HILL RECREATIONAL AND SERVICES VALUATION: A CASE STUDY OF TAMAN MELAWATI HILL

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ABSTRACT

This study estimates the economic values of household preference for preservation and conservation of hill recreational and services values in Malaysia. The Contingent Valuation technique is employed on 100 randomly selected households in the vicinities of Taman Melawati Hill. The study finds that hill preservation is important and the public is willing to pay for initiatives to mitigate further degradation to this ecosystem. More specifically, the study ascertains that households on average are willing to donate MYR92.40 per annum to the trust fund for hill mitigation management initiatives. This value conveys a total economic value of MYR51.6 million per annum, based on the Selangor state population who are willing to pay for the mitigation cause. This substantial value can help policy makers to identify any mismatch between what the public actually demands and are willing to pay for and the degradation to the supply due to modern developments.

Key words: willingness-to-pay, hill recreational and services values, contingent valuation

INTRODUCTION

Hills and forests do not only provide mankind with numerous positive environmental effects but recreational values as well. They provide natural flood mitigation, watershed protection, habitats for animals, flora and fauna, and help minimize air pollution. These endowments too could serve as good recreational sites for nature lovers at zero costs, as they are public goods by origin.

Malaysia has a total forest area of 20,890,000 hectares, which covers 63.6 percent of the total land area. In the recent years, this encouraging figure has been declining at an annual rate of 0.7 percent based on the statistics of 2000 to 2005. The continuation of this downward trend may jeopardize the existence of the world's oldest natural heritage if left

unchecked. Though there are some active reforestation projects in the country, the rate of deforestation has been higher, exacerbated by many illegal logging activities.

With higher levels of education and awareness of the importance of hills and forests, the demand for more trees and green spaces is rising in the country. The robust economic growth in the recent years has increased the living standards with better disposable incomes. These have partially boosted leisure time and pursuits of environmental recreation like hill and beach outings.

In Malaysia, there are many famous hills which are suitable for recreation and eco-tourism, such as Cameron Highlands, Penang Hill, Maxwell Hill, Broga Hill and many others. In the recent years imbalanced agricultural developments in parts of Cameron Highlands and Penang Hill have caused these hills to lose some of their unique characteristics as the natural habitats of many species of flora and fauna, and also their cool temperatures. The consequences of uncontrolled damage to these hills clearly suggest the urgent need for immediate government interventions. The government has several laws and regulations, like the National Forest Policy and National Forestry Act, to protect the hills and forests but a lack of strict implementation has allowed many irresponsible companies and individuals to slip through the laws and systems.

While the Malaysian economy expands confidently, the opportunity cost is the cutting of hills and forest areas to provide space for development and building materials. Of late, hasty developments and expansions have degraded or wiped out huge hectares of green spaces. Some prominent examples of these activities are the hill-cutting on Penang's North Coast for Development and Reclamation areas, forest clearance for infrastructure-building in Kundasang, Sandakan, and Kota Kinabalu in Sabah and the Federal Hill in Selangor. A more recent example is the forest clearance to make way for the construction of a new highway along the Klang Gates Quartz Ridge, which is one of the world's greatest geological formations. These irresponsible hills and forests cuttings have resulted in the loss of human lives and properties in several cases of landslides like the Kapit, Sarawak landslide, the Bukit Ceylon, Kuala Lumpur landslide and the Bukit Antarabangsa, Selangor landslide. All these landslides are directly or indirectly linked to excessive or improperly planned hills cuttings.

There have been calls from many quarters of the public for better controls and the banning of hill-cutting projects due to the harm they bring to human lives and the ecosystem. In order to arrest the damages and develop an integrated and lasting green space blueprint, new strategies need to be developed by the local authorities. However, environmental projects are always losing out in competition with other socio-economic activities for a share of scarce annual budgets. In this respect, a more informed study of the importance of hills and forests may give environmental projects an extra edge. This could be done by estimating the monetary values of green lungs which offer a worldwide and concrete basis to justify the costs incurred in their protection, and to put up fair competition with other demands for policy and financial support.

Recreational services and opportunities are vital human-use services. There are numerous indirect and intangible benefits of recreational areas which are non-market products but could be favorably decoded into monetary terms. The public can appreciate the contributions of these environmental services by validating some resources for the conservation and preservation of these green spaces. These contributions would serve as a

good shadow price for the environmental resources as the willingness-to-pay for conservation and preservation would show the value the public places on them. Nevertheless, a deep understanding of residents' recreational behaviors and the fundamental factors that influence them holds the promise of effective planning, design and upkeep of these green spaces.

Given the said background, this paper intends to elicit the public's appreciation for the hill by decoding it into monetary terms through capturing their willingness-to-pay (WTP) to preserve and conserve this pristine piece of natural heritage. It is also the intention of this study to estimate its total economic value (TEV) and factors that may influence the WTP for hill recreations.

The Malaysian Hills: Taman Melawati Hill as the Case Study

This paper has selected Taman Melawati Hill as the case study to illustrate the elicitation of WTP and estimation of the TEV. Taman Melawati Hill, located in Kuala Lumpur, is a recreation park excellent for picnics and exercise for residents living in the vicinities of Taman Permata, Taman Melawati, Wangsa Melawati, Wangsa Maju, Bukit Antarabangsa and Kemensah Heights. It is the last remaining green lung in Taman Melawati. Much of this hill is still covered in remnant lowland/hill forest, which is very rare in the highly urbanized areas of Selangor and Kuala Lumpur. The forest of this hill represents a fine example of remnant forest and refuge for fauna and flora in the Klang Valley and the Ampang-Ulu Klang areas.

Despite its urban location, Taman Melawati Hill is exceptionally rich in flora and fauna, with five species of mammals, about 67 species of birds (resident and migrant) and seven species of herpetofauna (amphibians and reptiles, including three species of snakes). These also include two species of monkeys, the dusky leaf monkey (*Trachypithecus obscurus*) and long-tailed macaque (*Macaca fascicularis*). The dusky leaf monkey is a totally protected species under the Protection of Wild Life Act 1972 in Malaysia. Taman Melawati Hill is perhaps the only green urban area with a healthy population of dusky leaf monkeys remaining in the Klang Valley.

Taman Melawati Hill is also an important migration site for raptors (birds of prey) migrating from northern Asia to Malaysia and other countries in South-east Asia. Raptor migration research has been carried out at Taman Melawati Hill since 1999, where thousands of raptors have been observed migrating over the site. Some of the raptors use the hill as an important resting and roosting area during their long and tiring journey.

Some of the unique and interesting plants found at Taman Melawati Hill include *Baeckia frutescens* (cucur atap), pitcher plant (*Nepenthes* sp.), *Hanguana malayana*, fig trees, ru (*Fragrae* sp.) and *Alstonia* (pulai) species. It is suspected that some unique plants from the Klang Gates Quartz Ridge have germinated and established populations on Taman Melawati Hill. These unique plants have a good potential for the horticulture industry and will ease pressure of over collection from the Klang Gates Quartz Ridge. The appendix shows some photographs of the wild animals and flora and fauna found in Taman Melawati Hill. In addition, the forest on the hill maintains the local microclimate and contributes to the cooling of the surrounding environment. It also prevents hill surface run-offs and the pollution of waterways and rivers.

While Taman Melawati Hill maintains its serenity, there have been proposals for housing developments in its vicinities. Since it already has had areas with recorded earth movement and several cases of landslide between 2005 and 2007, further developments may have to be minimized. Further housing developments may degrade the recreational areas, flora and fauna, and bring harm to animals and human lives and properties. In addition, the developments may damage the ecological heritage which could be preserved for the future generations. These threats have caused concerns for the residents living in the area and green lovers in the country.

The choice between hill development and hill preservation can be made clearer if public appreciation of the hill is monetized and used as an additional piece of information by the policy makers. Monetizing environmental goods and services is made possible through valuation techniques using implicit or simulated markets. The premise of these techniques is based on the idea that consumers are willing to trade off other goods or income in order to enjoy improved environmental quality. This phenomenon should convey to policy-makers that environmental quality, though a non-market good, has economic values.

Monetizing Non-market Goods and Services Using Valuation Methodologies

The economic concept of value provides the foundation for neoclassical welfare economics, and expresses the magnitude to which a good or service satisfies the preferences of consumers. Hence, the estimation of the economic value can be obtained by the willingness to pay (WTP) for such goods or services or the willingness to accept (WTA) as a compensation for sacrificing the good or service. Both these willingness can be revealed in business transactions in the market, which automatically reveals their value. The market, however, is only capable of revealing one component of the total economic value (TEV), which is the direct use values, i.e. the WTP or WTA for only actual use of the good or service. The other values such as indirect use values and non-use values, which make up the TEV, however, would have to be estimated using environmental valuation techniques.

Use value is the present or future benefits derived from the use of the environmental goods and services. This value is further categorized into direct use values and indirect use values. Direct use value is the benefits obtained through direct use of the environmental commodity. This kind of use value can be consumptive (e.g. hunting and collection of medicinal plants in the forest, and wood sales from wetlands) or non-consumptive (e.g. observing tigers in national parks, photography and ecotourism). The sightings of fireflies at the Kuala Selangor Fireflies and Nature Park (Jamal, 2000), and sightings of rare birds species at the Putrajaya Wetland Park (Alias & Juwaidah, 2005) are examples of direct use values. Indirect use values are benefits derived indirectly from the environmental commodities, for example, the water retention role of hills, softening impact of tsunami by mangrove forests and natural habitats of wild animal and plant life.

Non-use values are benefits (or costs) gained (or incurred) not directly from the consumption of environmental good and services, but by acknowledging the presence of those environmental commodities and feeling good (uncertain) about it. These values include also the knowledge of bequest where these commodities can be enjoyed by the future generations. Thus, non-use values comprise both the existent values and bequest

values. For example, the existent and bequest values can be illustrated by the WTP to conserve a hill in order to maintain its serenity and green vista for the present and future generations.

There is a variety of non-market valuation methods that could be employed to value the elements in the TEV framework. These techniques with their own characteristics and capabilities can be grouped into the following three approaches and the respective methods are shown in the parentheses: the Market-based approach (e.g. Productivity, Damage cost avoided, Replacement cost and Substitute cost) with valuation done on actual market values observed in the markets, the Surrogate market approach (e.g. Travel cost and Hedonic pricing), where valuation is based on inferences about the value of environmental commodities influenced by people's attitudes and how it changes when the environmental quality changes, and the Constructed market approach (e.g. Contingent valuation and Choice model) where valuation is based on a surrogate market by directly asking people for their preferences and valuation of proxy market conditions and the reaction of market agents under different circumstances.

METHODOLOGY

The monetization of the economic benefits of environmental commodities is based on the neo-classical principles of welfare economics (Bergstrom & Stoll, 1989). The welfare principle allocates available resources as efficiently as possible to attain Pareto efficient or at least Pareto improvement. The procedure to estimate the economic benefits of ecosystems and biodiversity draws on the measures of these welfare changes. These measures are known as equivalent surplus (ES) or compensating surplus (CpS) reflected by the public's WTP. The two surpluses are variations of welfare measures besides the commonly used consumer surplus (CS). Since the objective of this study is to elicit the public's appreciation to stop further degradation to the recreational services of Taman Melawati Hill, the ES (WTP) is estimated.

Contingent Valuation

To elicit the ES (WTP) of the hill, the contingent valuation (CV) technique is employed. CV is an economic and environmental valuation technique which uses a surrogate market by directly eliciting consumers' preferences and WTP for some proposed market conditions which offer potential improvements or avoid potential damages. It is grouped under the family of non-market environmental valuation stated preference technique, which aims to quantify the environmental goods or services of non-market attributes (e.g. improved waste disposal technology or water sanitation) into monetary or market values. CV elicits the maximum WTP of individual respondent to obtain improvement or avoid damages on environmental goods and services in a hypothetical market (Stellar, Stoll & Chavas, 1985; Bergstrom & Stoll, 1989).

The CV technique has been widely used to estimate WTP due to its flexibility in application, allowing it to value almost everything. It can even value goods and services with no observable behavior but which are easily understood and identified by respondents. The direct approach of eliciting the WTP through survey interviews to obtain improvement

or abstain from degradation of environmental goods and services provides defensible estimates which are easy to analyze and describe. CV is famously used to value total economic value, including the use and non-use values of an environmental good or service. CV has been used to value public goods and biodiversity in all facets, like wilderness and landscape preservation and biodiversity (Adam et al., 2008; Broberg & Brannlund, 2007; Lee & Mjelde, 2007; Sattout, Talhouk & Caligari, 2007; Amirnejad, Khalilian, Assareh & Ahmadian, 2006; Cho, Newman & Bowker, 2005; Lienhoop & MacMillan, 2005; Barnes, Schier & Rooy, 1997; Kramer & Mercer, 1997), preservation of historical artifacts (Whitehead & Finney, 2003; Chambers, Chambers & Whitehead, 1996), water quality (Blaine & Smith, 2006; Tapvong & Kruavan, 2003; Du, 2003), wetlands (Chang, Yoo & Kwak, 2004; Jamal, Bennett & Blamey, 2004), recreational services (Dayang Affizzah, Alias & Siti Baizura, 2006; Alias & Juwaidah, 2005).

Although CV has been widely used in economic valuation, critics are skeptical of its ability to accurately and adequately measure the WTP for any environmental goods or services (Diamond & Hausman, 1994). However, the CV results can be reliable if the recommendations reported by The National Oceanic and Atmospheric Administration's (NOAA) Panel are closely followed. The validity and accuracy of CV can be further enhanced by respondents' familiarity with the issues at hand and with interviews conducted by well-trained interviewers (Yoo & Kwak, 2009). This paper follows these conditions as closely as possible to ensure reliability of the findings.

The Proposed Policy

This study proposes a preservation and conservation scheme for Taman Melawati Hill to maintain its current state and mitigate any degradation to its ecological system. A *Taman Melawati Hill Trust Fund* will be set up and governed by a trustee under the umbrella of a non-governmental body in the country. This fund will aid conservation projects in sustaining the hill's natural capacity for flood mitigation watershed protection and air pollution mitigation and as a habitat for animals, flora and fauna. The fund will also help to maintain and upgrade basic infrastructures in the hill area.

The WTP of the public towards this trust fund would reveal their appreciation of the hill's recreational and services values. These values can serve as valuable information for policy-makers especially the state government and local council in approving future developmental projects in this area.

Questionnaire Design and Survey

The CV questionnaire consists of three main parts focusing on the environmental attitudes and concerns of the respondents, the CV question and socioeconomic characteristics of the respondents. The households at the hill area are the unit of analysis for this study.

Before the CV question was presented to the respondents, a description of the survey site was given and the proposed policy to stop degradation of the ecosystem was explained. The interviewees were asked introductory questions such as the ranking of a series of socioeconomic and environmental issues according to importance, their involvement in environmental organizations, and activities they normally do at the hill area.

After the interviewers had explained the ecological contributions of the hill to the respondents, pictures of flora and fauna and wild animals found at Taman Melawati Hill were shown. This served to give a clearer understanding of the potential loss that would result from future degradation of the hill to the interviewees.

The respondents were then informed of the proposed policy and were asked to reveal their maximum WTP into a trust fund for preservation and conservation of the hill. The open-ended CV format was used in this study and it allowed respondents the full autonomy to state their maximum WTP. Enumerators were warned not to influence the respondents in choosing the values of WTP to minimize "starting-point" bias. The respondents were told explicitly that if they decided to make a contribution to the proposed plan, it would mean reducing their disposal income. If they were willing to donate, they would have to make their monthly, quarterly, bi-annually or annual contribution through direct debit of their banking accounts or credit cards. The respondents were then asked for their maximum WTP.

Open-ended questionnaires do not constraint respondents' answers because no category is given (Whitehead & Finney, 2003). Responses to open-ended questionnaires appeared not to be biased (O'Conor, Johannesson & Johansson, 1999) and are likely to yield lower estimates of central tendency and smaller standard errors (Boyle et al., 1996). The pen-ended approach remains a common method to adopt a conservative approach in relation to the application of the findings to policy making although it undervalues the environmental goods or services (Cummings, Brookshire & Schulze, 1986). However, it is recognized that the open-ended CV would put pressure on the respondents to state their WTP and this gives rise to high level of protest bids (Yoo & Kwak, 2009). However, to minimize this concern, enumerators were told to give sufficient time and space for the respondents to think carefully of their WTP.

The CV question posed to the respondents followed that of the conventional question used in past studies; "*What is the maximum amount that you are willing to donate to the Taman Melawati Hill Trust Fund for conservation and preservation projects?"* (Please refer to Appendix A).

Following the key WTP question, socio-demographic information about the respondents and their households were recorded. These include asking questions about age, gender, household income and other items.

Survey interviews were done on 100 households at the hill area. The interviews were conducted on heads of households, normally the *father*, or in his absence, the *mother* or any adults in the family who had purchasing decision and income. Otherwise, the household would be skipped.

The finalization of the questionnaire was done after a pre-test was conducted to check if the questions and proposed policy could be understood and were acceptable. After taking the feedback into consideration, improvements were made to the questionnaire before the actual survey was launched.

The survey was conducted by face-to-face interviewing as other methods, such as mail or telephone interviews, could not allow the interviewers to explain the actual issue in detail and clearly to the interviewees. Face-to-face interviews were anticipated to obtain more accurate and complete responses. The average time to complete the questionnaire was about 20 to 30 minutes. The interviewers were properly trained through mock interviews and they

visited the survey sites to help them to understand the location before the actual surveys were administered.

Concerns of Using Contingent Valuation

CV respondents may not be familiar with the environmental goods posed to them for WTP elicitation. This information bias would influence their stating of the true monetary values. Besides, these respondents may have just revealed their opinions based on the scenario given to them rather than expressing value for the goods. Respondents may state agreement to WTP to show their support for environmental protection in terms of preservation and conservation, but not the monetary values they give to the environmental good itself. In the interview process, enumerators reminded the respondents on this issue to minimize the bias.

This valuation technique is posed with several issues of biases. Hypothetical bias occurs when the actual payments by the respondents are lower than the hypothetical values pledged (List & Gallet, 2001). The choice of payment vehicles like taxes, annual house assessment or even direct debit from respondents' credit cards may minimize this bias as they would have to honor the value they pledged. Strategic bias occurs when CV respondents supply answers which are biased in order to influence some outcomes of their personal agenda. The interviewers can only try to minimize this bias by constantly reminding the respondents that the proposed policy should be of public interest and general welfare.

MODEL SPECIFICATION AND RESULTS

The WTP is regressed on the socio-economic variables using the ordinary least square (OLS) model to reveal the mean WTP and identify factors that significantly explained WTP. The model specification is as follows:

$$ln\ WTP = \alpha + \beta_1 U + \beta_2 ENV + \beta_3 G + \beta_4 lnA + \beta_5 M + \beta_6 R + \beta_7 O + \beta_8 TP + \beta_9 EDU + \beta_{10}\, lnINC$$

where U= user of recreational services of the hill, ENV= member of environmental organization, G= gender, A= age, M= marital status, R= race, O= occupation, TP= type of profession, EDU= educational level and INC= monthly household income.

WTP Responses and Findings

The descriptive statistics of the respondents are shown in Table 1 for a better understanding of the sample interviewed.

The respondents ranked environment at the middle level of importance with crime protection as the top concern and defense as the lowest concern among the eight socio-economic objectives. However, interestingly, concern for hill preservation was ranked at the higher end among the eight environmental issues. This shows that while environment may not be an important concern, hill preservation is still of importance to the public. Table 2

shows the ranking of the importance of socio-economic indicators and Table 3 shows the ranking of concern of environmental issues. The ranking is based on a lower mean at a higher ranking on a scale of 1 to 8.

Table 1. Descriptive Statistics of Respondents

Variable	Average	Mean
User of recreational services	User	0.62
Member of environmental organization	Non-member	0.23
Gender	Female	1.4
Age	44	3.79
Marital status	Married	1.8
Race	Chinese	1.97
Occupation	Own business	3.37
Type of profession	Professionals	0.82
Educational level	Tertiary first degree	4.23
Monthly household income	MYR7,500	2.08

Table 2. Ranking of Socio-economic Objectives

Socio-economic indicators	Mean
Crime protection	2.75
Public education	2.98
Poverty	3.85
Unemployment	4.20
Environment	4.39
Public health services	4.44
Housing	5.90
Defense	7.44

Table 3. Ranking of Environmental Issues

Socio-economic indicators	Mean
Water pollution	2.67
Air pollution	2.83
Preservation of hills	3.97
Deforestation	4.45
Solid waste management	4.53
Landslides	4.79
Extinction of wild plants/animals	6.05
Noise pollution	6.67

Analysis of the WTP responses shows that 65 percent agree while 35 percent disagree to donate to the preservation cause. Those votes which are not WTP are considered as

protest bids. In most CV studies, protest bids are excluded from the computation of the mean WTP as they are not indicative of the respondents 'true' values.

The sample mean WTP shows that on average, people are WTP MYR25.00 per month for the proposed policy of preserving and conserving Taman Melawati Hill. The median WTP is MYR15.00 and this indicates that the majority of the respondents are supporting the proposed policy at higher levels of WTP. This can be explained by the nature of the hill being the last green lung in the area and the implicit values that the hill gives to the public staying around its vicinities.

Estimation Results and Discussions

The OLS regression results are shown in Table 4 and only three explanatory variables are significant, namely the user of the hill, gender, and household income. Users of the hill are WTP 69 percent more for every Malaysian Ringgit donated than non-user. Males are WTP about 36 percent less for every Malaysian Ringgit pledged than the females. The income elasticity of WTP is approximately 0.35 from the findings.

Table 4. OLS Regression Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.1333	1.4545	0.7792	0.4393
U	0.6911	0.2051	3.3695	0.0014*
ENV	0.1073	0.2162	0.4965	0.6216
G	-0.3631	0.1767	-2.0556	0.0447**
A	0.1763	0.4228	0.8757	0.3851
M	-0.2514	0.3005	-0.8366	0.4065
R	0.2071	0.1507	1.3744	0.175
O	0.0573	0.1013	0.5659	0.5738
TP	-0.0362	0.0995	-0.3643	0.7171
EDU	0.0828	0.0629	1.3163	0.1936
INC	0.3531	0.1383	2.5536	0.0135**
R-squared	0.4737			
Adjusted R-squared	0.3763			
F-statistic	4.8603			
Prob(F-statistic)	0.0000			
VIF	1.9000			

* denotes statistically significant at the 99 % level of confidence
** denotes statistically significant at the 95 % level of confidence

The adjusted R^2 denotes that about 38 percent of variation in WTP is explained by the independent variables. This model fit is acceptable as a minimum adjusted R^2 of 15 percent

is recommended (Mitchell & Carson, 1989). Besides, this model is free from serious multicollinearity problem as shown by the VIF value. A Ramsey specification test has been analyzed and the model is found to be free from mis-specification with probability-F value of 0.077.

The actual mean WTP estimated from the OLS model is MYR92.40 per annum (or MYR7.70 per month). The estimation is comparable to the findings of related works on recreational and environmental conservations in Malaysia. A study of Bako Recreational Park by Dayang Affizzah et al. (2006) reported an individual's WTP of MYR7.66 per month.

With the actual mean WTP value, the total economic value (TEV) can be estimated by multiplying the value with the percentage of respondents who are WTP and total households in the state of Selangor Darul Ehsan (please refer to Appendix B). According to the General Report of Population and Housing Census 2000, there are 858, 900 households in Selangor. This TEV computation is based on the state level where the hill is located. Thus, the TEV of Taman Melawati Hill is MYR51.6 million per annum. This present value would be worth MYR93.2 million in 20 years' time when compounded at a rate of 3 percent. The National Oceanic and Atmospheric Administration (NOAA) adopts this rate as the social rate of time preference in the computation of future values

SUMMARY AND POLICY IMPLICATIONS

The aim of this study is to estimate the economic values of public preferences for sustainable hill recreational services. Taman Melawati Hill has been used as the case study. The open-ended CV technique is employed on selected households around the vicinity of the hill area.

This study has obtained the households' WTP to preserve and conserve Taman Melawati Hill from further degradation. In general, households value the proposed policy to maintain the serenity of the hill. They are willing to donate to the trust fund which will mitigate any degradation to the hill's ecological system. This is consistent with the high ranking of hill preservation as one of the important environmental issues that should be given more attention.

To obtain this, the model suggests that the average households are WTP approximately MYR92.40 per annum. This will give the hill a TEV of MYR51.6 million per year and if compounded for 20 years, a fair time period for hill sustainability initiative, the future value will be worth MYR93.2 million. The model also shows that usage of the hill recreational services, gender, and household income are some of the socio-economic variables that influence the household WTP towards the hill preservation efforts.

This study has demonstrated empirically the demand perspectives of hill recreational services values. The results from the study can be used by the local municipal council, state government and interested stakeholders to identify any mismatch between what the public wants and are WTP for hill recreational services and the desire to exchange the hill for modern developments. This way, a more comprehensive environmental and development policy can be identified, planned and implemented by the relevant authorities.

Appendix A

The Open-ended Contingent Valuation Question.

Taman Melawati Hill, located at the vicinity of Kuala Lumpur, is exceptionally rich in flora and fauna and species of mammals and birds. It is also a well-known place for recreational activities since it is the last green lung of Taman Melawati. Lately, a housing development project has been planned at the foothill of Taman Melawati Hill. The development may degrade the environment through land clearance which results in the loss of ecological heritage, unique flora and fauna, and the biodiversity conservation properties.

Suppose there is a proposed trust fund to preserve Taman Melawati Hill to ensure its environmental sustainability, are you willing to participate?

If yes, what is the maximum contribution that you are willing to donate to this cause?

RM _____ per month.

Appendix B

The following is the formula used to compute the total economic value of Taman Melawati Hill:

$$Total\ Economic\ Value\ (TEV) = Mean\ WTP \times \frac{Number\ of\ Respondents\ that\ willing\ to\ pay}{Total\ Respondents} \times Total\ Household\ in\ Selangor$$

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