263	.0605	.144	.381	18.837	.000
Education	-.005	.0159	-.036	.026	.087	.768
Employment	-.004	.0081	-.020	.012	.204	.652
[Gender=0]	.048	.0233	.003	.094	4.289	.038
[Marital_Stat=0]	.009	.0290	-.048	.066	.099	.753
Dependent Variable: Number of Visit.						

The regression results show that in all the cases, frequency of visits is positively related to the visitor's per capita family income and negatively affected by the distance travelled to reach the site from the tourist's area of origin and the per person travel expenses for a single round-trip to the site (Table 6). Moreover, significant positive correlation has been observed between a tourist's travel distance and the expenses incurred, indicating that a portion of the impact of travel distance is already reflected in travel expenditures.

6.1 Estimation of Visit Demand Function, Consumer Surplus and Recreation Benefit

The ZTCM is employed to estimate the Trip Generation Function (TGF) or the visit demand function (VDF). The TGF is derived by the optimization of the visitors' utility function given their budgetary constraints, aligning with neoclassical analysis as elucidated by Nillesen (2002) and Khan (2003). Treating a visitor as a metaphorical consumer, who allocates her/his income between the utilization of a market good (Q_M) and a public good (V), in this case, visiting tourist destinations. The visitor seeks to maximise utility within the constraints of their budget, expressed mathematically as follows:

Maximize: $U(Q_M, V)$… … … … (4)

Subject to: $Y = P_X Q_M + P_o V$ … … (5)

Here, U represents consumer's utility, Q_M stands for market good, V denotes frequency of visits to a recreational site, P_x indicates cost of the market good (Q_M), and P_o refers to the amount of money paid for visiting the sites. Y is used as the visitor's money income (Khan, 2003). Solving this formulation yields the Marshallian VDF as $V = g(P_x, P_o, Y)$. The demand function implies that consumer's demand to visit a tourist site is influenced by the price of a visit, associated expenditures, household income, and other socio-economic factors (not explicitly mentioned here). V is only a function of P_o for given P_x and Y. Due to each site's unique ability to satisfy various visitor demands, the cost of visiting a substitute site is not taken into account in this approach.

Zonal TCM has been applied for estimating CS and the recreational use value of the Charaideo Maidams (CMs). First, with the help of travel cost data the Trip Generation Function (TGF) or visit demand function (VDF) has been estimated. The TGF/VDF is estimated by using Clawson's ZTCM. First of all, the 'zonal' visit rate for the tourists from different zones has been estimated and this value has been used to estimate the visit demand function.

Here surveyed tourists are grouped into domestic and foreign categories. The domestic tourists are visitors from different states of India visiting the chosen sites mainly for recreation purpose. The visitors from foreign countries usually visit other sites of India together with the selected sites. Thus, for them travel expenditure form their previous point to the study site and returning point in India has been considered for the analysis.

As the area under derived demand curve in respect of the average expenditure per single visit offers an assessment of the recreational value for an average tourist upon visiting the particular site, it is extrapolated to the pertinent visiting population for estimating the overall recreation benefit generated by the site in a specific year.

To ensure consistent estimations, 2-stage least square (2SLS) regression method has been employed. While in individual travel cost method, all variables from equation (3) are considered, in case of estimation of the demand function by zonal travel cost method, only six observed explanatory variables were considered, viz. average total cost, PCSDP (proxy for income), distance travelled, employment, educational qualification and age of the tourist. Regression of the number of visits on the logarithmic values of these explanatory variables was conducted to avoid inconsistency. Subsequently, the actual visit rate was replaced with the anticipated visit rate in order to estimate the demand curve and consumers' recreation benefit.

6.2 Estimation of Trip Generation Function (TGF), Consumer Surplus and Recreational Value for Charaideo Maidams (CMs)

The TGF for CMs is estimated in the second stage takes the following form:

For all tourists,

$$\text{Ln WTP} = 12.794 - .568\, LnVR_{hat}{}^{*} \ldots \ldots \ldots \quad (6)$$

R^2 = .881, F = 1492.091

Mean LnVR_hat = 8.01, Consumer Surplus (CS) = 19.32

Equations 6 shows that there exists an inverse relationship or a negative correlation between the travel costs and visit rate in case of all the visitors (domestic and international), and thus reflects the law of demand.

Table 7. Result of Regression of LnVisit Rate on Explanatory Variables

Variables	B	Std. Error	t-value	p-value
(Constant)	17.731	1.020	17.391	.000
LNATC	-1.065	.067	-15.968	.000**
LnPCNSDP	.054	.076	.708	.480
LnADT	-.532	.051	-10.466	.000**
LnEmp	.295	.085	3.466	.001**
LnEdu	.339	.137	2.484	.014**
LnAge	.291	.106	2.760	.006**
Zone 5, N = 300, R^2 = .900, Adj R^2 = .897, F = 294.330 (.000)				

Source: Calculation based on sample survey in CMs during 2021-22.
Note: **, * significant at the 1% and 5% level of significance respectively.

The estimated consumer surplus per 100000 visitors of all tourist categories in case of CMs is INR 19.32 lakh, while the overall value is INR 8.88 lakh. This surplus directs the sum that visitors are willing to contribute beyond the actual expenses to enjoy the recreational benefits by visiting these historical monuments. The total recreational value for all tourists is calculated to be INR 1.61 crore.

Table 8. Estimation of Consumer Surplus in CMs

Tourist Site	Tourist Type	Choke Price (INR) (1)	CS (per 100000 population) (INR) (2)	CS per person (INR) (3)	Total Visitor in 2021- 22 (4)	CS for Visitors of 2021-22 (INR) [(3)*(4)]
CMs	*All Tourists*	360051	1932000	19.32	45975	888237

Table 9. Annual Recreational Value of CMs

Tourist Site	Tourist Type	CS per person (INR) (1)	Total ATC per Person (INR) (2)	Total Visitor in 2021-22 (3)	Total Recreational Value (INR) [{(1)+(2)}x(3)]
CMs	*All Tourists*	19.32	35023.31	45975	161108491

6.3 Willingness to Pay (WTP) based on CVM

The CVM utilizes various question formats including dichotomous choices, open-ended queries, iterative bidding and payment card formats, and each has its own advantages and drawbacks. There are also several variations in their application. To assess WTP for the *preservation and conservation* of the selected monument, the dichotomous choice form of CVM is utilized. According to the findings, 96.07 percent of the respondents expresses a desire to contribute financially for the preservation and better management of the sites.

6.4 Estimation of Visit Demand Function (VDF) based on WTP Examined by CVM and Applying 2SLS Method

Taking into account the additional WTP exhibited by the visitors beyond their current expenditure in terms of increased entrance fees, parking fees, and entertainment taxes, a distinct regression equation has been formulated for the site, resulting in the following revised demand function:

Ln WTP = 12.797* – .568 LnVR_hat*
(0.118) (0.015)
[R(bar)2 =0.883, F = 1521.34, n = 203]
Mean LnVR_hat = 8.012, Consumer Surplus (CS) = 18.23

The values within brackets denote the standard errors of the respective coefficient, and an asterisk (*) signifies that the coefficient is significant at the 1 percent level of significance by the two-tailed test.

The revised consumer surpluses estimated is INR 8.89 lakh respectively. Therefore, there is a slight increment of consumer surplus by INR 919.5. This indicates that the visitors/tourists are willing to contribute more for Charaideo Maidams. However, in the case of Charaideo Maidams, a large number of visitors are local day visitors and students, and most of them are reluctant to pay more and many cannot afford. On an average, the

responses of all the visitors showed that they are willing to contribute more by INR 235.51 for the site, along with the existing entry fee.

Table 10. Estimation of Revised Consumer Surplus

Tourist Type	Choke Price (INR) (1)	CS (per 100000 (Popu) (INR) (2)	CS per person (INR) (3)	Total Visitor in 2021- 22 (4)	CS for the Visitors of 2021-22 (INR) [(3)*(4)]
All Tourists	861132.43	1934000	19.34	45975	889156.5

Source: Researcher's calculation on the basis of field survey 2021-22.

Estimated consumer surplus for foreign tourists is INR 361.46, where there is a negligible increment of consumer surplus by INR .66 only. However, the WTP for the site is much higher in the case of foreign visitors and their WTP is also much higher than an average domestic tourist. This can be primarily attributed to their significantly higher monthly incomes. On an average, responses of the foreign tourists showed that they are willing to contribute more by INR 631.96 for the site with the existing entry fee of INR 250/person.

Using total number of visitors, total consumer surplus or recreation benefit generated during 2021-22 is estimated, which is presented in Tables 11 and 12.

Table 11. Annual Revised Recreational Value for the year 2021-22

Tourist Type	*CS per person (INR) (1)*	*Total ATC per Person (INR)*	*Total ATC+WTP per Person (INR) (2)*	*Total Visitor in 2021- 22 (3)*	*Total Recreational Value (INR) [{(1) +(2)}x(3)]*
All Tourists	19.34	35023.31	35258.82	45975	162102425

Table 12. Approximated Total Recreational Gain in the year 2021-22

Tourist Site	Estimated Surplus Generated (Crore INR)	Surplus as per WTP (Crore INR)	Expressed Variation (Crore INR)
CMs	1.61	1.62	0.01

Table 12 reveals that the overall annual recreation benefit derived by all the tourists was about INR 1.61 crore, which could be increased to INR 1.62 crore, if the WTP of the visitors for the purpose were considered *i.e.*, by about INR 0.01 crore. Furthermore, the development of tourism in these sites yields numerous additional benefits in diverse forms. As a result, the genuine benefits derived from the site extend well beyond the currently estimated recreational advantages. If the resources allocated for tourism purposes are appropriately managed, there exists significant potential to augment these benefits, thereby enhancing the well-being of the individuals connected with it.

7. Discussions

India stands out as one of the world's most enchanting countries, renowned for its vibrant culture and rich heritage. The historical monuments of India, characterized by splendid architecture and a profound legacy, are a testament to its cultural richness. With the magnificent beauty of North-East India and the government's dedicated efforts in preserving heritage sites, tourism has experienced a significant growth, attracting travellers from across the globe. Sivasagar, a prominent historical city in North-East India showcases remarkable architectural, archaeological, and engineering marvels. These are evident in the numerous temples, palaces, stone bridges, tanks, and pyramid-shaped Maidams, the first UNESCO heritage site that grace the region.

The present study has been undertaken primarily to estimate the recreation values of Charaideo Maidams, a UNESCO recognized cultural heritage site in North-East India, in order to know the emphasis given by the visitors and that would be reflected through their willingness to pay. It provides some important guidelines for the preservation of unique and untarnished beauty of these areas, and for the sustainable growth of tourism there. As usual, majority of the visitors in the chosen site were domestic tourists. The findings highlight that the monthly income of tourists strongly favour the frequency of visit, while longer travel distance and higher expenses adversely affect the visit rate. ZTCM, the study establishes demand functions and calculates consumer surpluses or recreation benefit for domestic and foreign tourists. However, it is imperative to note that the study focuses solely on recreational values, overlooking the broader "Total Economic Value" encompassing non-use values as well. In conclusion, it can be rightly said that, since this study captures only the recreational values of the selected site, the actual total economic value of the site is much higher. Therefore, proper policies need to be implemented

in order to have sustainable development of such sites, which will also have significant positive economic impacts on the economy of the local community.

Using the estimated number of visitors, total consumer surplus or recreation benefit generated in that particular year is estimated for the site, to be around INR 1.61 Crore, which could further be increased to INR 1.62 Crore, if the WTP of the visitors for the purpose of preservation were considered *i.e.*, an increase of about INR .01 Crore. Thus, it can be argued that as there are other social and economic benefits (through employment and income generating tourist activities); the actual benefit is much more than the estimated recreational values of the site and that provides an important policy implication.

Conclusions and Further Research

This study examines the impacts of various factors on the visiting decisions of the potential tourists to the historical cultural sites of Charaideo Maidams in Assam, India. After that ZTCM has been employed to estimate the visit demand function and based on that the consumer surplus (use value) of the site. Also, preservation benefit is computed by finding out the willingness to pay over and above the average payment calculated from visit demand function under ZTCM by applying CVM. The outcome of the present study is in line with findings of Pearce & Ozdemiroglu (2002), Noonan (2003), Montenegro *et al.* (2009), Voltaire *et al.* (2017), Islam (2021), Baitalik & Bhattacharjee (2023) on the historical, cultural and recreation value of heritage sites in different places. However, each of them used either TCM or CVM to estimate the WTP of the visitors as a valuation of recreation or historical benefit. There are significant variations in valuation obtained by CVM (holistic approach and hypothetical market) and TCM (related market approach) and WTP for preservation to capture option values was not addressed earlier. The present study captured visitors' WTP for the sustainable management of UNESCO heritage site Charaideo Maidam in Assam by combining CVM with Zonal TCM that has important policy implication.

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Credit Authorship Contribution Statement

Utpal Kumar De: Understanding the problem, revision of draft, verification of analysis and finalization.
Bidyajyoti Borah – Conceived the problem, data mining, analysis, drafting.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

This is to declare that we have not used generative AI and AI-assisted technologies during the preparation of this work.

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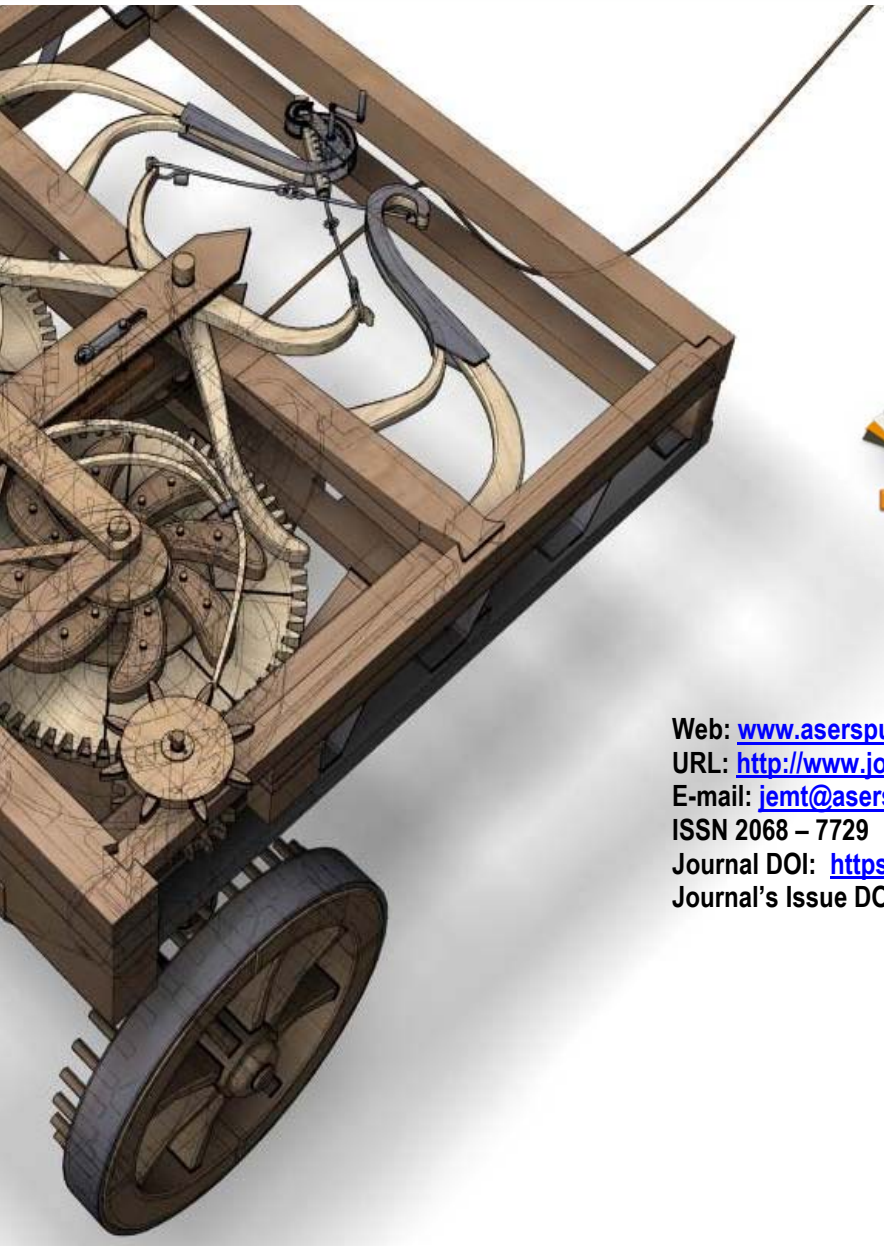

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