The Existence Value of Peat Swamp Forest in Peninsular Malaysia

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By

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Abstract

Forests form the dominant natural ecosystem in Malaysia. About 55% of Malaysian land area is forested and endows a rich diversity of flora and fauna. Peat swamp forests constitute a significant component of forest and account for about 75% of the country's total wetlands. Many peat swamp forests have already been converted to new land uses including palm oil plantations, agriculture and housing. The south-east Pahang peat swamp forest (SEPPSF), located at Pahang state is the largest peat swamp forest cover in Peninsular Malaysia and is believed to be the mainland Asia's largest and intact peat swamp forest. It harbours unique flora and fauna, provides benefits and services of national interest and supports the livelihood of the aborigines (*Orang Asli*) communities. Many of the benefits and services from peat swamp forests are unpriced and this can lead to faulty land use decision making. Non market valuation can provide important information on the value of many currently unpriced items and enable decision makers to consider the opportunity costs of proposed land use changes. Total economic value (TEV), which includes use and non-use values, is a complex method to determine the estimated total benefits for a tropical forest. This study reports on a contingent valuation study of existence value (non-use value) of the SEPPSF. The economic value is based on the mean maximum willingness to pay of the households in Kuantan (the capital city of Pahang state) to conserve the forest.

Key words: SEPPSF, economic value, CVM

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INTRODUCTION

The peat swamp forest of Malaysia

Worldwide, peat swamp forests (PSFs) have been estimated to cover around 350,000 km^2, occurs in a few areas in Africa and parts of Central America but most are located in South-East Asia (60%) (UNDP, 2006). PSFs are an important component of the world's wetlands which provide a variety of goods and services, both directly and indirectly, in the form of forestry and fisheries products, energy, flood mitigation, water supply and groundwater recharge. They are also important reservoirs for biodiversity. As a distinct ecosystem, many species are endemic to these environments.

The forest types of Peninsular Malaysia was described by Symington (1943) and further elaborated by Wyatt-smith (1964) (in Abdul Latiff and Faidah Hanum 1997) (Table 1). The classification is also applicable for Sabah and Sarawak.

Table 1. The rainforest types of Malaysia

Climatic climax forest	Edaphic forest
Lowland dipterocarp forest	Heath forest
Hill dipterocarp forest	Limestone hill forest
Upper dipterocarp forest	Forest over ultramafic outcrops
Montane oak forest	Beach stand forest
Lower ericaceous forest	Mangrove forest
Montane subalpine forest	Brackish water forest
Semi-evergreen seasonal forest	Peat swamp forest
	Fresh water swamp forest
	Seasonal swamp forest

Malaysian PSFs account for about 75% of the country's total wetlands. It is estimated about 1.54 million hectares are still remain, with 80% located at east Malaysia (Sarawak 73%; Sabah 8%) and 20% in Peninsular Malaysia. The state of Pahang has the largest area of PSFs in Peninsular Malaysia (Table 2).

Table 2. Estimated extent of peat swamp cover in Malaysia (2006)

State	Total area (hectares)
Selangor	76,000
Johore	13,000
Terengganu	13,000
Pahang	200,000
Sabah	120,000
Sarawak	1,120,000
Total	**1,542,000**

Source: UNDP (2006)

This forest type in Peninsular Malaysia has undergone rapid reduction since the 1980s. In 1981, the PSFs cover was estimated to be 0.67 million hectares but had halved to 0.34 million hectares in 1990s as more forested land was cleared for

agriculture, aquaculture, industry and residential schemes. An estimated of 302,000 hectares remains in Peninsular Malaysia of which 67% has been protected within Permanent Forest Reserves and the remainder are in stateland forests (UNDP, 2006). Almost all of the peat swamp forests within permanent forest reserves are designated production forests and are available for sustainable logging, while those within the stateland forests are generally available for conversion into other land uses as well.

The greatest threats to the Malaysian PSFs ecosystem are the large scale land conversion schemes into agriculture, urbanization, and infrastructure projects (Ng and Shamsudin 2001). Other threats to PSF are (Anon, 2007);

a) Hydrological problems resulting from the irreversible lowering of ground water tables which cause the loss of essential nutrients needed for plant growth

b) Unsustainable timber extraction which contributes to the loss of biological diversity and soil compaction, leading to severe damage of the PSF habitat

c) Unregulated hunting which contributes to the loss of animal species

d) Forest fire, resulting from current unregulated land-use practices

Considering many threats to the remaining PSFs in Peninsular Malaysia, the conservation and sustainable use of this forest remains a very important and critical issue which needs immediate attention, consideration and meticulous planning involving the interested stakeholders. The intangible benefits contribute by PSFs could override the price of overall PSFs value in monetary terms.

Total Economic Value (TEV) in forested wetlands

Making choices for biological diversity conservation is always complex, especially for a country endowed with a vast biodiversity. Economic valuation of biological resources and diversity is an important tool in making the right choices for conservation and sustainable development as it presents the opportunity costs of these resources in a future context. Arguments are often made that the failure to demonstrate economic values of the environment results in the systematic loss and degradation of the world's ecosystems (Adger et al. 2002; Pistorius 2007).

Pearce (1995) explained about the issue of measuring importance in a particular way with the application of economic value concept. Economists agreed that the importance is measured by people's preferences while the economic value is measured by the summation of many individuals' willingness to pay (WTP). Hence, economic valuation in the environment context is about measuring the preferences of people for an environmental good or against an environmental bad.

Total economic value (TEV) is used to define the estimated total benefits for a tropical forest. It includes use and non-use values. Use value is comprised of direct, indirect and option values while non-use value includes bequest and existence value. In brief, the components of TEV are (Pearce, 1993);

TEV = UV + NUV
Where, UV is use values and NUV is non-use values

UV is comprised of direct use value (DUV), indirect use value (IUV) and option value (OV).

UV = DUV + IUV + OV

Non-use values refer to existence value (EV) and bequest value (BV)

NUV = EV + BV

Therefore,

TEV = UV + NUV
     = (DUV + IUV + OV) + (EV + BV)

The total value of most wetland functions is often unknown and not seriously included in decisions regarding wetland use and conservation. The number of studies attempting to value the partial or total economic value of wetland sites is on an increasing trend and gaining attention of policy makers.

Integrated models can provide detailed information about the ecohydrological consequences and associated economic costs and benefits of land use policies. Valuation studies can provide insights about the loss of nonuse values associated with particular policies. Moreover, such values can be used to support economic accounting modules in integrated wetland models. The framework of the integrated model of wetland is summarized in Figure 1.

In the case of peat swamp forest, the economic value can be classified as explicit use benefits and implicit non-use benefits. Use benefits comprise of (AGPS, 1995):

1) productive activities such as log production
2) physical use of the environmental service such as recreational fishing and
3) benefits unaccompanied by market exchanges or explicit activities such as benefits that individuals derived from admiring an aesthetic landscape.

On the other hand, non-use benefits refer to all values that not associated with direct or indirect human uses (i.e. existence and bequest value).

Figure 1. Connections among wetland functions, uses and values
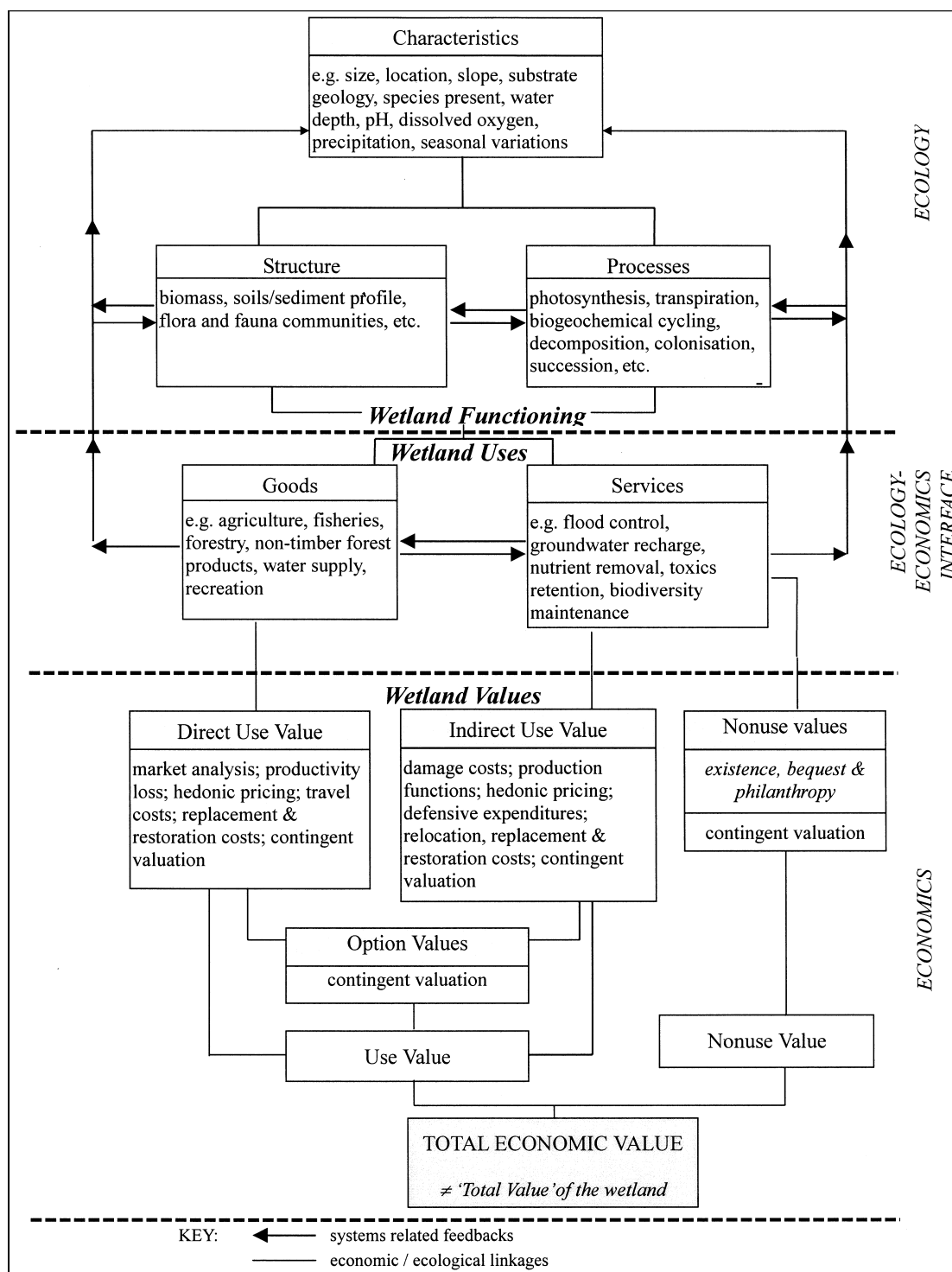
Source: Turner et al. 2000

Existence value

Existence value is one of the component of non-use values besides vicarious value, option value, quasi-option value, and bequest value which relates to valuation of the environmental asset unrelated to either current or optional use or may be held by residents who do not intend to visit the area (AGPS, 1995). Most people reveal their WTP for the existence of environmental assets without taking part in the direct use of the resources in question. The value is also defined as the value of people expressed their WTP simply for the knowledge that the asset exists and captures people's desire of conserving the environmental resources even though they never intend to use them (Van Kooten and Folmer 2004; McNally and Mohd Shahwahid 2002).

The existence value can be measured empirically through questionnaire approaches (i.e. CVM) which suggested that existence value can be a substantial component of TEV. The existence value can be important, particularly where the object of valuation is unique (Pearce, 1993). Kramer et al. (2003) added that existence value has emerged as the most important non-use or passive use value associated with environmental resources.

Contingent valuation method (CVM)

Non-use values can be measured using stated preference methods whereby most researchers use one of two stated preference methods, namely CVM and attribute based method (ABM) to reveal non-market values of forest quality. Kramer et al. (2003) suggested that CVM remains an important tool for forest resource economists because forest ecosystems provides various goods and services which are not be easily separated.

The CVM is a method of estimating the non-market value of environmental attributes or amenities such as values of certain areas, endangered species, recreational opportunities, scenic resources and others. These values are generally measured based on the willingness to pay (WTP) for improved environment, the willingness to accept (WTA) compensation for damaged environment or to accept a condition of being deprived of the improved environment. The most appealing aspect of the CVM is that it allows estimation of total value rather than components of the total value itself (Bateman et al. 2002).

Basically, the respondents are asked to complete a questionnaire which includes questions on WTP to conserve an area. The aim of CVM is to elicit valuations that are as close as possible to what would be revealed if a market actually existed. By setting up a hypothetical market to establish monetary value for environmental goods and services, it is possible to estimate how much individuals would be WTP for an environmental benefit, or how much money they would be WTA for a loss of environmental good or service (McNally and Mohd Shahwahid, 2002; Jamal and Mohd Shahwahid 1999). It is quite difficult to measure prefect WTP, however, CVM appears to provide values that may resemble those generated by cash transactions (Bishop and Heberlein, 1987).

The inclusion of non market values in total value is an example of an emerging approach to decision making which is not purely based on marketed values of natural resources. The inclusion of non-market values for the environment or natural

resources in benefit cost analysis, can enable more comprehensive and sustainable management plan.

Objective of Study

The purpose of this paper is to estimate the economic value of the south-east Pahang peat swap forest (SEPPSF) based on the Kuantan's residents perspectives on the existence and importance of the forest.

Specifically, the objectives of the paper are;

1) to examine Kuantan resident's understanding of forestry issues in Malaysia

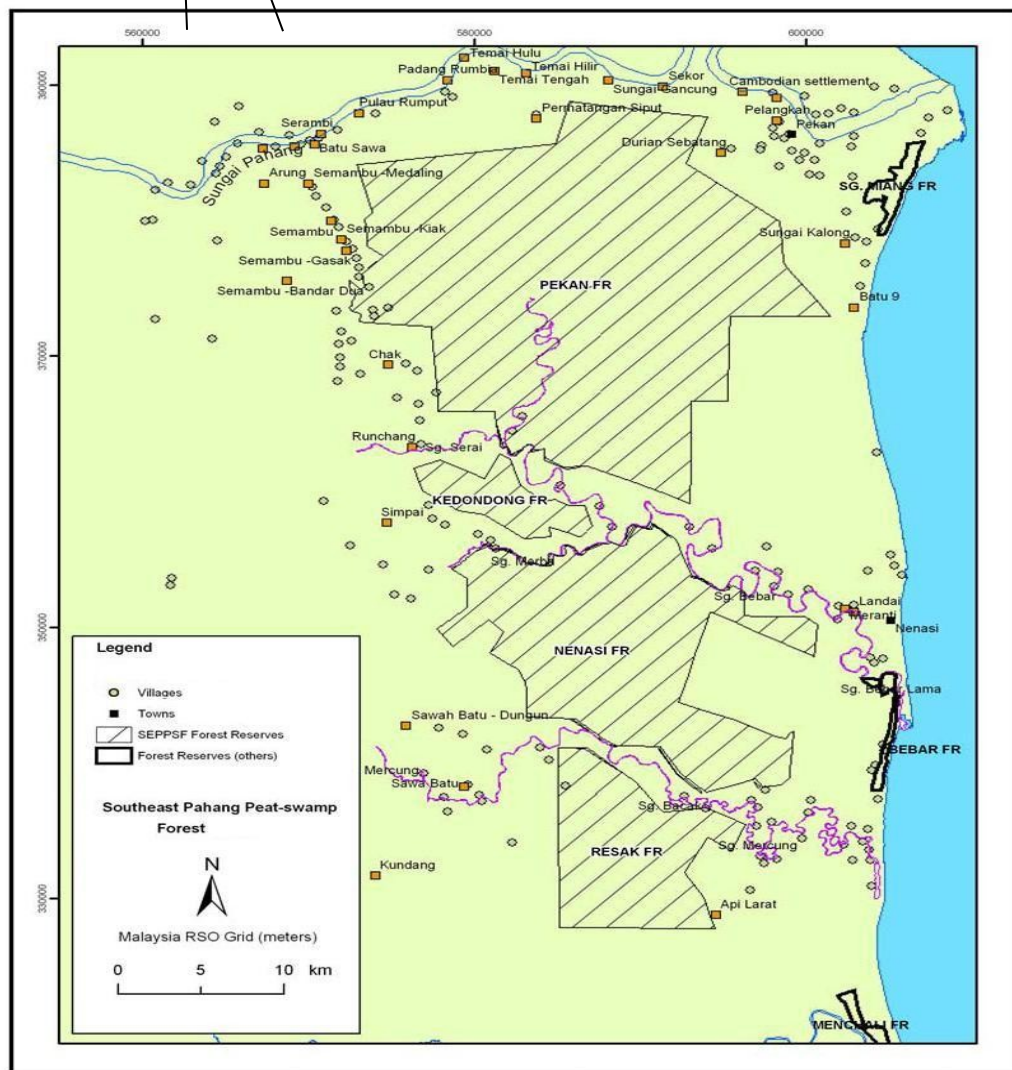2) to estimate the existence value of the south-east Pahang peat swamp forest (SEPPSF)

RESEARCH METHOD

Study area

The South-East Pahang Peat Swamp Forest (SEPPSF)

The SEPPSF is believed to be mainland Asia's largest and most intact peat swamp forest. SEPPSF comprises about 200,000 hectares or about 66% of the surviving peat swamp cover in Peninsular Malaysia (Map 1). About 44% of this area (about 87,045 hectares) is located within four designated Permanent Reserve Forests namely Pekan, Nenasi, Kedondong and Resak Reserve Forest. The SEPPSF harbors unique flora and fauna that are found typically in peat swamps (Table 3), provides benefits and services of national interest and supports the livelihood of the aborigines (*Orang Asli*) communities. All these resources are significant not only for the ecological functioning of the forest but also for future biodiversity conservation and sustainable development of the whole area.

Map 1. Location of SEPPSF

Table 3. Status of flora and fauna of SEPPSF

Total area of SEPPSF	87, 045 hectares
Common timber species	Kempas (*Koompassia malaccensis*) Ramin Melawis (*Gonystylus bancanus*)
Commercial fish species	Tapah, Toman and Baung
Number of plant species	216
Number of mammals species	62
Number of bird species	192
Number of fish species	56
Number of frogs species	17
Number of tortoises, lizards and snakes species	21
Animal species under serious threat	Malayan sun bear, flat-headed cat, white-handed gibbon, small-clawed otter and Malayan porcupine
Animal species critically endangered	Painted terrapin, Malayan tiger, Asian elephant, Sunda otter civet, hairy-nosed otter, panther, leopard, lesser adjutant stork, wrinkled hornbill, large green pigeon, short-toed coucal, Wallace's hawk-eagle, false gharial (Buaya Julung) and Malayan giant turtle.

Source: Anon (2004)

Data collection

Data required in estimating the economic value were collected from a survey conducted on non-user of SEPPSF (i.e. Kuantan district residents). A structured questionnaire was prepared which comprised five sections. Section one consisted the general questions related to forest issues, section two elaborated on the status of ecosystem richness (both flora and fauna) and the location of the study site. Section three asked respondent's opinion on the importance of forest conservation. Section four asked questions related to the estimation of respondent's WTP for the conservation of SEPPSF. The last section sought socio-economic information from respondents.

The direct or open-ended question format was used as WTP elicitation method. The open-ended format was used to allow flexibility and freedom for respondents to answer without pressures; thus avoiding the starting point bias and reducing the risk of hypothetical bias (Hanemann 1994; Boyle 2004). The payment vehicle adopted was the trust fund solely meant for the management and conservation of SEPPSF, and additional to the current state government budget on environment related matters.

To reduce strategic bias, information regarding the management of SEPPSF was explained to respondents. They were informed that to manage and conserve the SEPPSF ecosystems need a substantial amount of financial resources. Therefore, their participation in contributing to the trust fund is important. Respondents were asked to indicate the amount that they were willing to pay in order to achieve the objective of conservation of the peat swamp forest ecosystem.

Sampling

To estimate the number of respondents (households) in Kuantan district, the formula below was used (Calderon et al. 2003):

$$n = N / 1 + Ne^2$$

where;

n = sample size
N = total number of households aged 20 and above in Kuantan district (EPU Pahang, 2006)
e = desired margin of error

Using 235,900 households aged 20 and above and 2.5% as the desired margin of error, a total of 1,589 is considered as the number of respondents to be interviewed. However, taking into consideration the limited resources available for data collection, a sample of 400 households was targeted and randomly selected during a 16 weeks survey period (January to April 2009). The sample selection and enumeration of the respondents were done on weekdays and weekends. The survey was conducted using in-person (face-to-face) interview.

Question to elicit WTP

In section four of the questionnaire, CVM related questions were asked. Respondents were informed about the status of SEPPSF management which currently under the authority of State Forestry Department. By creating a hypothetical situation which assumed the study area needs financial expenditure from the local community (as additional to current budget) to support the conservation programme, respondents were asked to contribute a substantial amount of donation annually to a special conservation trust fund as the payment vehicle.

A specific question to elicit respondents WTP to support the conservation programme of SEPPSF was as below;

Assume that the state government of Pahang decided to organize a special trust fund to support the conservation and protection of SEPPSF. Residents of Kuantan are encourage to participate in the programme.

Are you willing to contribute?
_____ Yes (go to question QX)
_____ No

QX. What is the maximum amount that you are WTP?

RM _____ per year?

RESULTS AND DISCUSSION

Socio-demographic characteristics

During the survey, 433 residents of Kuantan have been approached and 279 households (64%) were willing to participate in the study. However, only 274 questionnaires were used in the analysis after omitting the outliers.

Most of the respondents interviewed were male (81% of 274 respondents) and the most frequent age category was 23 to 28 years old (23%). About 75% of the respondents were married and the average number of individuals per participant household was four people. A very high percentage of respondents were university graduate (46%) and a majority of them worked in the public sectors (62%). Respondent's years of schooling ranged from six to 16 years and most of them (46%) spent about 16 years in schools and tertiary education. The average year of schooling for the respondents was 14 years.

The average gross monthly income for the respondents was MYR2,500 (NZD1,125) and modal earnings were MYR2,401 (NZD1,081) to MYR3,200 (NZD1,440) per month (29%). About 93% of respondents were Malays, 5% were Chinese and 2% Indian which resembled the current ethnic group population distribution whereby Malay community was the majority population (74%) in Kuantan district (EPU, Pahang 2006).

The distance of SEPPSF from respondent's house ranged from 53 km to 109 km. The mean distance from SEPPSF was 73 km while the modal distance (28%) was less than 65 km. Table 4 shows summary of the socio-demographic data.

Table 4. Statistical results of socio-demographic variables[1]

Variable	Mean	Standard deviation	Minimum	Maximum
Age (years)	36.8	10.23	18	60
Size of the household	3.85	2.30	1	12
Years of schooling	13.82	2.39	6	16
Gross monthly income (MYR)[2]	2468.98	1241.94	650	7000
Distance from SEPPSF (km)	72.63	11.12	53	109

Notes:
[1] Total number of respondents = 274
[2] MYR = Malaysian Ringgit
MYR1 = NZD0.45 as of August, 2nd 2009 (Anon, 2009)

Respondent's awareness and understanding of forest management and conservation issues

The respondents were asked about their awareness of forest conservation in Malaysia. By providing three answer options, most of them were occasionally concerned about the matter (76%), 13% stated they always pay close attention on the issues while 11% of the respondents did not consider the issues seriously. From 243 respondents who stated their concerned about forest conservation, 71% claimed that television and radio were their main sources of information. Newspapers (69%) were the next best media source for the respondents, followed by information provided by magazines (30%) (Table 5). On average, the respondents gained information related to forest conservation issues from at least two main sources.

Table 5. Source of information related to forest conservation[1]

| Source	Percentage
Academic/educational books	15%
Magazines	30%
Newspapers	69%
TV/Radio	71%
Seminars/workshops	5%
Others(internet, friends/colleagues, office works)	7%

Note:
[1] Based on 243 respondents

There were some reasons why 11% of the respondents did not pay close attention to forest conservation issues. By grouping the answers to four main groups, most of them (55% from 31 respondents) believed that the related government agency (i.e. Forestry Departments) should take full responsibility on every issues related to forests and should not burden the public with forest issues. The second notable reason (26%) was the high commitments of their time to office works and personal life. They felt that they utilized their precious time by focusing on their career and family and left the forest conservation issues to be managed by the government. While some respondents had the initiatives to seek forest related information, 16% stated they lacked exposure to items on the importance of forest and conservation issues from the relevant agencies and mass media (television and radio). Only 3% claimed that social issues are more important than forest conservation issues (Figure 2).

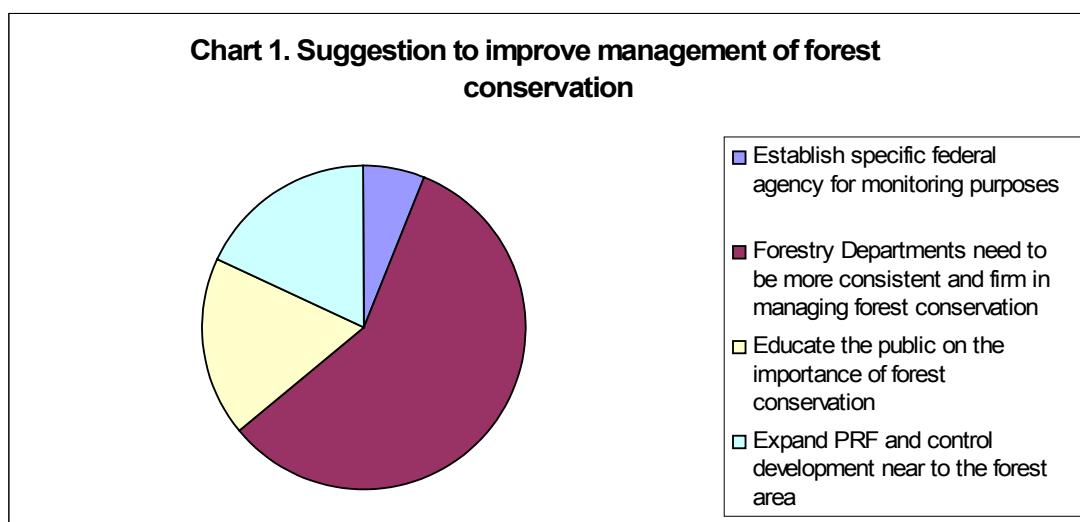**Figure 2. Reason why forest conservation is not importan**
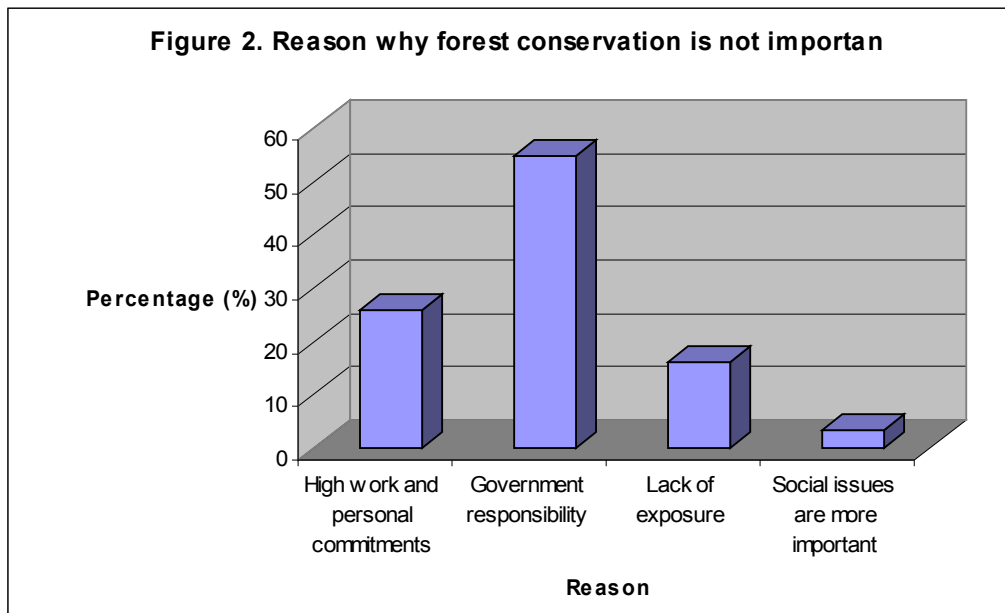
The respondents were also asked their opinion regarding the management of forest conservation in Malaysia. Three answer options were provided. Half of the respondents (50%) stated they did not understand and know nothing about the management of forest conservation. About 30% thought that there is a need for improvements in the management of forest conservation while 20% were satisfied with the current process of forest conservation management (Figure 3).

Figure 3. Opinion on management of forest conservation
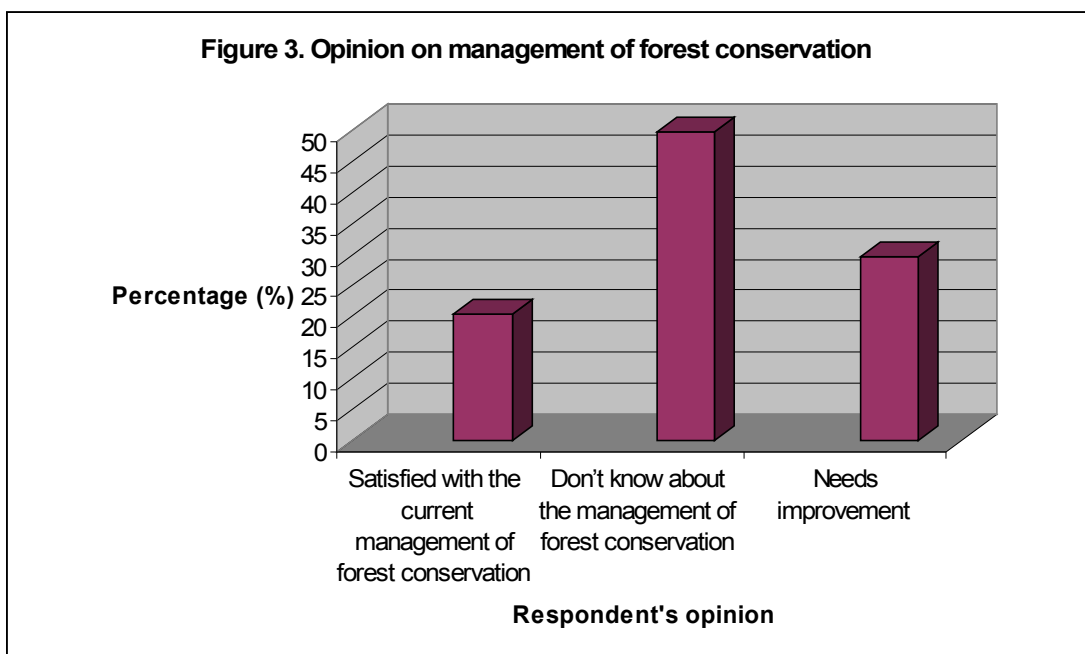
About 83 respondents felt that the related government agency (i.e. forestry department) needs to improve the current management of forest conservation. Some measures have been suggested by respondents. Majority of them (58%) concluded that the state forestry department needs more consistent and firm action in enforcement of forest law especially related to encroachment and illegal logging activities. In addition, the application of digital technology adapted from scientific

research should be used for regular monitoring purposes. The second suggestion (18%) was the government (through related agency) should provide efficient, accessible information channels to the public regarding the forest conservation issues. Early exposure to the importance of forest conservation to humans and ecosystems should begin in primary school and continue until the tertiary education. Results from scientific research related to forest conservation should be conveyed in laymen terms to educate the publics as well as to increase their awareness on any illegal activities and current forest management issues.

Another 18% of respondents urged the government to expand the forested areas under the permanent reserve forests (PRF) apart from encouraging the development of more forest plantation areas. Close monitoring and effective control of infrastructure and house developments need to be considered thoroughly if the development areas are located near to forest areas. A small portion of respondents (6%) suggested the establishment of specific federal unit or agency for the purpose of monitoring the problem of forest encroachment and illegal logging (Chart 1).

Chart 1. Suggestion to improve management of forest conservation

- Establish specific federal agency for monitoring purposes
- Forestry Departments need to be more consistent and firm in managing forest conservation
- Educate the public on the importance of forest conservation
- Expand PRF and control development near to the forest area

Willingness to pay (WTP) for SEPPSF conservation

After explaining the purpose of establishing the conservation trust fund, 78% of respondents agreed to participate. Their maximum WTP ranged from MYR1 (NZD0.45) to MYR50 (NZD22.50) with a weighted average of MYR11.50 (NZD5.18) per year. The survey indicated that half of the respondents were willing to contribute at the lowest range group of WTP, ranged between MYR1 (NZD0.45) to MYR10 (NZD4.50) per year to the SEPPSF conservation trust fund (Table 6).
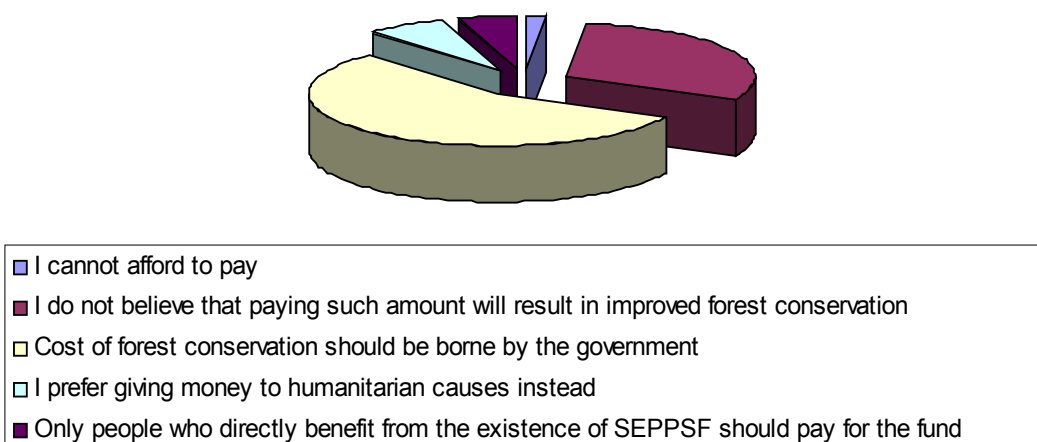
Table 6. Maximum WTP to conserve SEPPSF

| Amount (MYR)	No. of respondents	%
0	59	21.5
1 – 10	136	49.6
11 – 20	42	15.3
21 – 30	18	6.7
31 – 40	3	1.1
> 40	16	5.8
Total	**274**	**100**

The second highest percentage of respondents (22%) were in the group of WTP which are willing to pay RM0. There were asked to select one from six answer options beside their own answer, why they preferred to pay RM0. Most of them (56%) believed that the government should bear the cost of forest conservation as the cost can be covered with the profit gained from logging activities. About 31% of respondents agreed that paying an amount to the conservation trust fund would not result in better forest conservation. Many respondents stated there should be change in attitude and ethics amongst the public towards the importance of forest and its relationship to human needs. The publics should be given sufficient information on current status of forest resources as well as future management plans for the forest area.

Furthermore, problems of corruption in the management of forest should be addressed by those who have the authority. Some respondents stated the possibility of misuse of money from the proposed conservation trust fund is high as has happened in many cases related to public donations. In addition, they suggested the government should allocate a portion of income tax for the purpose of forest conservation in the future. A small percentage of respondents provided other reasons such as cannot afford to pay (2%), prefer to donate to other trust funds related to humanity (7%) and only those who receive direct benefits from SEPPSF should contribute to the trust fund (5%) (Chart 2).

Chart 2. Reason not interested in paying for forest conservati

- I cannot afford to pay
- I do not believe that paying such amount will result in improved forest conservation
- Cost of forest conservation should be borne by the government
- I prefer giving money to humanitarian causes instead
- Only people who directly benefit from the existence of SEPPSF should pay for the fund

In conclusion, 72% of respondents were only willing to pay at the low rate of donation. This situation can be related to their opinion on how important is the forest conservation in the government expenditure compare to other selected areas. The respondents were asked to rank their priority for government spending from one as the top priority to seven as the lowest priority for areas such as health, infrastructure developments, national defense, education, tourism, agriculture development and forest conservation (Chart 3).

Chart 3. Priority of government's expenditure
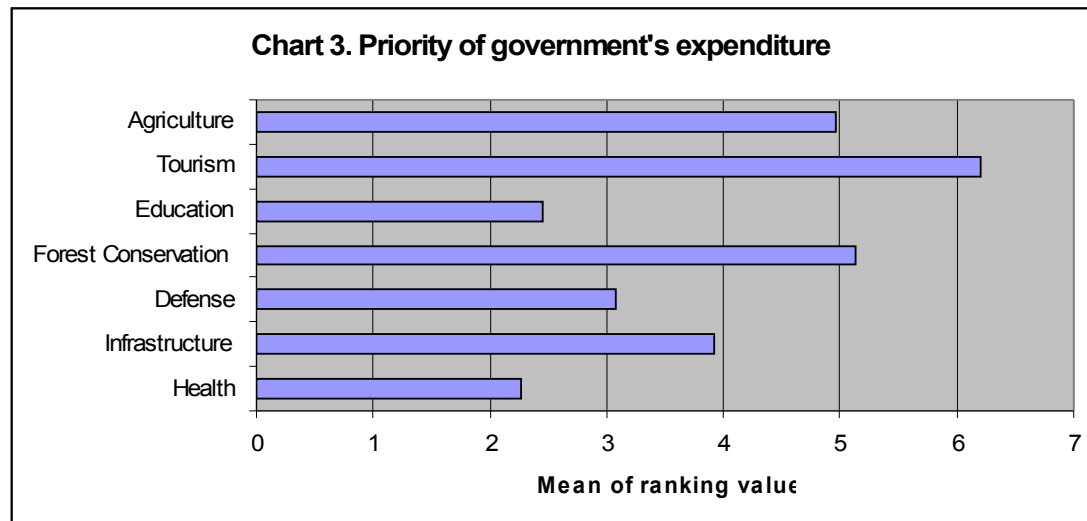
The chart showed that the top priority government's spending chosen by the respondents was on health with the mean ranking value of 2.27. The closer the ranking value to one is considered as top priority while value closer to seven is otherwise. Second important area for the priority government's spending was education (2.45) followed by national defense (3.08), infrastructure development (3.92), agriculture development (4.96), forest conservation (5.13) and the less priority was tourism (6.20). From 274 respondents, only 4% of the respondents ranked forest conservation as their top priority in future government's spending.

This results could explained why most of respondents were willing to pay with small amount of money to protect and conserve the SEPPSF as their perspectives on forest conservation in the government's expenditure was in the second lower ranking value before tourism.

The existence value of SEPPSF

To estimate the economic value of SEPPSF, two main variables were used namely, the mean value of respondents WTP and options of Kuantan district and Pahang state populations. The population of Pahang state was also used to determine the existence value of SEPPSF in a broader view. As Kuantan is the most populated district in Pahang state (EPU Pahang 2006; DOS 2008), it is assumed that the mean value of WTP derived from Kuantan's respondents can be used to estimate the Pahang state's existence value.

Based on Pahang State Economic Planning Unit (2006), the total population of Kuantan district aged 20 years old and above was 235,900 (57% of the total

population) while the population for Pahang state was 835,500 (58%). The population of Kuantan and Pahang increased to reach 420,300 and 1,483,600 respectively in June 2008 (DOS, 2008). By assuming the percentage of population aged 20 years old and above is remains as its 2006, it was estimated that the adult population of Kuantan and Pahang in 2008 were 239,571 and 860,488. To determine total number of households in Kuantan district and Pahang state, the weighted average size of households, four persons per family was used. This provided an estimated total number of 105,075 and 370,900 households in Kuantan and Pahang respectively.

Therefore, by taking the mean value of maximum WTP, the total estimated annual existence value for SEPPSF ranged from MYR1.2 million (NZD0.6 million) to MYR4.9 million (NZD2.2 million) in Kuantan district while the value ranged from MYR4.4 million (NZD2.0 million) to MYR17.4 million (NZD7.8 million) in Pahang state (Table 7).

Table 7. Existence value of SEPPSF

Economic value[1]	Annual Existence Value	
	Kuantan district	Pahang state
Mean value	MYR11.50 (NZD5.18)	MYR11.50 (NZD5.18)
Economic value based on total population	MYR4.9 million (NZD2.2 million)	MYR17.4 million (NZD7.8 million)
Economic value based on adults population	MYR2.8 million (NZD1.3 million)	MYR10 million (NZD4.5 million)
Economic value based on number of household	MYR1.2 million (NZD0.6 million)	MYR4.4 million (NZD2.0 million)

Note:
[1] Based on data in June 2008

Little attention has been focused on estimation of economic value of wetlands in Malaysia. However, a recent study by Ahmad (2009) estimating the recreational value of mangrove forest in Larut Matang, state of Perak can be used for comparison. Ahmad (2009) estimates the direct values (use values) of mangrove ecosystems to about 331 local recreationists. The CVM was used to elicit respondent's maximum WTP and the research found the estimated economic value of Larut Matang mangrove forest was MYR41.18 (NZD18.53) per visit and had a total value of MYR3.4 million (NZD1.53 million) per year to the local recreationists. The total use value computed was slightly higher than the total non-use value of this study, MYR2.8 million (NZD1.3 million) per year, if the WTP amount of each adults in the population was recognized.

CONCLUSION

It is notable that peat swamp forests constitute the largest wetland area in Malaysia and provide significant social-cultural, economic and environmental benefits. Those benefits could accrue to communities who live adjacent to the forest, aborigines and people in the whole state or country in terms of direct and indirect benefits. Therefore, by taking into account all the marketed and non-marketed resources from the peat swamp ecosystems, the potential economic value of its existence could potentially be high.

Economists can use TEV as tool to estimate total benefits of specific forest areas. It comprises of use and non-use values and specify the importance of such areas in monetary terms. One of the values categorized under non-use values is existence value. The estimation of non-market value of SEPPSF for existence forms a part of the total economic value of the ecosystem. This study used CVM to determine the existence value of SEPPSF based on the maximum WTP of non-user towards forest conservation. The non-users selected as respondents were Kuantan district households.

The survey revealed that most of the households interviewed were not really aware about issues related to forest conservation in Malaysia. Only 13% stated that they always pay close attention to the subject and their main sources of information were television and radio. The main reason stated for not paying close attention to the topic was forests should be managed by forestry departments without any involvement from the public.

Because of that, 50% of the respondents did not have knowledge and understanding about the management of forest conservation. However, 30% of respondents suggested that there is need for some improvement in the management of forest conservation. The most important aspect was the need for consistency in enforcement measures of encroachment and illegal logging activities. In terms of the importance in government spending compared to other selected areas, only 4% of respondents ranked forest conservation as the top priority. Overall, forest conservation was ranked sixth out of seven selected areas in future government spending.

Despite lack of knowledge and understanding of forest conservation issues, 78% of respondents stated they were interested in donating for the SEPPSF conservation trust fund. Their maximum WTP ranged from MYR1 (NZD0.45) to MYR50 (NZD22.50) with a mean value of MYR11.50 (NZD5.18) per year. Twenty-two percent of respondents stated that they were willing to pay RM0 and argued that the cost of forest conservation should be fully borne by the government as they profited from logging activities.

By using mean maximum WTP of respondents of MYR11.50 (NZD5.18) per year the total existence value of SEPPSF from various options of population can be estimated. Overall, the existence value of SEPPSF from the perspective of households in Kuantan ranged from MYR1.2 million (NZD0.6 million) to MYR4.9 million (NZD2.2 million) while the value ranged from MYR4.4 million (NZD2.0 million) to MYR17.4 million (NZD7.8 million) per year for Pahang state respectively.

Estimation of non-market value of forest resources is an important task if the potential total benefits from the forest are to be understood. The value estimated can provide policy makers an indication of the importance of unpriced forest resources or forest ecosystems as a whole in monetary terms. Information on the social benefits of maintaining forests should be available before decisions on forest conversion occur. The public's preferences as measured by their WTP for forest conservation should be given due consideration in decision making to promote sustainability of forests.

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REFERENCES

Abdul Latiff, M. and Faridah Hanum, I. 1997. *Setting Biodiversity Priority Areas for Research and Development in Malaysia*. Paper presented at the Workshop on Biodiversity, Conservation and Utilisation: Present Status and Future Directions. Indonesia – Malaysia Joint Working Committee on Forestry (Group `D' Research, Training and Extension). Forest Research Institute of Malaysia (FRIM), Kuala Lumpur, Malaysia. 27 – 28 November 1997. 23 pp.

Adger, W.N., Brown, K., Cervigni, R. and Moran, D. 2002. Tropical Forest Values in Mexico. In Pearce, D., Pearce, C. and Palmer, C. (Eds.). *Valuing the Environment in Developing Countries: Case Studies*. Edward Elgar Publishing, Inc., Massachusetts, USA. ISBN: 1-84064-148-7. Pp: 329-357.

Ahmad, S. 2009. Recreational Values of Mangrove Forest in Larut Matang, Perak. *Journal of Tropical Forest Science No. 21(2)*. Pp: 81 – 87.

Anonymous. 2004. *Malaysia: Potential in Peat Swamp*. Loh, F.F. Malaysian Star. http://forests.org/articles/reader.asp.

Anonymous. 2007. *Conservation and Sustainable Use of Tropical Peat Swamp Forests and Associated Wetland Ecosystem*. http://www.psf-frim-undp.org/about_project.htm

Anonymous. 2009. http://nzfinance.yahoo.com/currency/convert.

Australian Government Publishing Service (AGPS). 1995. *Techniques to Value Environmental Resources: An Introductory Handbook*. Australia Government Publishing Service (AGPS), Canberra, Australia. ISBN: 0-644-24869-4. 73 pp.

Bateman, I.J., Carson, R.T., Day, B., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Ozdemiroglu, E., Pearce, D.W., Sugden, R. and Swanson, J. 2002. *Economic Valuation with State Preference Techniques: A Manual*. Edward Elgar Publishing Limited. Cheltenham, UK. ISBN 1 84064 919 4. 458 pp.

Bishop, R.C. and Heberlein, T.A. 1987. The Contingent Valuation Method. In Kerr, G.N. and Sharp, B.M.H. (Eds.). *Valuing the Environment: Economic Theory and*

Applications. Studies in Resource Management No. 2. Centre for Resource Management, Publication Section, Lincoln College, Canterbury, New Zealand. ISBN: 1-86931-025-X. Pp: 99 – 199.

Boyle, K.J. 2004. Contingent Valuation in Practice. In Champ, P.A. et al. (Eds.). *The Economics of Non-Market Goods Resources: A Primer on Non-Market Valuation*. Kluwer Academic Publisher, Dordrecht. Pp: 111 – 170.

Calderon, M.M., Camacho, L.D., Carandang, M.G. and Dizon, J.T. 2003. *Improved Management of the Angat, Ipo, Umiray and La Mesa Watersheds in Luzon, The Philippines: A Contingent Valuation Study*. Research proposal submitted to the Economy and Environment Program for Southeast Asia (EEPSEA). 14 pp.

Department of Statistics (DOS). 2008. *Basic Population Characteristics by Administrative Districts*. Department of Statistics, Putrajaya, Malaysia.

Hanemann, W.M. 1994. Valuing the Environment through Contingent Valuation. *The Journal of Economics Perspectives (8)*. Pp: 19 – 44.

Jamal, O. and Mohd Shahwahid, H.O. 1999. Constructed/Hypothetical Market Methods: Contingent Valuation (CV). 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. Forestry Department of Peninsular Malaysia (FDPM) and Danish Cooperation for Environment and Development (DANCED). 119 pp.

Kramer, R.A., Holmes, T.P. and Haefele, M. 2003. Contingent Valuation of Forest Ecosystem Protection. In Sills, E.O. and Abt, K.L. (Eds.). *Forests in a Market Economy*. Kluwer Academic Publishers, Dordrecht, The Netherlands. ISBN: 1-4020-1028-1. Pp: 303 – 320.

McNally, R. and Mohd Shahwahid, H.O. 2002. *Environmental Economics: A Practical Guide*. WWF-UK and Universiti Putra Malaysia (UPM). ISBN: 983-41144-0-0. 134 pp.

Ng, T.P. and Shamsudin, I. 2001. Common Trees in Peat Swamp Forests of Peninsular Malaysia. *Research Pamphlet No. 124*. Forest Research Institute Malaysia (FRIM), Kepong, Selangor. 97 pp.

Pahang State Economic Planning Unit (EPU, Pahang). 2006. *Pahang: Basic Data 2006*. Economic Planning Unit (EPU), Kuantan, Pahang. 74 pp.

Pearce, D. 1993. *Economic Valuation and the Natural World*. Centre for Social and Economic Research on the Global Environment (CSERGE). Earthscan Publication, London U.K. 129 pp.

Pearce, D. 1995. *Blueprint 4: Capturing Global Environmental Value*. Centre for Social and Economic Research on the Global Environment (CSERGE). Earthscan Publications Ltd, London, UK. ISBN: 1-85383-184-0. 212 pp.

Pistorius, T. 2007. A Global Network of Forest Protected Areas Under the CBD: Financing and Implementation. In Schmidt, C.B., Pistorius, T. and Winkel, G. (Eds.). *A Global Network of Forest Protected Areas Under CBD: Opportunities and Challenges (Proceedings of an International Expert Workshop Held in Freiburg, Germany, May 9 – 11, 2007)*. Verlag Kessel, Eifelweg 37, 53424 Remagen, Germany. ISBN: 3-935638-90-6. Pp: 39 – 44.

Turner, R.K., van den Bergh, J.C.J.M., Soderqvist, T., Barendregt, A., van der straiten, J., Maltby, E. & van Ierland, E.C. 2000. Ecological-economic Analysis of Wetlands: Scientific Integration for Management and Policy. *Ecological Economics (35)*. Elsevier. Pp: 7 – 23.

United Nations Development Programme (UNDP). 2006. *Malaysia's Peat Swamp Forests: Conservation and Sustainable Use*. United Nations Development Programme (UNDP), Kuala Lumpur, Malaysia. ISBN: 983-40995-5-X. 40 pp.

Van Kooten, G.C. and Folmer, H. 2004. *Land and Forest Economics*. Edward Elgar Publishing Ltd., Cheltenham, UK. ISBN: 1-84376-881-X. 523 pp.