



CONSERVATION OF FOREST RESERVE IN URBAN AREA: HOW MUCH RESIDENTS' WILLINGNESS TO PAY

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Abstract: *This paper applied contingent valuation to investigate the willingness-to-pay to conserve the Kota Damansara Forest Reserve. A total of 395 respondents were selected based on non-probability convenience sampling in Petaling Jaya Utara. The findings show that 390 respondents (99%) perceive that there is a need to conserve the KDFR. However, only 86% (340 respondents) are willing to contribute, while 14% (55 respondents) did not agree to contribute to the conservation of the KDFR area. Main reason that indicated by respondents were not willing to pay is that the conservation of the forest area and the development of the area were responsibility of the government. The frequency analysis shows that the WTP levels in terms of the entrance fee to KDFR range from RM0 to RM50 with the mean WTP at RM3.01. In 2011, the estimated benefits calculated based on the mean willingness to pay (WTP) is RM0.5 million. If there are proposals to charge (eg. in the form of tax) for the conservation of KDFR, the maximum amount found in this study is RM3.98 per entry, this value can be used by the authorities to determine the appropriate conservation fees. The findings in this study could be used in the management, operation and policy development of KDFR and other similar resources in Malaysia. Therefore, there is the need to include economic valuation as a tool in any decision making process in connection with environmental conservation.*

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INTRODUCTION

Kota Damansara Forest Reserve (KDFR) was gazetted as a Permanent Forest Reserve on February 18, 2010 covering an area of 320 hectares. KDFR serves as Recreational Forest, Education Forest and Research Forest, under the administration of the Selangor State Forestry Department and managed jointly with the local community and consumer groups. Apart from providing goods and services, KDFR also generate ecological services and functions to protect human welfare. The study conducted to assess conservation value of the KDFR by residents in Damansara.

The health of forests is fundamental to many of their environmental functions. Environmental issues are currently debatable in mass media and political globally. Most of the time natural resources are valued through timber and non-timber products which have monetary value. Other natural process and ecosystem services such as soil protection, carbon sequestration, biodiversity conservation and recreations are typically neglected in economic decision making. Economic value of the KDFR can be categorized as in Table 1.

Table 1: Economic valuation taxonomy for environmental goods and services

Direct Use Values		Indirect Use Values of Ecosystem Functions	Option Value	Non-Use (Existence and Bequest) Values
Productive Use Values	Consumptive use Values:			
<ul style="list-style-type: none"> • Commercial fishing • Commercial forest products • Ecotourism 	<ul style="list-style-type: none"> • Fuel wood • Subsistence dependence: <ul style="list-style-type: none"> - Traditional medicines - Food 	<ul style="list-style-type: none"> • Nutrient retention and maintenance of nutrient cycles • Sediment retention • Flood control • Regulation of climate • Absorption/decomposition of pollutants 	All direct and indirect uses in the future, which involve some uncertainty.	All values not associated with direct or indirect human uses.

Adopted from: Mohd Shahwahid, H.O. (1999)

Environmental economists have developed a classification of values of the various goods and ecological services provided by the forest using several methods which are price-based, surrogate market, constructed market, and cost-based valuation. Economic valuation has a huge aspects need to be considered. However, this paper focuses on conservation value which will be measured using willingness to pay (WTP) of residents in Damansara. It



highlights the perception of residents towards conservation of KDFR and the findings are important for future plan and development of KDFR.

LITERATURE REVIEW

Forest Community in Kota Damansara restores species of flora & fauna, as well as providing new opportunities for urban community for leisure, recreation and education. High provision of recreational opportunities activities in people's living environment has generally been found to promote active living that includes participation in recreation (Henderson and Bialeschki, 2005). Socioeconomic status can affect an individual's type of recreational involvement (Bell et al., 1990). With hectic lifestyle nowadays, people are preferred spend their time to visit shopping centres or foreign travel rather than others activities including forest recreation. Studies from Kramer and Mercer (1997) and Horton et al. (2003) show that family size, gender, education and income have an influence on tropical forest conservation.

One of the key success factors for sustainable conservation is the level of awareness and appreciations on the heritage value of the resources by stakeholders, particularly the local communities (Norzaini, Sharina & Ibrahim, 2009). Over the past two decades, the importance of understanding local communities's attitudes, needs and aspirations has been widely acknowledged by researchers, donors, conservation agencies and protected area authorities. This acknowledgement comes from the recognition of local communities as the key factor for the success of any development and conservation agenda (Baldus, Kibonde & Siege, 2003). In 2010, study done by Norzaini, Sharina, Ong, Salsela & Ibrahim for the Langkawi Global Geopark. The findings show that local community awareness and understanding is dependent on the degree of their engagement in geopark activities. The results also suggest that more awareness programmes and dialogues as well as workshops could be organized by relevant authorities to increase better understanding of the geopark as well as encourage local participation in geopark-based activities.

METHODOLOGY

General Approach of the Study

Constructed/hypothetical market valuation using contingent valuation method was used for this study. Contingent valuation is a technique involving the construction of a hypothetical market in order to elicit the WTP or WTA as compensation involving the gain or loss of



environmental services respectively. The WTP is an indicator of demand and was applied by this technique. This method enables respondents to state how they would act if they were placed in certain contingent situations. In this study, the respondents household were asked their maximum WTP for the preservation of KDFR resources.

Model Formulation for WTP Estimation

A linear model using OLS method was employed in order to determine the variables governing the amount of money an individual is willing to pay for the preservation of the study area using maximum WTP figures as dependent variable against other independent variables, which can be expressed as;

$$WTP_i = \alpha + \beta_i X_i + \varepsilon_i \quad [1]$$

where, X_i is a vector of independent variables, and ε_i is a random error, assumed to be normally distributed with mean zero and common variance σ^2 , i.e. $\varepsilon_i \sim \text{iid } N(0, \sigma^2)$. The estimated regression model is:

$$\hat{WTP}_i = \hat{\alpha} + \hat{\beta}_i X_i \quad [2]$$

The average levels of the socio-economic and other explanatory variables were inserted into the OLS model to obtain the mean WTP. However, it should be noted that the mean WTP estimated from the OLS regression was biased upwards, as only respondents who had declared a positive WTP were included in the estimation. In order to take into consideration those who were supportive of conservation and yet not willing to state a positive WTP, a Tobit regression was performed.

The Tobit model is a regression model for censored distributions, i.e. distributions where there are no observations beyond a certain point, in this case zero. Following Wooldridge (2003), the Tobit model can be defined as follows:

$$WTP_i^* = \alpha + \beta_i X_i + \varepsilon_i \quad [3]$$

$$WTP_i = \max(0, WTP_i^*) \quad [4]$$

The latent variable WTP_i^* has a normal, homoscedastic distribution with a linear conditional mean. Equation [4] implies that the observed variable, WTP_i , equals WTP_i^* when $WTP_i^* \geq 0$, but $WTP_i = 0$ when $WTP_i^* < 0$. The marginal effects of changes in the independent variables were evaluated using the Tobit models at the mean values, which can be expressed as:



$$\text{OLS: } \frac{\partial E(WTP|X)}{\partial X_i} = \hat{\beta}_i \quad [5]$$

$$\text{Tobit: } \frac{\partial E(WTP|X)}{\partial X_i} = \hat{\beta}_i \Phi(X\hat{\beta}|\sigma) \quad [6]$$

where, $\Phi(X\hat{\beta}|\sigma)$ is the adjustment factor at the mean values of the X_i in order to make the Tobit estimates comparable with those of the OLS, i.e. coefficients obtained from direct estimates of $\partial E(WTP|X)/\partial X_i$. Since $\Phi(X\hat{\beta}|\sigma) = P(WTP > 0|X)$, equation [5] shows that the adjustment factor approaches one as $P(WTP > 0|X)$ approaches one. Because this is a value of the standard normal cumulative distribution function, it is always between zero and one. The elasticity, e , is given by:

$$\text{OLS: } e = \hat{\beta}_i \cdot \frac{\bar{X}}{WTP} \quad [7]$$

$$\text{Tobit: } e = \frac{E(WTP|WTP > 0, X)}{\partial X_i} \cdot \frac{X_i}{E(WTP|WTP > 0, X)} \quad [8]$$

As mentioned above, there were two models involved in the WTP estimation. The models were linear models called ordinary least squares (OLS) model and the Tobit model which were employed in determining the variables governing the amount of willingness to pay for the maximum WTP figures as dependent variable. The average levels of the independent variables were inserted into the OLS model to obtain the mean of WTP. The mean WTP values using the estimated coefficient of each of the model were calculated.

Questionnaire design and sampling procedure

Surveying households is done by using a structured questionnaire, the primary data. Before the questions were asked, the respondents were briefed on the objectives and the purpose of the survey. The questionnaire was administered in a single interview with every respondent.

This study used primary data collected through 3 pages standard questionnaire which were circulated to residents and face-to-face survey at retail shops and shopping malls. The questionnaire consists of 2 sections: Section A on resident' views and willingness to pay (WTP) for conservation; and Section B on personal information/background. Interviewers were shown satellite image of KDFR, picture of land use changes and several activities



conducted in KDFR to respective respondents before to start interview them. An interviewing session for a respondent took about 30-40 minutes. They were selected based on non-probability convenience sampling in order to get a broad perspective of population.

Sampling Frame

Sampling frame for the study based on 34,898 size of population in four areas in Petaling Jaya Utara. Based on Yamano (1985), number of sample should be 395 respondents, and following to stratified random sampling, expected sample size by area as shown in Table 2.

Table 2: Sampling size by area

NO	SEKSYEN	AREA	Number of population (2009)*	Expected number of sample	Actual number of sample
1	PJU 5	Kota Damansara	20,165	228	195
2	PJU 7	Mutiara Damansara	1,476	17	18
3	PJU 8	Damansara Perdana	8,651	98	23
4	PJU 10	Damansara Damai	4,606	52	70
		Others	92,329	-	89
		Total	127,227	395	395

*Source: Petaling Jaya City Council (MBPJ)

RESEARCH FINDINGS AND DISCUSSION

Profile of respondents

Table 3 shows the distribution of respondents by gender. There are 209 respondents (53%) are male while 186 respondents (47%) are female. In term of marital status, distributions of respondents also almost similar with 224 respondents (57%) are married and 171 respondents (43%) are single (Table 4). Overall as many as 36% and 27% of respondents are grouped in age range of 20-29 years and 30-39 years respectively (Table 5). Only 12 respondents (3%) are aged more than 59 years. In term of area of growing up, 167 respondents (42%) are in urban area, followed by rural with 136 respondents (35%) and 92 respondents (23%) in sub-urban area (Table 6).



Table 3: Gender of respondents

Area	Male	Female	Total
Kota Damansara	108 (52)	87 (47)	195 (49)
Mutiara Damansara	12 (5)	6 (3)	18 (5)
Damansara Perdana	10 (5)	13 (7)	23 (6)
Damansara Damai	35 (17)	35 (19)	70 (18)
Others	44 (21)	45 (24)	89 (22)
Total	209 (53)	186 (47)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value

Table 4: Marital Status of respondents

Area	Married	Single	Total
Kota Damansara	111 (50)	84 (49)	195 (49)
Mutiara Damansara	8 (4)	10 (6)	18 (5)
Damansara Perdana	19 (8)	4 (2)	23 (6)
Damansara Damai	36 (16)	34 (20)	70 (18)
Others	50 (22)	39 (23)	89 (22)
Total	224 (57)	171 (43)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value

Table 5: Age group of respondents by area

Age Group	Kota Damansara	Mutiara Damansara	Damansara Perdana	Damansara Damai	Others	Total
Less than 20 years	29 (15)	4 (22)	3 (13)	4 (6)	1 (1)	41 (10)
20-29 years	62 (32)	4 (22)	4 (17)	32 (46)	38 (43)	140 (36)
30-39 years	39 (20)	5 (28)	11 (48)	21 (30)	32 (36)	108 (27)
40-49 years	35 (18)	5 (28)	2 (9)	6 (8)	10 (11)	58 (15)
50-59 years	25 (13)	-	2 (9)	3 (4)	6 (7)	36 (9)
More than 59 years	5 (2)	-	1 (4)	4 (6)	2 (2)	12 (3)
Total	195 (49)	18 (5)	23 (6)	70 (18)	89 (22)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value



Table 6: Area of growing up of respondents

Area	Urban	Sub-urban	Rural	Total
Kota Damansara	94 (56)	36 (39)	65 (48)	195 (49)
Mutiara Damansara	9 (5)	7 (8)	2 (1)	18 (5)
Damansara Perdana	5 (3)	5 (6)	13 (10)	23 (6)
Damansara Damai	25 (15)	17 (18)	28 (21)	70 (18)
Others	34 (21)	27 (29)	28 (20)	89 (22)
Total	167 (42)	92 (23)	136 (35)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value

Table 7 shows the highest educational attainment of respondents. A total of 158 respondents (41%) achieved the high secondary school level. Followed by 80 respondents (20%) have professional certificate/diploma. Only 5 respondents (1%) do not have formal education. Majority of respondents (60%) are working in private sector and 62 respondents (16%) have their own business (Table 8).

Table 7: Highest educational attainment of respondents

Level of education	Kota Damansara	Mutiara Damansara	Damansara Perdana	Damansara Damai	Others	Total
No formal education	2 (1)	-	1(4)	1 (1)	1 (1)	5 (1)
Primary	10 (5)	1(6)	4 (17)	5 (7)	-	20 (5)
Lower secondary	28 (14)	1 (6)	3 (13)	7 (10)	6 (6)	45 (11)
High Secondary	75 (39)	8 (44)	5 (21)	39 (56)	31 (34)	158 (41)
Prof.certificat e/ diploma	35 (18)	6 (33)	6 (26)	13 (19)	20 (23)	80 (20)
Bachelor degree	29 (15)	2 (11)	3 (13)	4 (6)	20 (23)	58 (15)
Master	11 (6)	-	-	1 (1)	9 (10)	21 (5)
PhD.	5 (2)	-	1(4)	-	2 (2)	8 (2)
Total	195 (49)	18 (5)	23 (6)	70 (18)	89 (22)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value



Table 8: Types of respondents' work by area

Types of work	Kota	Mutiara	Damansara	Damansara	Others	Total
	Damansara	Damansara	Perdana	Damai		
Government	12 (6)	2 (11)	5 (23)	7 (10)	15 (17)	41 (10)
Private	111 (57)	11 (61)	12 (52)	42 (60)	62 (70)	238 (60)
Own business	42 (22)	4 (22)	-	9 (13)	7 (8)	62 (16)
Retiree	5 (2)	-	-	1 (1)	1 (1)	7 (2)
Unemployed	-	-	1 (4)	-	-	1 (0)
Student	14 (7)	-	1 (4)	3 (4)	1 (1)	19 (5)
Housewife	8 (4)	1 (6)	3 (13)	4 (6)	-	16 (4)
Others	3 (2)	-	1 (4)	4 (6)	3 (3)	11 (3)
Total	195 (49)	18 (5)	23 (6)	70 (18)	89 (22)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value

Conservation and willingness to pay

A total of 264 respondents (67%) were never visited KDFR and only 131 respondents (33%) did visited KDFR (Table 9). Table 10 shows that 390 respondents (99%) perceive that there is a need to conserve the KDFR. However, only 86% (340 respondents) are willing to contribute, while 14% (55 respondents) did not agree to contribute to the conservation of the KDFR area (Table 11). Main reason that indicated by respondents were not willing to pay is that the conservation of the forest area and the development of the area were responsibility of the government. Any improvement of the facilities and services will benefit them without the need for them to pay. The respondents might have considered that they did not need to pay or contribute to the conservation of the KDFR since they were already doing so through their income tax deductions.

Table 9: Status of visited KDFR

Area	Have visited KDFR		Total
	Yes	No	
Kota Damansara	84 (64)	111 (41)	195 (49)
Mutiara Damansara	6 (5)	12 (5)	18 (5)
Damansara Perdana	10 (8)	13 (5)	23 (6)
Damansara Damai	10 (8)	60 (23)	70 (18)
Others	21 (16)	68 (26)	89 (22)
Total	131 (33)	264 (67)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value



Table 10: Perception towards conservation of the KDFR

Area	Perception		
	Need to conserve	to Do not need to conserve	Total
Kota Damansara	195 (50)	-	195 (49)
Mutiara Damansara	18 (5)	-	18 (5)
Damansara Perdana	23 (6)	-	23 (6)
Damansara Damai	66 (17)	4 (80)	70 (18)
Others	88 (22)	1 (20)	89 (22)
Total	390 (99)	5 (1)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value

Table 11: Willingness to contribute for conservation of the KDFR

Area	Yes	No	Total
Kota Damansara	170 (50)	25 (45)	195 (49)
Mutiara Damansara	13 (4)	5 (9)	18 (5)
Damansara Perdana	22 (7)	1 (2)	23 (6)
Damansara Damai	59 (17)	11 (20)	70 (18)
Others	76 (22)	13 (24)	89 (22)
Total	340 (86)	55 (14)	395 (100)

Source: Actual survey (2010)

Note: Figures in parentheses refer to percentage value

The frequency analysis shows that the WTP levels in terms of the entrance fee to KDFR range from RM0 to RM50 and is summarized in Table 12. The frequency analysis also shows that the mean WTP of the entrance fee of KDFR for this study is at RM3.01.

Table 12: WTP levels

WTP Levels (RM)	Overall (%)
0 (free entry)	12.5
0.5-2	54.0
2.5- 4	6.4
4.5 – 6	18.9
6.5 – 10	6.9
10.5 – 15	0.3
>15	1.0
Total	100

The results for the linear models which estimated using OLS are presented in Table 13. According to the results, the variables measuring single status (SINGLE), environmental protection is the government responsibility (ENVGOVRES), low energy consumption



contribute to reduce global warming (ENERREDGWARM) and read magazine related to the environment (READMAG) are all with the anticipated signs, except for the variable KDFR's contribute to climate change (CONTCLIMATE). The R^2 is the coefficient of multiple determination which measures the goodness of a general linear model to fit a set of data. The measurement of R^2 value is between 0 and 1. For the value of R^2 closer to 1, the variables are strong. However, if the value of R^2 is nearer to 0, the model does not fit the data well. From the analysis, the R^2 is 0.069 indicating that 6.9% of the variance in the dependent variable is explained by the independent variables in the model. However, the F statistics test is used to test the significance of the function as a whole in contributing to the variance in dependent variable.

The results indicate that the respondents with a positive perception to the low energy consumption in daily life and people from the single status group (as indicated by ENERREDGWARM and SINGLE) would be willing to pay more. Besides that, the positive perception regarding the responsibility of conserving the natural environment would also lead to the support of the contingent valuation scenario with higher WTP. For the people who constantly keep abreast of environmental issues through reading (as indicated by (READMAG), respondent who have and experience and knowledge about natural environment would be willing to pay more.

Table 13: Estimated parameters of the linear model for the preservation of KDFR

Variable	Ordinary Least Square (OLS)		Tobit model	
	Coefficient	Coefficient	Marginal effect	Elasticity
Constant	6.913 (1.686)	6.938 (1.687)		
SINGLE	1.235 (0.519)**	1.264 (0.519)**	1.264 (0.519)**	0.318
CONTCLIMATE	-5.413 (1.371)***	-5.508 (1.372)***	-5.5077 (1.372)***	1.389
ENVGOVRES	-1.058 (0.631)*	-1.109 (0.631)*	-1.1087 (0.631)*	0.279
ENERREDGWARM	1.015 (0.749)	0.986 (0.749)	0.986 (0.749)	0.249
READMAG	1.290 (0.877)	1.393 (0.882)	1.3934 (0.8817)	0.352
No. of obs. (n)	329	329		
R^2	0.069			
Pseudo R^2		0.012		
F Value	4.77			



Note: Standard errors in parentheses

* denotes significant at the 10% level ($p < 0.10$)

** denotes significant at the 5% level ($p < 0.05$)

*** denotes significant at the 1% level ($p < 0.01$)

The estimated coefficients from the Tobit model are reported also in Table 13. Basically, the results obtained from the Tobit model are similar to those of the OLS in terms of expected sign of coefficients. A Tobit regression is important, especially for aggregation purposes and was employed in order to take into account those respondents who were supportive of conservation but not willing to state a positive WTP. From the results, in terms of elasticity, it seems that respondents' WTP is sensitive to the KDFR's contribute to climate change. The elasticity with respect to KDFR's contribute to climate change is 1.389 (Table 13). This indicates that a one-percent increase in changes of climate leads to decrease in maximum WTP by 1.4%.

Measurement of the economic benefit of conserving KDFR

Approaches involved in estimating the mean WTP, which is the linear model, OLS and Tobit models. The estimated mean value is shown in Table 14 according to the model estimated using different approaches. Referring to the estimates obtained from all respondents, the mean WTP for the OLS model is RM3.98, On the other hand, model estimated through Tobit provide lower estimates to that of OLS models, of RM3.96.

Table 14: Mean WTP estimated for the sample

Model	Mean WTP (RM)
OLS	3.98
Tobit	3.96

In order to aggregate the WTP for the conservation of KDFR, willingness to pay (WTP) of individuals obtained from the analysis were multiplied by the number of households on various conducted sampling areas. The annual conservation value or benefit to KDFR is based on the mean WTP calculated from the models (OLS and Tobit model). Table 15 shows the annual benefits from preservation / conservation of KDFR.



Table 15: Estimated benefits (RM) of conservation KDFR based on Mean OLS and Tobit

Year	Number of households	Analysis	
		Model Tobit WTP = RM3.96	Model OLS WTP = RM3.98
2011	127,227	RM 503,819	RM 506,363

In 2011, the estimated benefits calculated based on the mean willingness to pay (WTP) for OLS model is about RM0.51 million. However the value for tobit model was RM0.50 million. If there are proposals to charge (eg. in the form of tax) for the conservation of KDFR, the maximum amount found in this study is RM3.98 per entry, this value can be used by the authorities to determine the appropriate conservation fees.

POLICY IMPLICATIONS

The most significant policy implication of this study concerns the conservation fee and revenue mechanism for KDFR. This study found the mean WTP to range between RM3.96 and RM3.98, which could contribute revenue of RM0.5 million in aggregate (based on the number of households in 2011). The revenue collected would be useful in improving the management and maintenance of KDFR resources.

The other policy implication based on the findings of this study was that the respondents were only willing to pay if the collection was to be channeled back to improve the management of the KDFR resources. This means that the conservation charge collected from the household needs to be used for the development of KDFR only.

CONCLUSION

It is important to recognize and realise that the various ecosystems do have economic values which need to be included in the decision-making process when making development plans, developing management plans for natural resources. Worldwide, there is increasing realization of the need to include environmental considerations in investment and planning decisions as well as integrating economic concerns into nature conservation by means of economic valuation.

There is a need to continuously raise awareness among the decision-makers and officers on the use of economic valuation studies as input to decision-making in connection with



environmental conservation. The use of economic valuation will provide useful input in the short, medium and long-term decision-making processes.

The findings in this study could be used in the management, operation and policy development of KDFR and other similar resources in Malaysia. Therefore, there is the need to include economic valuation as a tool in any decision making process in connection with environmental conservation. Further research should be conducted on cost benefit analysis of KDFR to provide better framework for assessing the KDFR in holistic point of view by comparing conservation value of KDFR with value of project development on KDFR.

REFERENCES

1. Baldus, R., Kibonde, B., & Siege, L. 2003. Seeking conservation partnership in the Selous Game Reserve, Tanzania. *Parks* 13, no. 1:50-61
2. Bell, P.A., Fisher, J.D., Baum, A., Greene, T.C., 1990. *Environmental Psychology*. Harcourt Brace Jovanovich College Publishers, New York.
3. Henderson, K.A., Bialeschki, M.D., 2005. Leisure and active lifestyles: research reflections. *Leisure Sciences* 27 (5), 355-366.
4. Horton, B., Colarullo, G., Bateman, I.J., Peres, C.A., 2003. Evaluating non-users willingness to pay for a large scale conservation programme in Amazona: a UK/Italian contingent valuation study. *Environmental Conservation* 30 2), 139-146
5. Kramer, R.A., Mercer, E., 1997. Valuing a global environmental good: U.S. residents's willingness to pay to rotect tropical rain forests. *Land Economics* 73 (2), 196-210.
6. Mohd Shahwahid, H.O. 1999. Chapter 1-Role of valuation in economic analysis of peat swamp forests: theory and empirical evidence. Pp. 1-13 in *Manual on economic valuation of environmental goods and services of peat swamp forest*. Malaysian-DANCED project on sustainable management of peat swamp forests, Peninsular Malaysia.
7. Norzaini, A., Sharina, A.H. & Ibrahim, K., 2009. Integrated Public Education for Heritage Conservation: A case for Langkawi Global Geopark. In Ainsworth G & Garnett Stephen, S. (Editors) (2009). *RIMBA: Sustainable Forest Livelihoods in Malaysia and Australia*. LESTARI, UK:Bangi. Pp. 151-157.



8. Norzaini, A., Sharina, A. H., Ong, P.L., Salsela, S. & Ibrahim, K., 2010. Public Education in Heritage Conservation for Geopark Community, 510 pp
9. Yamano, J.F. 1985. *Statistic: a tool for social research*. Wadsworth Publishing, USA.