



Willingness to Pay towards the Conservation of Ecotourism Resources at Gunung Gede Pangrango National Park, West Java, Indonesia

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Abstract

The objectives of this study are to determine the visitors' willingness to pay for conservation of the resources at Gunung Gede Pangrango National Park (TNGP), and to determine the satisfaction of visitors towards the use of the ecotourism resources of the park. The dichotomous choice Contingent Valuation Method (CVM) was employed to determine the willingness to pay (WTP). A total of 423 respondents were interviewed face-to-face to collect the data. The results show that most visitors are satisfied with the ecotourism resources in TNGP, many of the visitors have come to TNGP more than once. In order to sustain the benefits derived from the resources at the park, the visitors agree that various organization involved must cooperate to conserve and protect the ecotourism resources. The economic benefit of conservation of the ecotourism resources at TNGP was measured using the visitors' WTP for higher entrance fee to the park. A logit regression model was used to determine visitors' willingness to pay. The results indicate that income, gender (male) and residential (urban) were the significant factors that influencing the visitors' WTP for the entrance fee to TNGP. The mean WTP is found to be RP 7629.77 per visit. It is estimated that in 2004 the benefits of conservation of the ecotourism resources in TNGP amounts to RP 452 million.

Keywords: Willingness to pay, Contingent Valuation Method, Sustainable Tourism, National park

1. Introduction

National park like other environmental resources and public goods used by humans can benefit in many different ways. Those environmental resources have many functions relating to the ecological functions. They also offer recreational resources to everyone who visits this park. National parks which are offered as ecotourism sites can enhance national income, and have economic impacts to society around the area of national park. Then, it can make up the national economic growth.

Currently, the popularity of national parks for recreational purposes in many countries is rising. As a selected place for ecotourism, national park covers both an opportunity and challenge, because although the tourism development can produce some economic benefits, it can also negatively impact the natural environments and socio-cultural circumstances. The opportunity is to offer the attractive view of national park resources for ecotourism that will provide visitors' satisfaction. On the other hand, the challenge is to realize the harmonizing component of the national park, which is to conserve the scenery and the natural resources, also the historic objects and the wildlife therein. This can prove to be complicated under conditions of high visitation to the national park. A strategy that could be formulated and implemented by the government and the private sector in managing the national park that would combine both the opportunity and challenge is by getting revenues from use of the resources by charging entrance or user fees.

Gunung Gede Pangrango National Park (TNGP) has long been recognized as a popular ecotourism site in Indonesia as illustrated by the large number of visitation at the park (Table 1). These large numbers of people may create a number of problems, where it will devastate the biodiversity of the park, due to the visitors' activities (Sjaifuddin, 2004).

In order to manage and maintain the ecotourism resources at TNGP, the management needs a large amount of budget which is currently supported by the government fund and visitors' user fees. Government fund for these national parks is limited, because of national economic aspect and other government allocations such as for infrastructure, education, healthcare, etc. Thus, the management of the park may have to obtain more revenues by increasing the visitors' user fees. At present, low entrance fee is charged to visitors who want to enjoy the TNGP resources, and this entrance fee has never been increased since 15 years ago (Management of TNGP). Due to this low fee, the number of visitors to TNGP has always been high.

The potential benefits from charging user fees and differentially pricing access to national parks are significant. As charging fees could lead to a more optimal market (Dixon and Sherman, 1991), it could provide the vehicle for capturing benefits of ecotourism which often accrue primarily to the private sector. It can also reduce visitation in areas that suffer from overuse and accompanying ecological damage. This study therefore attempts to assess the net economic values of recreational resource in this park by using a Contingent Valuation Method (CVM).

This paper is organized into five sections. Section one is the literature review, followed by section two which describes the location of study. Section three explains the methodology and sources of data used in study. The empirical results are presented in section four, while the last section offers some discussion and concluding comments with regard to non-market valuation works.

2. Sustainable Development of Ecotourism

The essentials for the planning, development and management of ecotourism are sustainable resource management and conservation of natural areas. Sustainable development in ecotourism implies that the natural, cultural and other resources are conserved to bring benefits to the present society without sacrificing the needs of the future. Ecotourism can help in justifying and paying for conservation of natural and cultural resources if the ecotourism resources are properly developed based on the concept of sustainability. Sustainable development is needed because ecotourism activities are related to the natural environment, historical heritage and cultural patterns of the areas. As a result, the adoption of the concepts and principles of sustainable development to ecotourism in protected areas has been widespread. These principles have been applied to the tourism industry, since ecotourism is related to the environmental management in protected areas (Butler, 1998).

IUCN (1994) define environmentally sustainable tourism as a "form of tourism that supports the ecological balance" and tourism which is developed and maintained in an area (community, environment) in such a manner and ecotourism on such a scale that it remains viable over an indefinite period and does not degrade or alter the environment. According to Boo (1990 and 1993), to be sustainable, tourism development must meet the needs of present tourists and host regions while protecting and enhancing opportunities for the future. IUCN (1994) and Honey (1999) identified seven points for sustainable ecotourism which:

- i. Involves travel to natural destinations
- ii. Minimizes impact
- iii. Builds environmental awareness
- iv. Provides direct financial benefits for conservation
- v. Provides financial benefits and empowerment for local people
- vi. Respects local culture
- vii. Supports human rights and democratic movements

The National Ecotourism Strategy (Commonwealth Department of Tourism, 1994) defined ecotourism as "ecotourism is nature-based tourism that involves education and interpretation of the natural environment and is managed to be ecologically sustainable". It notes that ecotourism should be ecologically sustainable, provide visitor satisfaction, local benefits and be appropriate to its environmental and cultural setting. Ecotourism includes forms of tourism that are consistent with natural, social, cultural and community values. In ecotourism, 'greening' of tourism is important where environmental aspects are given high priority. To be considered as ecotourism, an activity or experience must positively contribute to the environment. Butler (1998) stated that "if the environment has not at least achieved a net benefit towards its sustainability and ecological integrity, then the activity is not ecotourism".

Wight (1993) has identified nine principles that should underpin sustainable ecotourism These are:

- i. Develop the resource in an environmentally sound manner and not degrade it
- ii. Provide first hand, participatory and enlightening experience;

- iii. Involve education among parties i.e. local communities, government, non-governmental organizations, industry and tourists;
- iv. Encourage all parties' recognition of the intrinsic values of the resource;
- v. Recognition of limits and acceptable of the resource;
- vi. Promote understanding and partnership between many players;
- vii. Promote moral and ethical responsibilities and behaviour towards the natural and cultural environment;
- viii. Provides long-term benefits and
- ix. Ensures the underlying ethics of responsible environment are applied to external and internal.

Ecotourism depends on minimal impacts to the environment and therefore does not contribute to damaging it. It is not ecotourism if it damages the natural resources. Well (1997) stated that "ecotourism has by definition minimal environmental impact, since unspoiled natural environments are the attraction of this type of tourism". Finally, there is a need for governments to encourage good quality sustainable ecotourism and control poor quality ecotourism.

Ecotourism, with respect to sustainable development, is interpreted as relating to economic sustainability, ecological sustainability, the long-term viability of tourism, and accepting tourism as a part of an overall strategy for sustainable development and biodiversity conservation of a protected area (Butler, 1998). The development of ecotourism has demonstrated the economic value of natural areas for recreation and tourism itself, local economic development and socio-cultural development. The ecotourism generates and enriches visitors' experiences, and provides employment, income and other benefits to local communities. Even though ecotourism is sensitive to the qualities of the natural and human environment, it also has an impact on the environment.

In terms of sustainable tourism (or ecotourism) development, a good example study was conducted by Barke and Towner (2004), to investigate tourism development in Malaga, Spain in the context of sustainable tourism (ecotourism) development. They used a simple model for the assessment of sustainable tourism which included four elements: environment, economic, socio-cultural and political. When they compared the eastern coastal area with an older developed site (Costa del Sol), they found that the growth of the tourism development in terms of sustainable forms was superficial. Their findings of two other proposed tourism developments were that there were clear failures in the context of sustainable tourism development.

Ecotourism can be an effective means to achieve the conservation of biological diversity, both for the benefit of the tourism industry and for the intrinsic and economic values of biodiversity (WCMC, 1997). Ecotourism activities are directly related to natural resources and many of these activities take place in protected areas. That is why ecotourism has been identified as a key industry sector with a legitimate right and obligation to contribute to the policy and implementation of biodiversity conservation measures. Ecotourism practices in protected areas must be ecologically sustainable and management of these practices must lead to the long-term maintenance of ecosystems and species.

In order to develop and manage the ecotourism industry successfully in the country, the consideration of economic impacts (sometimes called economic benefits) must be well understood. The concept of sustainable ecotourism will be achieved if economic, environmental and social and cultural impacts are weighed together (Ross, 2002). Economic impact refers to the change in sales, income, jobs or other parameters generated by ecotourism. A common ecotourism goal is the generation of economic benefits whether they are jobs for society, revenue for the parks or profits for companies. The possible economic benefits of ecotourism are:

- i. Income generated and its contribution to the Gross National or Domestic Product
- ii. Foreign exchange from international tourism
- iii. Generation of local employment through direct and indirect employment
- iv. As a catalyst for other economic activities using tourist expenditure
- v. Contribution to government revenues e.g. airport departure taxes

3. Literature review

Most environmental goods and services, such as clean air and water, ecotourism, healthy fish and wildlife populations, are not traded in markets. Economic valuation technique is a method that has been developed in valuing the environmental goods and services, and generally known as non-market valuation. This method can help economists, government, and society to predict the impact of economic decision and activities into environment and resources, and also to identify and estimate the monetary value of all economic benefits that a society derives from environmental resources.

The economic approach in valuing environmental changes is based on people's preferences for changes in the state of their environmental. The term value in economics has a precise definition, it is the price individuals are willing to pay in

order to obtain a good or service. The basic economic concepts of supply and demand are employed to estimate willingness-to-pay (called producer surplus and consumer surplus, respectively). Lipton et al. (1995) noted that economic value is a measure of what the maximum amount an individual is willing to forego in other goods and services in order to obtain some good, service, or state of the world. This measure of welfare is formally expressed in a concept called willingness-to-pay (WTP).

Economic valuation can be defined as the attempt to assign quantitative values to the goods and services provided by environment resources, whether or not market prices are available (Barbier *et al.*, 1997). The environmental resources are always faced with the problem of limited information about the price, costs, and quantity consumed. Therefore the benefits and costs of these resources are difficult to determine. Hence, using of the economic valuation process in finding WTP value could solve the problems.

Non-market values can be categorized as use values and non-use value. The use value of an asset is the value to society from the active use of the asset. This value involve direct use value (timber, firewood, hunting, fishing, ecotourism, research, and education), indirect use value (soil protection, flood control, and ecological functions), and option value (future direct and indirect uses). Non-use values reflect the value an individual or society places on an asset, even if they never intend to use this asset directly. This involve existence value (biodiversity, habitat, and endangered species), and bequest value (object, species, and environment for the future generation).

NOAA (2006) noted that environmental valuation is largely based on the assumption that individuals are willing to pay for environmental gains and, conversely, are willing to accept compensation for some environmental losses. The individual demonstrates preferences, which, in turn, places values on environmental resources. That society values environmental resources is certain; monetizing the value placed on changes in environmental assets such as coastal areas and water quality is far more complex. Environmental economists have developed a number of market and non-market-based techniques to value the environment. Figure 1 presents some of these techniques and classifies them according to the basis of the monetary valuation, either market-based, surrogate market, or non-market based.

Brandon and Margoluis (1996) in their paper of structuring ecotourism noted that the distinguishing feature of ecotourism is that it benefits biodiversity conservation. There is a set of five benefits to conservation which should be evident in any tourism activity which claim to be ecotourism. Therefore, Himayatullah (1999) stated that there are multivariate analyses to investigate empirically the WTP of the consumers for recreational services in two selected parks in Northwest Frontier Province (NWFP), Pakistan. The study use CVM to estimate WTP. A series of multivariate analyses were performed to explore the variation in different measures of visitor's WTP for improved recreational services of the two parks.

In order to understand the determinants of respondents' WTP responses and to see whether these determinants are consistent with economic demand theory, a series of multivariate analyses were performed with the survey data. The results indicated that total travel cost, income of visitor; distance, and quality of recreational services were found to be statistically significant 1 percent level. Other variables including education and age were significant at 5 and 10 percent significance level, respectively. Regarding demand elasticity, own-price, cross-price and income elasticity were also significant.

Loewen and Kulshreshta (1995) used travel cost method (TCM) and CVM to estimate the economic value of the recreation experience at the Prince Albert National Park (PANP) of Saskatchewan. The main purposes of their study are to estimate the economic benefit to society from recreation in the PANP and to analyze park user patterns and characteristics. A total of 79 respondents (PANP visitors) have been collected in their survey, where the sample consisted of mainly day visitors, accommodation guests (both commercial and non commercial), and campers. The results in this study showed that the respondents spent on average \$30 per person per day on their visit to PANP. Analyzing the sample visitors types, day visitors, accommodation guest, and campers spent on average \$27, \$44, \$13 per person per day, respectively. The TCM estimates the consumers' surplus was \$24 per person per day, and CVM estimates the consumers' surplus was \$13.68 per person per day. Thus, the total value of recreation in PANP was estimated at approximately \$16 million a year.

Arin and Kramer (2002) used CVM for an exploratory study on diver demand for visiting a marine sanctuary in the Philippines. In this study, an exploratory contingent valuation study was carried out among foreign and local tourists in three major dive destinations in the Philippines. The researcher noted that a charge an entrance fee to visitors is one way to finance marine reserves. This is also a way for local communities to capture the scarcity rent of their resource. Revenues thus collected would help cover maintenance and anti-fishing rule enforcement costs of a marine reserve. Furthermore, the entrance fee may be used as a tool to regulate the number of visitors to minimize diver damage. The maximum WTP was modeled as a function of age, gender, income, level of education, general interest in environmental protection, Philippines residency and type of diving (scuba and snorkel). Then, the maximum WTP of each diver was elicited through the contingent valuation question. The results suggested that the average WTP is considerably higher on Mactan Island than in Anilao and Alona Beach, where the average WTP was US\$3.7 in Anilao, US\$5.5 on Mactan and

US\$3.4 on Alona Beach. Based on the survey results, it showed a positive willingness to pay to enter marine sanctuaries where fishing, one of the major threats to coral reefs, is prohibited. Estimated annual potential revenues range from US\$0.85 to US\$1 million on Mactan Island, US\$95 to US\$116 thousand in Anilao and from US\$3.5 to US\$5.3 thousand on Alona Beach. These revenues could be used to support coral reef conservation and possibly the creation of alternative employment opportunities for locals, who would be barred from fishing.

Another study by Zhongmin *et al.* (2005) measure the total economic value of restoring ecosystem services in Enjina region, China. The CVM was used on their study to obtain estimates of WTP for restoring Enjina ecosystem services. To capture the respondents' willingness to pay, they used a payment card (PC) format and a 12 page survey booklet with maps, depicting the reasons why Enjina ecosystem deteriorated. In the PC format, respondents are confronted with an ordered sequence of bids where they choose the maximum amount that they are willing to pay. The result of this study indicate that respondents would pay an average of 19.37 (RMB) per year with 20.78 per household for the main river area, and 16.41 per household for the rest of Hei basin. The aggregate benefit to residents of the Hei basin is 8.84 million annually for 20 years. Taking into account an environmental discount rate calculated by using respondents' equivalent utility between periodical payments and lump sum payments, the present value of aggregate benefit of restoring Enjina ecosystem is 55.33 million.

Furthermore, Dumadisele *et al.* (2005) reports on tourists' WTP to view Cape clawless otters *Aonyx capensis* along the Eastern Cape Wild Coast, South Africa. Sampling was done in Dwesa Nature Reserve, which is situated on the Eastern Cape Wild Coast in South Africa. A survey procedure was used to assess if tourists at Dwesa would be WTP a trained guide to show them otters. In this research, a total of 120 questionnaires were handed out to tourists who come to Dwesa Nature Reserve. There were 30 questions which consisted of different structured questions including open questions, closed questions and rank ordering questions. Some of the questions were personal (such as gender, age, nationality, residency, level of education, income, reasons for visiting Dwesa). The researcher received 67 completed questionnaires. Many of the respondents did not respond to personal questions such as age, gender, residency, level of education and income. From five bid offered (<R50, R50-R100, R100-R150, R150-R200, and >R200), most of the respondents were WTP either less than R50.00 (US\$8.00) or R50.00-R100.00 to view otters regardless of the chances of seeing them. The result found that number of respondents that would pay less than R50.00 to view otters, increased as the percentage chance of seeing otters decreased, while the number of respondents that would pay R50.00-R100.00 to view otters decreased as the percentage chances decreased.

Kim *et al.* (2004) assessing the economic value of a world heritage site and willingness-to-pay determinants at Changdeok Palace, using the CVM. The type of question that they used in this study is closed-ended (or dichotomous choice). Logit models in both linear and logarithmic forms were employed to identify determinants from the DC question. Based on the results of the pre-test, 10 price offers were given on the questionnaire.

The researchers compute the mean WTP values from the estimated coefficient of each model through LIMDEP 8.0 program. The mean WTP values were 5706 Won (\$5.70) in a log-linear model and 6005 Won (\$6.00) in a log-logit model. Result show that the gap between the two mean WTP amounts was small. The computation of the user value requires an aggregation of average WTP for a specific quantity of public good by multiplying the sum of the mean WTP and current admission price, 2300 Won by the number of visitors. The number of visitors was 685,694 including foreign visitors of 443,772. As a result, aggregate use value from the log-linear model was estimated as approximately 1.93 million dollars, while aggregate use value from the log-logit model was estimated as 2.01 million dollars.

In a study conducted by Chen (1999), the CVM was used to measure the values of wetland in Taiwan. The study was conducted from ecological and economic points of view in the setting of a nature reserve of wetland in Taiwan. The ecological data (including area, habitat, ornithological diversity, ornithological rarity, population size, and representativeness) of 28 wetlands in Taiwan were collected, and factor analysis was used to regroup those attribute. From the 12 evaluation items analyzed with factor analysis, it is grouped into four categories: rarity factor, representativeness factor, diversity factor, and area factor.

The ecological valuation method and the results were introduced to the dichotomous choice with follow up (DCF) contingent valuation questionnaire. Cameron's expenditure function model and maximum likelihood estimation for DCF data were used to estimate WTP values for the residents of Taiwan. The result indicate that some ecological factor (relative weight of mix index list, rarity factor, representativeness factor, age, education, and occupation) are statistically significant, which shows the importance of combining ecological valuation and economic evaluation. The estimated median annual WTP is NT\$1069.52.

4. Methodology

4.1 Data sources

This study used mostly primary data, which was gathered from the personal interview with the respondent (visitors). Surveys were conducted in June to August 2006 in TNGP. The primary data consist of visitors' socioeconomic

characteristics; visitor's perceptions about ecotourism resources, attitude, and their WTP to enjoy the ecotourism resources at TNGP.

4.2 Sampling area

TNGP is situated in the province of West Java, south of Jakarta. The TNGP constitutes the core area of the biosphere reserve. It includes two twinned volcanoes and mountainous rain forests with many Javan endemic species. Administratively, TNGP is shared among the regency of Bogor, Cianjur, and Sukabumi. TNGP comprises a variety of landscapes. This site has beautiful waterfalls, lakes and rivers, rugged volcanic landscape, quiet alms, montane swamp, and tropical mountain forest. The features of ecotourism area at TNGP are showed in Figure 2.

The interviews were carried out at the various locations which were popular among the visitors. Most of interviews were conducted at the main entrance gate and in the Cibodas botanic garden.

4.3 Sample size

The sample size for a study needs to be large enough to provide sufficient statistical power. It is very important that the sample be as representative as possible. In this study, a total of 500 respondents participated in this survey but only 423 respondents answered the questionnaire completely, thus the useable in this study was 423. The respondents were chosen at convenient since there was as records of the visitors to the park. The interview methods used in this research was face-to-face interview to the visitors. In order to avoid redundancy, only the leader of a group was chosen as the respondents.

4.4 Questionnaire design

CVM uses survey question to elicit the society's preference for public goods by creating a hypothetical market. CVM questionnaires can be designed to elicit WTP or willingness to accept (WTA) estimates for a change in the level of provision of a public good. Eventually, the decision to use WTP or WTA depends on the property rights of the good. However, WTA estimates are often biased upwards; therefore most of CV studies are designed to elicit WTP estimates (Mitchell and Carson, 1989).

The questionnaire for this research has been designed to gather primary information such as socio demographic profile, attitude, and visitors' willingness to pay for ecotourism resources at TNGP. The questionnaires consist of structured questions that were divided into two forms: dichotomous choice and multiple categories questions. Generally, the questionnaire will divided into four categories; (a) characteristic of visitors and society, (b) attitude of visitors in relation to sustainability of ecotourism resources at TNGP, (c) visitor's perception about ecotourism resources at TNGP, and (d) willingness to pay of visitor for TNGP entrance fee (bid price presented).

A dichotomous choice question offered just two answer choices, yes or no. Meanwhile, the multiple categories questions had more than two answers. Dichotomous choice is a single "take it or leave it (TIOLI)" bid offer presented to each respondent. This technique is simple and inexpensive to administer by mail. However, the information derived from the responses must be transformed into WTP or WTA estimates based upon a utility theoretic method which predicts the probability of a yes response.

A total of 180 domestic visitors were interviewed, but only 160 were used for the purpose of this analysis due to missing values. Information on socio-economic characteristics of the respondents obtained included race, place of origin, age, marital status, education, size of family members, occupation, and monthly and supplementary gross income. The personal interviews were conducted on visitors at TNGP by filling the questionnaires at the chosen location. Each of the respondents was informed regarding the details on the purpose of preservation of island, facilities available and format used in Contingent Value techniques. Respondents were asked the following questions and required to respond either 'Yes' or 'No':

'If entrance fees are increased by RP x, would you willing to pay so that you could continue to use this recreational area?'

where x ranged from RP5000 to RP9000, representing a 'reasonable' additional amount of entrance fee to many privately managed recreational areas in Indonesia.

4.5 Willingness to Pay Estimation

Following recommendations from environmental literature (Arrow *et al.*, 1993), the closed-ended (CE) WTP approach to estimate the benefits from the preservation the TNGP was used. Individuals were asked as whether they would pay specific additional fees amount for a given commodity, with possible responses being "YES" and "NO". The bid amount is varied across respondents and the only information obtained from each individual is whether his/her maximum WTP is above or below the bid offered.

Logistic regression technique was used to estimate WTP (Hanemann, 1984). Using this approach the probability of saying "YES" to a bid at different level of the independent variable is estimated as

$$P = (1 - e^{-x})^{-1} \quad (1)$$

Here, x is the "bid amount" (price), and P is the probability of accepting the price. Mean WTP is estimated as the area under this probability function. This area shows the proportion of the population who would consume the good at each price level, and their associated utility. The area under the curve is estimated by integration techniques and can be expressed as;

$$E(\text{WTP}) = \int_L^U (1 + e^{a+b\text{PRICE}})^{-1} d\text{PRICE} \quad (2)$$

where $(1 + e^{a+b\text{PRICE}})^{-1}$, are the probability of saying "YES" and U and L the upper and lower limits of the integration respectively.

Estimating mean WTP within this framework relies on making some assumption about upper and lower limits of the integral, i.e. knowing the price amounts at which probability saying "NO" is zero and probability saying "YES" is one. Bishop and Heberlein (1979) and Sellar *et al.* (1986) used the upper range for the integration of their price amounts as the upper limit for the integration. Hanemann (1984) argued that such an approach makes a certain assumption about the probability distribution for the unknown WTP in the sample. He argued that the upper limit should be infinity and that using the highest offered amount may be a poor approximation of the mean utility estimated when integrating between zero and infinity. In this study, zero was chosen as the lower limit of the integral and the maximum value as the upper limit. Confidence interval of WTP also calculated using the variance-covariance matrix and a technique adopted for dichotomous CVM by Park *et al.* (1991).

The ability to seek willingness to pay is represented by the dichotomous variable of WTP with values of 1 for those willing to pay the additional amount of entrance fee and 0 is otherwise. An OLS regression of the above relationship with WTP as the dummy variable is beset by several problems namely: (1) non-normality of the error term, (2) heteroscedasticity, and (3) the possibility of the estimated probabilities lying outside the 0-1 boundary (Gujarati, 1988). Since the dummy WTP is actually a proxy of the actual propensity or ability of willingness to pay, the probit and logit models guarantee that the estimated probabilities lie in the 0-1 range and that there are nonlinearly related to the explanatory variables. The difference between these two approaches is mainly in the distribution of the regression error terms. The logit approach assumes that the cumulative distribution of the error term is logistic while probit assumes that is normal.

5. Results and discussion

This section presents the summary statistics of the respondent's socio-economic characteristics, and also respondent's responses regarding their perceptions and attitudes.

5.1 socioeconomic characteristics

Visitors who come to TNGP Park can be grouped into two categories, local and international visitors. But, for this study the visitors that was selected was only local visitors only. To ensure that the selected sample was representative of the population, a number of questions were asked in relation to the socioeconomic characteristic of the visitors.

Information about respondents' profile included their age, gender, residential area, marital status, education level, occupation, and income. The socioeconomic variables of respondents, collected in terms of categorical variables, are summarized in Table 2. With respect to the age, the visitors who come to TNGP come from various levels of age. The results indicated that the respondents' ages ranged from 16 to 68 year old. Most of respondents interviewed are in the range of 21-30 years old (53 percent). This was followed by those in 31-40 years old (20.1 percent), below 20 years old (14.4 percent), 41-50 years old (7.8 percents), and the fewest of respondents interviewed was those above 50 years old (4.7 percent). This information showed that most of visitors who visit TNGP come from the middle age group. Activities in this park include climbing Mount Gede and Mount Pangrango, camping, and hiking, require physical activity and strength.

Most of visitors who visited the park come from cities around TNGP, such as Jakarta, and Bogor (Wiratno *et al.*, 2004). Usually, they come on the weekend for vacation, and enjoy the gorgeous view and fresh air in the park. The result showed that approximately 77.3 percent of respondents are from urban area and only 22.7 percent from rural area. This result indicated that people from urban area were more interest with the natural and ecotourism resources at the park because these conditions are hard to exist in urban area. On the other hand, the natural resources are common to the rural community. Moreover, there are many places like TNGP, especially in West Java.

The level of education shows that most of the respondents (61.2 percent) had diploma/university level. This was followed by senior high school level (33.1 percent), elementary level (4.0 percent), primary school level (1.4 percent),

and no education or the respondents never been go to school (0.2 percent). This implies that ecotourism at Gunung Gede Pangrango National Park tends to be monopolized by the middle and highly educated people. These groups of people value the ecotourism activities more than the other group (lower education level).

The categories of respondents' occupation in the questionnaire were divided into 10 groups. As shown in Table 2, there were 152 (35.9 percent) respondents who worked as a private employee, and followed by businessmen 83 respondents (19.6 percent), student 54 respondents (12.8 percent), and government sector 40 respondents (9.5 percent). These groups of people need more recreation to diminish their boredom due to their routine activities.

Usually, the income level of respondents is an important factor that will affect to their WTP for the fee which was charged to them. Generally, more income indicates that they would be willing to pay more for the entrance fee. Previous studies by Hanim (1999), Zhongmin *et al.* (2002), and Syakya (2004) have identified that income affect visitors' WTP. In this study, most respondents (54.6 percent) had average household income of between RP 750,001 – RP 1,500,000 per month. This is followed by respondents with income of above RP 1,500,000 (28.4 percent), and than the last is respondents' group with earned income below RP 750,000 (17.0 percent).

5.2 Willingness to pay analysis

This section discusses the WTP stated by the respondents. The analysis uses the dichotomous choice CVM. In the dichotomous choice CVM, each respondent is asked whether they would be willing to pay a particular price for the entrance fee to visit TNGP, letting them answer with 'yes' or 'no' to the price of entrance fee offered (bid). Bids between RP 5000 (RM 1.92) to RP 9000 (RM 3.46) have been assigned in this survey at the TNGP.

The distribution frequency of respondents' willingness to pay at each bid amount is shown in Table 3. Generally, there were 258 (61 percent) out of 423 respondents who were willing to pay for the given bid, and 165 respondents (39 percent) were not willing.

For the WTP analysis, the data were estimated using the logit analysis. The bids of RP 5000 to RP 9000 were offered to the respondents. Generally, it is found that 61 percent of the respondents were willing to pay the given bids, while 39 percent were not willing to pay. The results were consistent to the theoretical expectation; as the given bid is increased, the number of respondents willing to pay decreases. With a RP 5000 bid level given to respondents, approximately 27.5 percent were willing to pay and only 6.1 percent would not. When a RP 9000 of bid level was given, 33.3 percent of respondents were not willing to pay, and 11.2 percent was willing to pay for this given bid level.

The binary logit regression was used to analyze the probability of visitors' WTP for the entrance fee at TNGP. This analysis was also used to test if there was a significant difference in the variables of the socioeconomic factors, and to provide further information about the independent variables which influenced willingness to pay bids. The initial estimation of the models involved the visitors' socio-economic characteristics such as age, gender, marital status, residential area, and income level. The results of the parameter estimates of the linear logit are shown in Table 4.

Based on the results summarized in Table 4, the variables that were significant at 1 percent level were urban residency and income level. M gender was significant at 10 percent level. The goodness of fit for the regression is given by Nagelkerke R-Square of 0.563. The percentage of correct prediction is 79 percent. This analysis showed that the results were satisfactory.

The coefficient for price (bid) is negative as expected, at the value of -0.00122. It implies that the higher the bid offered, the less the number of respondents who are willing to pay the bid, it was significant at 1 percent confidence level.

According to the logit regression results, gender coefficient (male) illustrates a positive value (0.574). In the questionnaire given, 0 refers to male and 1 refers to female. The *odd ratio* of this variable is 1.775. Thus, as expected, males are willing to pay the bid price 1.775 times higher than the female visitors.

The residential variable (urban) was significant at 1 percent of level confidence, with a value of 1.408. It illustrated that urban visitors had a positive value for WTP. The *odd ratio* of this variable was 4.086, meaning that visitors from urban area were WTP the bid price offered 4.806 times higher than visitors from the rural area.

The single-bounded dichotomous choice contingent valuation (DC-CV) model was applied to examine the data. For the DC-CV model, two results are possible; either the respondent is not willing to pay for the bid level of entrance fee offered or the respondent is willing to pay for the bid level of entrance fee offered. *Bid price* is the dependent variable, where 1 = 'yes' and 0 = 'no' in response to the hypothetical referendum question. *Bid* represents price (Rp A) that the respondent will pay for the entrance fee. Based on the estimation results, equivalent WTP measures were calculated using logit regression models at mean price and income level. Program Mathematica 5.0 was used to calculate the actual value of visitors' willingness to pay. The result showed that WTP for entrance fee to TNGP was RP 7629.77 per visit.

From logit regression model, based on the value of visitors' WTP, the benefit or expected value of ecotourism resources at TNGP can be calculated. Since there is an increase in the total amount of visitors, the total benefits at TNGP also will

increase every year. Table 5 shows the expected benefits at TNGP that can be captured by the management for the year 1995 to 2004. The total value of ecotourism resources in TNGP was estimated at approximately RP 400 million a year.

6. Conclusions

The study used CVM to estimate how much visitors were willing to pay for the entrance fee at TNGP, as an indicator of the benefits of conservation of the ecotourism resources. Generally, visitors' willingness to pay for the entrance fee at the park was higher than the fee charge to them at the present (RP 4000). As a source of fund to support the development of ecotourism at TNGP, the management should consider increasing the entrance fee at TNGP, since it is currently at very minimum level and the fee has not increased for the last 10 years. The results of the study show that household income, gender, residential, and bid price level were the significant factors that influence the amount of the entrance fee that they willing to pay.

The successful development of ecotourism at TNGP in the future will depend on the visitors' satisfaction for the resources and their WTP the park. Generally, visitors are satisfied with the ecotourism resources at TNGP, but the management must protect this, and also enhanced the facilities and services offered to the visitors. Even though the management increasing the entrance fee, most of visitors would still come to the park, because they thought that TNGP is a most suitable place for their recreation and they enjoy their vacation in the park. The results of visitors' satisfaction for the ecotourism resources at TNGP represent important information about conditions of the park at present.

These findings can assist the management of TNGP to take advantage of the increasing entrance fee which can be used to keep the sustainability of its ecotourism resources. The authority of the park also must consider the people who visit the park. The demographic, socioeconomic characteristic and the opinion of the visitors could be important inputs in order to ensure successful of ecotourism programs. This result also should be helpful to assist the authority for the fee system and how much they can increase the new entrance fee charged to the visitors.

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Table 1. Visitor's purpose and numbers of individual visitors

Year	Visitor Profiles and Number of Individual Visitors						Total
	Research	Education	Recreation	Climbing	Camping	Other	
1995	44	2,016	15,123	15,622	1,118	122	34,045
1996	24	1,095	15,316	32,279	2,161	31	50,906
1997	73	2,335	20,178	16,173	2,212	521	41,492
1998	35	7,200	16,379	23,486	2,415	1,195	50,710
1999	352	2,450	15,534	41,564	2,264	225	62,325
2000	215	1,152	16,315	42,645	2,187	309	62,823
2001	124	2,108	16,779	42,848	2,265	610	64,734
2002	99	1,855	17,102	40,105	1,878	209	61,248
2003	115	1,156	16,420	39,520	1,850	934	59,995
2004	165	1,320	16,350	39,422	2,744	328	60,329
Total	1,246	22,687	165,496	333,664	21,094	4,484	548,607

Source: Management of Gunung Gede Pangrango National Park, 2005

Table 2. Socioeconomic profile of respondents

Characteristics	Frequency (n=423)	Percentage
Age		
< 20	61	14.40
21 – 30	224	53.00
31 – 40	85	20.10
41 – 50	33	7.80
51 >	20	4.70
Gender		
Male	234	55.30
Female	189	44.70
Residential Area		
Urban	237	77.30
Rural	96	22.70
Marital Status		
Single	237	56.00
Married	186	44.00
Education Level		
Never been to school	1	0.20
Primary	6	1.40
Elementary	17	4.00
High school	140	33.10
College/University	259	61.20
Occupation		
Businessmen	83	19.60
Private employment	152	35.90

Government	40	9.50
Teacher/ lecturer	23	5.40
Farmer/ fisherman	6	1.40
Housewife	22	5.20
Student	54	12.80
Pensioner	3	0.70
Unemployed	3	0.70
Other jobs	37	8.70
Income		
Less than 750,000	72	17.00
750,001 - 1,500,000	231	54.60
More than 1,500,000	120	28.40

Table 3. Visitors' willingness to pay

Bid Offered	Willing to Pay (%)	Would Not to Pay (%)
RP 5000	27.52	6.06
RP 6000	27.91	10.3
RP 7000	18.18	20.54
RP 8000	12.79	32.12
RP 9000	11.24	33.33

Table 4. Results of logit regression model

Variables	Coefficient	Standard Error
Constant	5.403	0.8220***
Bid	-.00122	0.000***
Male	.574	.275*
Income	2.0355×10^{-6}	.000***
Urban	1.408	0.3440***
N	423	
Percentage of correct prediction	79.0 %	
-2 loglikelihood	338.724	
Cox & Snell R Square	0.415	
Nagelkerke R Square	0.563	

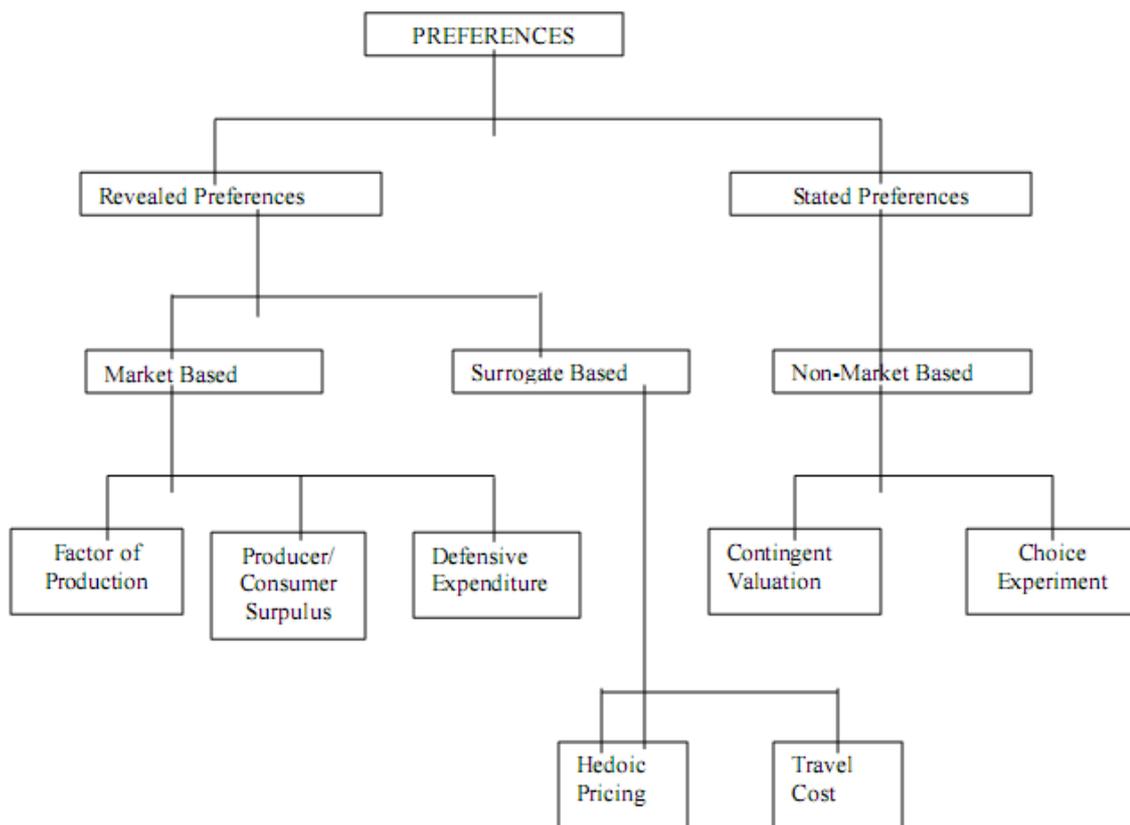
Source: Primary Data, 2006

Notes: *** Significant at 1 percent level

* significant at 10 percent level

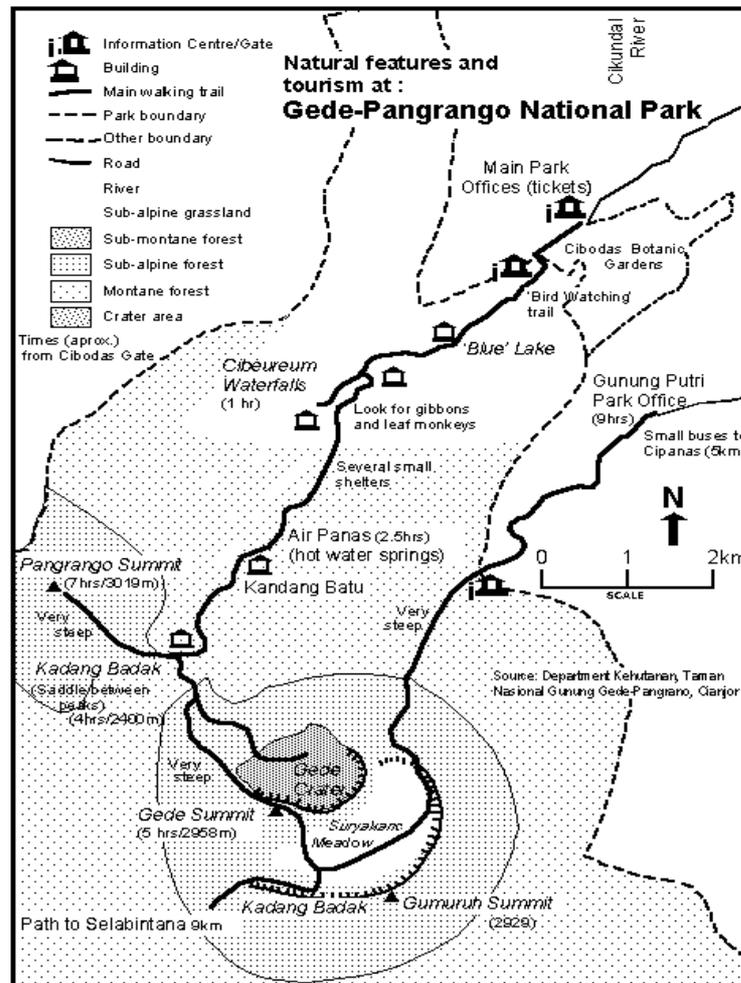
Table 5. Expected benefits of Gunung Gede Pangrango National Park

Year	Total Visitors per Year	Expected Benefits (Rp)
1995	34,045	259,775,519.6
1996	50,906	388,401,071.6
1997	41,492	316,574,416.8
1998	50,710	386,905,636.7
1999	62,325	475,525,415.2
2000	62,623	477,799,086.7
2001	64,634	493,142,554.1
2002	60,248	459,678,382.9
2003	58,795	448,592,327.1
2004	59,329	452,666,624.3



(Source: NOAA Coastal Services Center, 2006)

Figure 1. Environmental valuation methods



(Source: Indonesia Ecotourism Center, 2005)

Figure 2. Sampling area