The economic value of conserving the Asian elephant: contingent valuation estimates for Sri Lanka

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Abstract The Asian elephant (*Elephas maximus*) is one of the world's most seriously endangered species of large mammals. However, the economic value of conserving it from a total economic evaluation perspective has been little studied. This paper addresses this matter for Sri Lanka. It summarises the results of a contingent valuation survey of willingness to pay for the conservation of the elephant of a sample of urban residents in Colombo. The majority of respondents favoured the survival of the wild elephants, and were willing to pay (WTP) Rs. 110.16 per month amounting to a total of Rs 1,322 per year on average for a period of five year to support this goal. Extrapolating this value to the other urban centres in Sri Lanka, we found that urban dwellers are WTP Rs. 506.7 million per month, amounting to a Rs 2,713.3 million per annum and Rs. 40248.61 million for a period of five years. The annual return on this capitalised sum is Rs. 2012.43 million per annum in perpetuity at a 5% real rate of interest. Comparing this amount with our economic estimates of annual total crop and property damage caused by elephants in Sri Lanka (Rs.1121.42 million per annum) shows that urban residents could compensate farmers for these damages and be better off than in the absence of elephants in the country. This suggests that there is a strong economic case for the conservation of the wild elephant population in Sri Lanka, at least at their current population level. The economic value to urban residents of the continued existence of wild elephants in Sri Lanka appears to be about twice the extent of economic damage caused to farmers by elephants.

Keywords Asian elephant, Sri Lanka, contingent valuation method, crop damage, compensation, conservation.

Introduction

In many respects, the survival of the Asian elephant (*Elephas maximus*) is more precarious than that of the African elephant (Bandara & Tisdell, 2002a). IUCN (1996) declared the Asian elephant to be one of the most seriously endangered species of large mammals in the world. At present, it occurs in only thirteen countries in Asia, including Sri Lanka (Kemf & Santiapillai, 2000) and its population has fallen significantly. The Sri Lankan elephant population, for example, underwent a marked reduction starting from the mid-nineteenth century (Santiapillai & Jackson 1990; De Silva, 1998). Fragmentation and loss of natural habitat are the major factors contributing to this decline and these help generate human-elephant conflict (Desai, 1998). This situation largely results from the *ad hoc* development projects carried out during the last fifty years (Weerakoon, 1999), and is exacerbated by the lack of co-ordination between different government departments and wildlife authorities. Moreover, poor integration of economic aspects and lack of attention to public preferences for elephant conservation compounds the problem.

Several techniques are available for measuring the economic value that members of the general public place on the conservation of wildlife and other natural resources. These include the hedonic pricing approach (HPA), the travel cost method (TCM), and the contingent valuation method (CVM) (Carson *et al.*, 1996). However, the HPA and TCM have been criticised by a number of authors for failing to measure the non-use or intangible values of wildlife adequately (see Stevens *et al.*, 1995; Oglethorpe & Miliadou, 2000). The CVM is free from this particular criticism. It is able to elicit types of benefits that these other methods cannot elicit (Kotchen, 2000). CVM uses survey questions to elicit people's stated preferences for public goods such as conservation of elephants (Ready *et al.*, 1996; Loomis & Ekstrand, 1998; White *et al.*, 2001). However, CVM also has limitations. It can for example, involve errors in estimation of economic value due to strategic, design, part-whole and hypothetical biases (Bateman & Turner, 1993).

Nevertheless, CVM is a widely applied monetary evaluation method. For example, it has been widely applied to the valuation of environmental and natural resource-related goods such as the preservation of wildlife species and outdoor recreational amenities (see Seip & Strand, 1992; Diamond & Hausman, 1994; Jakobsson & Dragun, 1996; Loomis & White, 1996; Wills & Powe, 1998; Witzer & Urfei, 2001; Bandara & Tisdell, 2002b). In CVM, the non-use economic values of a given environmental amenity are generally measured based on the willingness to pay for an improved situation, or using the willingness to accept compensation for a damaged or diminished situation. An appealing aspect of the contingent valuation method is that it allows us to estimate total economic value (Pate & Loomis, 1997). It is widely used. Carson *et al.*, (1994) provide a bibliography of 1,600 CVM studies and related publications.

In economics, the importance of total economic valuation of wildlife and other natural resources is increasingly recognized. Estimates of total economic value combine willingness of stakeholders to pay for their direct interactive use of wildlife for harvesting, tourism or other purposes plus economic values generated by other than direct interactive use such as from the knowledge that a species continues to exist (existence value) or that it will be available to future generations (bequest value). Such willingness to pay can be influenced by feelings of moral obligation towards

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a species (cf. Tisdell, 1997; Etzioni, 1988). CVM is designed to capture all values that influence willingness to pay to conserve (or eradicate) a species. Therefore, it is a considerable advance on those economic techniques that merely measure economic value generated by direct use of a species. As a rule, these only given partial indications of economic value. Nevertheless, economic methods, such as CVM, represent only one philosophical approach to value. One should be clear that despite its wide perspective, CVM does not constitute a complete or exclusive approach to valuation (Tisdell, 1997; cf. Lehman, 1993). Yet, provided this is kept in mind, methods, such as CVM, designed to determine total economic valuation can significantly enhance our appreciation of social choices involving conservation of wildlife. The purpose of this article is to show how analysis using CVM can provide new perspectives on the desirability of conserving Asian elephants in Sri Lanka.

Our study involved first a CVM survey of a sample of urban residents in Colombo, the capital of Sri Lanka, in order to determine their WTP for the conservation of the Asian elephant. This was then used to estimate the willingness of Sri Lankan urban dwellers, as a whole, to pay for conservation of the Asian elephant. A dichotomous choice form of contingent valuation is applied to quantify the conservation value of the wild elephant. An analysis is undertaken to investigate the underlying factors that determine the willingness of urban respondents to pay for the conservation of the elephant. Furthermore, in this analysis we consider whether urban residents' WTP for the conservation of elephants is sufficient to compensate farmers for the damage caused by elephants and to raise farmers' tolerance of the present elephants on their farming fields. The survey procedures are outlined first. This is followed by analysis of the results. The economic losses associated with crop and property damages caused by elephants are then compared with the estimated urban WTP benefits in order to determine whether the urban residents' potential contribution for conservation of elephants would be sufficient to compensate farmers for the crop and property damage caused by elephants and consequently raise farmers' tolerance of the presence of elephants

Methods

Contingent valuation market to assess the conservation value of the elephants in Sri Lanka

Interviews with urban respondents involved four different steps. In the first step, the respondents were presented with updated information about the present status of the elephant population in Sri Lanka, and the policy and institutional issues that need to be addressed to conserve elephants in the country. Respondents were then told why it is important to adopt new approaches to ensure the survival of the elephant in Sri Lanka in the long-term. They were informed that existing protected areas are inadequate in size to ensure the long-term survival of wild elephants if elephants are confined to these areas. Furthermore, there is little or no prospect of a significant increase in the size of these areas. Thus, the survival of elephants seems to depend on their use of both protected areas and non-protected areas. Socially acceptable strategies for an appropriate level of co-existence between farmers and elephants are needed. Such co-existence hinges on greater compensation for farmers to tolerate elephants to a greater extent than currently.

In the second step, the survey respondents were presented with an alternative policy designed to address these issues. They were asked to assume that an autonomous body, reputed for its efficient and honest work, would introduce a sound conservation programme so that the current downward trend in elephant population could be halted while addressing other elephant related issues. The respondents were informed that this organisation would initially implement the following measures for the conservation of the elephant: a) Provision of extra protection around existing national parks and protected areas, b) translocation of excess and troublesome elephants, c) domestication of the elephants for local and foreign zoos, tourist establishments, temples, study centers, or for use as work animals, and d) establishment of animal orphanages and recreation centers to promote eco-tourism. Respondents were also informed that this policy alternative was developed based on the assumption of that the conservation of elephants can be achieved through integrated policies involving both public and private landholders in the elephant's range and other interest groups, such as city-dwellers.

In the third step, the respondents were informed about the need to finance the proposed programme and the required support of the general public to establish a 'trust fund' to support the proposed conservation programme. Moreover, they were also told of possible benefits that they would be able to obtain after the successful implementation of this programme. The benefits presented to the respondents were: a) greater possibilities to view more elephants in a single herd in the wild, b) greater opportunities to see elephants in the wild during a short number of visits to a given national park, c) opportunities to domesticate more elephants for the purpose of religious festivals and the local tourism industry, and d) increase in agricultural crop production due to the mitigation of HEC in the main agricultural regions in the dry zone of the country.

Finally in the fourth step, the respondents were presented with the contingent market valuation question: "*For the next five years, would you be willing to pay Rs X from the monthly income of your household, that is Rs X per year, starting from January 1st 2002, towards the establishment of the proposed trust fund to implement the above mentioned programs to conserve the elephants in the country*". Respondents were offered a set of bid values at four different stages conditioned to their response for the first WTP elicitation question. After survey respondents were presented with WTP elicitation questions, two follow-up questions were asked. These contained categories of reasons for the response to the contingent market and the respondent's preferred method of payment. These questions help to identify protest responses as well as motives for preservation.

Sample, data collection procedure and method of analysis

The surveyed population was purposefully chosen from urban residents in Colombo. The population density, level of urbanisation, living standards and life style of residents were taken into account for the selection of a sample of urban residents. A sample of 300 residents was chosen from three main housing schemes in Colombo, *Jayanthipura*, *Jayawadanagam*, and *Anderson Flats*. The Urban Development Authority of Sri Lanka (2001) classifies these schemes as upper middle class, middle class and lower middle class housing schemes respectively. This classification is based on the value of the property and other urban facilities in the area where these housing schemes are located i.e. public schooling, shopping centers and recreational sites. A hundred residents from each of these housing schemes were chosen as the sample. A stratified sampling procedure was adopted in selecting this sample.

An interview schedule (IS) was used to gather the information used in the analyses presented in this paper. This consists of five different sections. The first section of the IS contained the personal profile of the respondent. The second contained questions to assess the attitudes of the respondents on 'development' and 'environment'. Section three presented respondents with information about the present status of elephant conservation and the problems that are encountered in conserving elephants in the existing protected area network. Section four of the IS contained the most important questions in the survey, where respondents were presented with dichotomous choice elicitation to assess their WTP for the conservation of elephant. Section five of the IS contained a set of questions for the interviewer. In these questions, interviewers were asked about the level of understanding and sincerity of the respondents. Nine graduate students from the Faculty of Graduate Studies of the University of Colombo were used as interviewers to administer the IS. A face-to-face survey was conducted to gather the information. Hadker (1997) suggests that this is a more useful method compared to mailed questionnaires and telephonic surveys in developing country contexts.

A non-linear logit regression model was constructed to analyse the respondents' responses to the WTP elicitation questions. Jaibi & Raa (1998) provide a list of economic applications of this model and Pate and Loomis (1997) describe this model as the most commonly used non-linear model in CV studies. Sellar *et al,*. (1986) outline the merits of the logit model, and Kanninen & Khawaja (1995) discuss the advantages of use of logit analysis for a contingent valuation survey with dichotomous format. One such advantage is the opportunity to use logit analysis, a non-linear method, to regress a binary (dichotomous) dependent variable on one or more independent variables. McFadden (1974) has also outlined the bases of the dichotomous choice theory corresponding to the logit specification.

In this study, we used the probability of the respondents' responses to principal WTP elicitation questions $\{P_i /(1 - P_i)\}$, where P_i = Probability of yes to the WTP elicitation questions as a dependent variable and considered factors that influence their probable responses. A number of socio-economic, demographic and attitudinal variables were included as independent variables for the preliminary logit analysis. The variables were: the respondent's age (*AGERE*), attitudes to alternative elephant conservation approaches *(ATHEC),* bid value (*BIDVA*), awareness of the current conservation issues (*CONSE*), concern about future generation needs (*FUPRE*), pro-conservation perception (*GREEN*), association with environmental guilds or groups (*MEMBE*), concern about non consumptive use-value of the elephant (*NONUV*), personal income (*PERIN*), pro-development concern (*PRODE*), occupation *(OCCUP),* position in the household (*RPOSF*), total family income (*TOFIN*), and years of schooling (*YRSCH*). The choice of these variables was partly based on choices in several previous

Table 1 The factors influencing respondents' responses for the payment principle questions : The final logit regression results

Variable	Coefficient	*t*-statistics
CONSTANT	-5.021	-2.098
Respondent's age *(AGERE)*	-0.872	-3.392
Rupee value from the WTP question *(BIDVA)*	-1.029	-4.198
Awareness about current conservation issues *(CONSE)*	1.045	4.685
Opinion on pro-conservation perception *(GREEN)*	3.322	7.583
Opinion on the non use-value of the elephant *(NONUV)*	1.284	2.904
Personal income *(PERIN)*	4.785	9.213
Attitudes towards pro-development activities *(PRODE)*	-0.043	0.904
Position in the family *(RPOSF)*	1.224	2.253
Years of schooling *(YRSCH)*	2.990	5.207

Summary statistics:

Dependent variable = the probability of saying 'yes' to the principle WTP questions, Number of observations =300; log- likelihood is 73.8654,

F statistic: 31.1846; $\alpha = 0.05$; df = 9; $R^2 = 0.0.6050$; Adjusted R^2 0.5861.

CVM studies of environmental valuation (see Whitehead, 1992; Miller & Lindsay, 1993; Bateman & Langgord, 1997; Witzer & Urfei, 2001).

Results

The preliminary logit regression analysis was undertaken by using the Statistical Package for Social Sciences (SPSS) Version 10.0 to identify the factors associated with respondents' responses for the WTP elicitation question at the $p < 0.05$ significance level. This analysis reveals that some of the independent variables cited above were either statistically not significant, or were highly correlated with other variables at the $r > 0.8$ level. Hence, it was decided to exclude these variables from the final logit regression analysis. Several goodness of fit measures were used to estimate overall statistical performance of the estimated model in this study. These results indicate that the overall ability of the model to yield a correct prediction of urban residents' WTP for the conservation of elephant is significant at the 0.05 level of statistical significance. A summary of the final logit regression results is presented in Table 1.

Discussion

Factors influencing the respondents' response to conservation value questions

As indicated in Table 1, most of the estimated coefficients have a positive influence on the probability of saying 'yes' to the principal conservation value questions by the respondents in the sample. The positive sign for the *CONSE* variable supports the hypothesis that the probability of the respondent saying 'yes' to the WTP question increases with the respondent's awareness of the present status of HEC and the issues involved in the conservation of elephants in Sri Lanka. Loomis & Ekstrand (1998) observe a similar situation in relation to conservation of the Mexican spotted owl. As might be expected, the coefficient for the *NONUV* is positive and significant in the model. This suggests that a respondent who values the non-use values of elephant (such as altruistic bequest and existence values) has a higher probability of answering 'yes' to the WTP question. This is understandable because the elephant in Sri Lanka is closely associate with Sri Lankan, their history, religion, culture, folklore, mythology and ceremony.

The coefficients for the attitudinal variables such as *GREEN,* are positive and significant. The result suggests that respondents with pro-conservation attitudes are likely to contribute more towards the conservation of the elephant. Loomis & Larson (1994) observe a similar situation in a CV survey of the grey whale. On the other hand, the variable *PRODE* was used in the model to assess the response of anti-conservation attitudes on the probability of saying 'yes' to the WTP question. The *PRODE* was not significant. This is understandable because the majority of the respondents in the sample disagreed with development programs that cause environmental problems. In our preliminary discussion when we put the proposition "*Sri Lanka should not encourage development programs such as tobacco cultivation in central highlands that cause serious environmental damage*", 88.6% respondents agreed, implying that they were rather 'green', and inclined strongly towards environmental protection. Hadker *et al.,* (1997) observe similar attitudes in a CV study in India. In this study, it was found that about 72% of respondents strongly disagreed with development programs that hurt the environment.

BIDVA had a negative influence on the probability of the respondent saying 'yes' to the WTP question. This means that the larger the bid value presented in the interview to the respondent as a WTP elicitation question, the less willing these respondents were to pay for elephant conservation. Miller & Lindsay (1993) notice a similar relationship in a CV survey which was conducted to analysis WTP for a state gypsy moth control program in New Hampshire. Loomis & White (1996) also observe a similar result in an analysis of economic benefits of rare and endangered species.

Among the socio-economic characteristics, age, personal income, years of schooling, and respondent's position in the family were considered as influences on the probability of respondents being willing to pay for the conservation of the elephant. The positive sign of the coefficient of the *YRSCH* indicates that the probability of saying 'yes' for the WTP question increases with an increase in the number of years of schooling. This is understandable because more years of schooling would arguably increase the knowledge a person has about social, political, economic and environmental happenings. Moreover, the education would help a person comprehend news about environmental effects of economic development. Several CV studies find a similar relationship between level of education and respondent's response towards the WTP elicitation questions. For example, Whitehead (1992) noticed that the level of education is often positively correlated with the WTP amount in an *ex ante* willingness to pay analysis. Pate & Loomis (1997) describe the rationale behind this relationship in a case study of wetland and salmon conservation in California.

The variable *AGERE* is significant with a negative coefficient. This implies that younger respondents were more willing to say 'yes' to the WTP question than their older counterparts in the sample. Heinen (1993) observes a similar situation in a study of people's attitudes towards the wildlife in the *Kosi Tappu* Wildlife Reserve in Nepal. In this study, he found that the positive attitudes towards the preservation of nature could be measured by the individual willingness to pay amounts which correlate highly with the respondents' age, years of schooling and the gender. He also notices an interesting relationship between age and the years of schooling. Younger respondents are found often to have more years of schooling than the older ones in the sample. This is quite similar to the situation found in Sri Lanka.

The variable *PERIN* is significant. The positive sign of it implies that the respondents whose personal income is greater are more willing to pay for the conservation of the elephant than the respondents whose personal income is lower. A number of other CV studies have obtained a similar result. Boyle & Bishop (1987) estimate the effects of the income

on the determination of WTP amount for the conservation of endangered species. Carson *et al.,* (1996) found that the sum individuals are less willing to pay for the preservation of quasi-public goods tends to rise with their income. Loomis & Larson (1994) estimate an individual's WTP for increase in the quantity of an environmental public good in relation to a number of socio-economic factors including household income. Findings of Hadker *et al.,* (1997) suggest that the higher income earners in the metropolitan area of Bombay have a stronger interest in environmental conservation than the lower income earners.

The variable *RPOSF* is significant with a positive contribution to the likelihood of being WTP for conservation of elephants. However, this result may be linked to the traditional Sri Lankan family culture and values. In this setting, families are represented by the head of the household. In most cases, the head of the household is the father (or the mother in the absence of the father) or the oldest child (in the absence of both the father and mother). As a result, in this study over representation of heads of households in the age group of 30 years and above was unavoidable. This cultural situation restricted the opportunities to interview the other members in certain households. In most cases, such opportunities were found only where the head of the household was absent at the time of the interview and he or she permitted another family member (in most cases the most educated person in the family) to represent him or her in the interview.

The aggregation and extrapolation of WTP benefits

Of the 300 respondents, bids of 34 respondents were identified as protest bids. These responses were removed from the sample so that genuine WTP could be analyzed. Therefore, a total of 266 WTP amounts were used in aggregation and extrapolation of WTP benefits. This was carried out at three different levels: a) from the sample to Colombo metropolitan area, b) from the Colombo metropolitan area to other major urban centres, and c) from major urban centres to the entire urban population in Sri Lanka. In this process, the authors, mindful of the sensitivity of sample effects, referred to a study done by the Department of Census and Statistics of Sri Lanka on economic and demographic aspects of the population in the Colombo metropolitan area (Department of Census and Statistics, 1998). It was found that household characteristics of the urban population in Sri Lanka were quite close to the sample of the present study. However, it must be noted that the mean WTP values used to extrapolate from the sample to the population refer to the ones after the removal of protest bids.

In our extrapolation process, we found that urban residents in Colombo metropolitan area were WTP Rs. 166.35 million per month for the conservation of elephant. This amounts to an annual value of Rs 1996.22 million. As the payment will be made over a period of five years, the total net present discounted value of these annual amounts, at a 5% real rate of discount, equals Rs. 9,075.02 million. Extrapolating to these results to all major urban areas in Sri Lanka, it was estimated that residents in these areas were WTP Rs. 438.48 million per month for the conservation of elephant. This amounts to an annual value of Rs 5,261.17 million. As the payment will be made over a period of five years, the total present discounted value of these annual amounts, at a 5% real rate of discount, equals Rs. 24,554.20 million. Finally, when we extrapolate WTP for the entire urban population in Sri Lanka, using a population size of about 6.67 million (this figure was drawn by deducting 11.3% from the total population of 7.49 million people in urban areas to represent the protest responses based on the findings of the case study presented in this paper), we found it was Rs. 734.83 million per month. This amounts to an annual value of Rs 8818.01 million. As the payments are specified over a period of only five years, the total present discounted value of these annual amounts, at a 5% real rate of discount, equals Rs. 40248.61 million.

We know that urban residents are WTP Rs. 8818.01 million per year for five years but we do not know their WTP beyond that. Damages caused by elephants will, however, continue in perpetuity given current populations of elephants. One possible way to compensate farmers would, in principle, be to invest the urban dwellers' contribution over five years in the capital market to give an estimated return on the capitalised sum of Rs. 2012.43 million per annum at a 5% real rate of interest. This could arguably be considered an indirect indication of the willingness of urban dwellers to pay in principle in perpetuity to conserve wild elephants.

It is also worth mentioning that although in this study, we asked respondents about their WTP for the conservation of elephants for only five years, some (maybe most) respondents certainly would probably be willing to pay beyond this period. Furthermore, this amount could be increased by at least another 100%, if we extended our extrapolation to the population of residents in the rural areas where elephants do not occur or interfere with farming practices.

Urban residents WTP for conservation of elephants exceeds value of crop and property losses of farmers

As mentioned elsewhere in this paper, one the of objectives of this study is to find out whether the urban residents' WTP for conservation of elephants is sufficient to compensate farmers for the crop and property damage caused by elephants, and to raise farmers' tolerance of the presence of elephants. In this analysis, it was assumed that if urban dwellers could compensate farmers for losses associated with crop and property damages caused by elephants, given the current elephant population, and were better off than in the absence of wild elephants, the current population of elephants would be (Kaldor-Hicks) superior to the absence of wild elephants.

According to Bandara & Tisdell (2000b) the total value of the crop and property damage caused by elephants in Sri Lanka is about Rs. 560.71 million per cropping season or Rs. 1121.42 million per annum. These authors have derived this figure by extrapolating the elephant damages estimated in three selected case studies (see Bandara & Tisdell, 2002c; Jayawardene, 1998;

and De Silva, 1998) carried out in three different locations in the elephant's range. However, before we use this figure to reach any conclusions, it must be noted that the crop and property damage calculated in this analysis did not pay much attention to the possible cost that could be associated with elephants other than crop and property damages. Under normal circumstances, the total economic cost should include the cost of control measures undertaken by farmers to scare away the crop-raiding elephants, income foregone by farmers in having to replace some crops with others that are less attractive to elephants, and the management cost borne by government departments to undertake various programs for the conservation of elephants and the mitigation of HEC. Such comprehensive assessments of total losses associated with the elephant are yet to be estimated.

Nevertheless, when we compare the economic estimates of crop and property damage caused by elephants of Bandara & Tisdell (2000b) with above estimated return on the capitalised sum of Rs. 2012.43 million per annum, it shows that urban residents' financial support for the conservation of the elephant significantly exceeds the economic losses caused by the elephant. This means that our estimated return of Rs. 2012.43 million per annum on the capitalised sum in perpetuity is more than sufficient to compensate farmers for their estimated crop losses of Rs. 1,121.41 per annum; in fact almost twice the needed sum.

When compensation is paid, control of elephants by farmers is likely to be much reduced. Furthermore, a lot of their current control costs are ineffective in aggregate, either because elephants have become resistant to control measures or because, in many cases, control measures merely result in elephants moving from one farmed area to another (cf. Rollins & Briggs, 1996, p.369). Consequently, in the latter case, a type of prisoners' dilemma problem exists. If compensation for damage caused by elephants leads to much reduced control of elephants by farmers, they should achieve a net economic benefit because their control costs will be greatly reduced (or in the extreme case, eliminated) and the aggregate damage experienced by them from elephants will increase little or not at all. Nevertheless, there might be a small increase in damage in aggregate, if, for example, elephant populations increase slightly due to less harassment of elephants. Despite this, it is clear that, if compensation were paid to farmers, a sum of less than Rs 1,124.42 million per year would compensate them if allowance were made for the reduced control effort of farmers. The latter will reduce farmers' costs of control.

Conclusion

This study was conducted to survey a sample of urban residents in the Colombo metropolitan area to determine their willingness to pay for the conservation of the Asian elephant in Sri Lanka. The finding of this analysis indicates that there is a strong economic case for ensuring the survival of wild elephants in Sri Lanka. There is strong evidence that the current population of wild elephants in Sir Lanka is economically preferable to their absence considering the interests of all stakeholders, urban residents and farmers.

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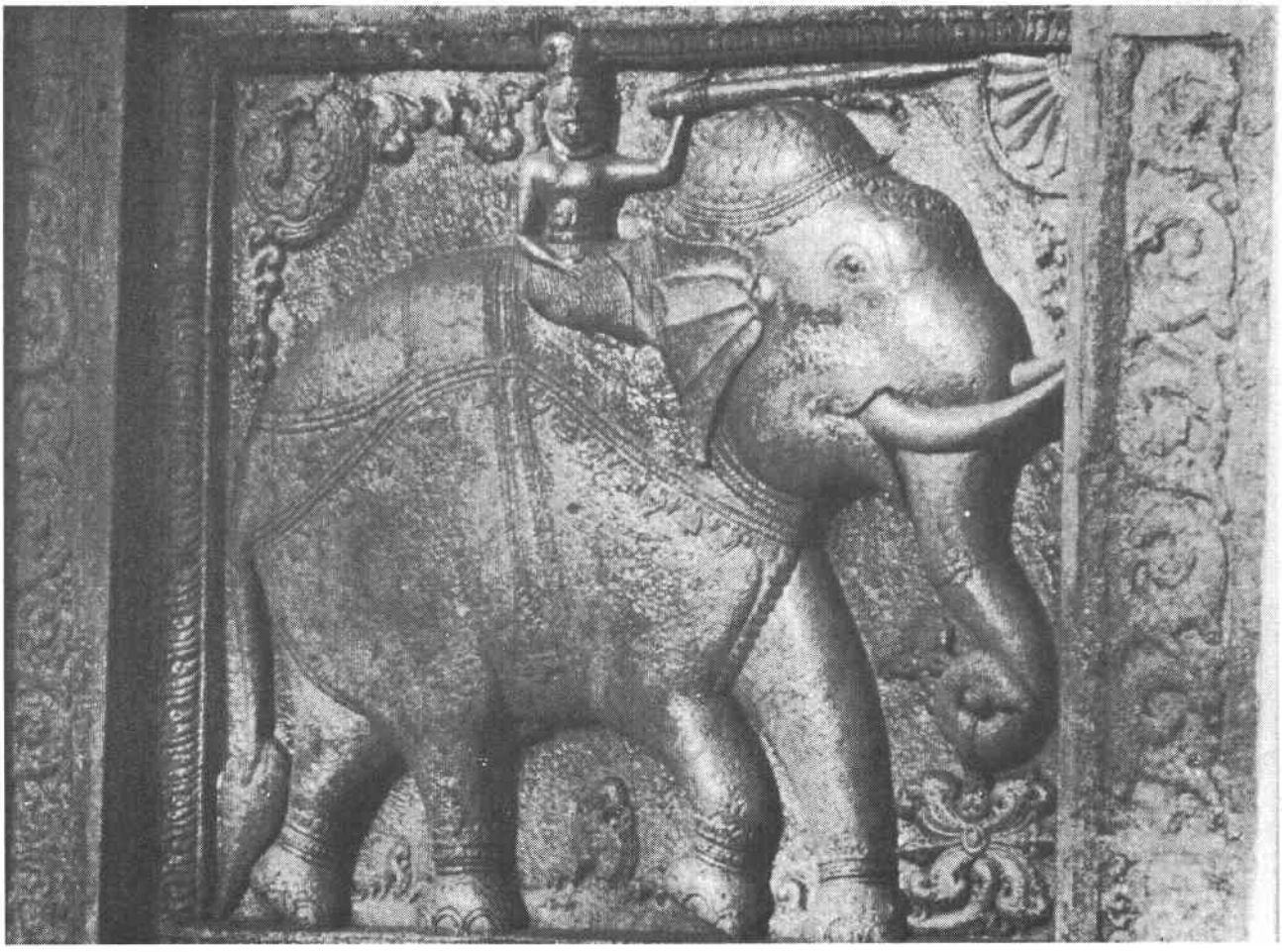

Elephant (18th Century) at the entrance to the Temple of the Tooth Kandy
(Photo: Dr. H. I. E. Katugaha)