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Local Residents' Awareness towards the Issue of Mangrove Degradation in Kuala Selangor, Malaysia

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Abstract

Mangroves in Malaysia reside coastlines and the largest areas of mangrove are in the Northern Sabah. They sheltered at the shores of the west coast. Over four decades since 1980, mangroves are recorded to be declining due to various causes. Aquaculture practices implemented in the first decade; in Peninsular Malaysia was the key reason of mangrove depleting during the years. Public participation and their awareness are considered as important components in conserving the mangrove areas. Thus, the research was conducted to discover local residents awareness towards the issue of mangrove degradation in Kuala Selangor. A questionnaire survey was employed to a total of 103 respondents in Kuala Selangor. The findings suggest that lack of local residents' awareness due to several reasons. In this regards, this research is to study the local residents' awareness on the importance of mangrove areas.

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Keywords: Mangrove forest; degradation; awareness; Kuala Selangor

1. Introduction

This study is to emphasise the awareness level of the residents in the management of mangrove forest in Kuala Selangor. Irrespective of the fact that on that point are many profound researchers conducted several studies on the

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management of mangrove forest, there are nonetheless a bunch of doubts and inquiries on that topic. Such as; how far do the local resident's actions and awareness make a difference in mangrove rehabilitation? Several researchers have come to an agreement on the idea of mangrove depletion all around the world; in Thailand, Indonesia, Malaysia and many other countries. The reasons for these happenings resulted from human activities; for example, conversion to agriculture and salt production, coastal industrialization, conversion to aquaculture and others. For instance, in Thailand, mangrove forests are lost to shrimp ponds and coastal developments (Macintosh, Ashton & Havanon, 2002). Moreover, difficulties in implementations, budget shortage and lack of experts in the matter make it harder for the authority to manage mangrove forests in Kuala Selangor.

The mangrove forests are seen as dump land and were not worth of looking and taking care of it. They are smelly, muddy and carry no beauty to the eye of a beholder. However, few studies have been conducted and together they come to a conclusion saying that mangroves are one of the great wonders of the environment. It has several criteria, making it a nature's defence against the harshness of the environment. Mangrove forests are a protection belt to the coastlines. With the mangrove gone, tsunami, waves and wind easily penetrated into the coastal and causing damage to nearby residents. A disaster that hits Aceh should be a lesson and guidance for us to keep the belt safe and sound so that in the future, it will protect us from the harsh waves and tsunami per se.

In essence, this study provides a better understanding of the residents on their awareness and acceptance regarding this issue. Furthermore, the economy of Kuala Selangor plays an important part in the development of Selangor per se. With that, the resident's awareness is crucial and significant in planning a better head for Kuala Selangor at par with the increasing number of residents and the environment.

Thus, the residents' awareness and involvement in this pertaining matter is important and crucial in helping the authority or planning department to plan ahead for the development of Kuala Selangor. Knowledge of the residents determines the effectiveness of rehabilitation program done by either the Government body or the Non-Government body. A good and successful environment management depends on the awareness that depicted entirely in accommodating the issues and problem while rehabilitation programs are well implemented and enforced. Therefore, it is the argument of this research that there is not enough awareness in some of the residents, and the lack of this awareness might just be the reason for poor participation in mangrove rehabilitation programs.

2. Methodology

This study has two components where first a collection of several literature reviews with as many keywords related to the topic such as community involvement, managed mangrove, mangrove depletion, public awareness and wetland management was conducted. The research study was carried out to form the theoretical foundation of the study and to aid the analysis of the outcome. The second component of the study is the research questions, objective and questionnaire formulated by the researcher.

The aim of this study is to acknowledge, the awareness level and education spread of the residents in Kuala Selangor concerning on the issue of mangrove depletion. Based on the literature review, field works and questionnaire survey (sampling size is 103) were deployed to provide a better understanding of the awareness from the local community on the participation at the local level.

3. Literature review

Studies on mangroves and its' ecosystem are massive in number and worldwide in the division. They provide an overview of the mangrove ecosystem and its' biodiversity, management aspects, status and trends, values and depleting causes (Field, 1998; Kamaruzaman & Dahlan, 2008; Food & Agriculture Organization [FAO], 2007; Macintosh, Ashton, and Havanon, 2002; and Kathiresan, n.d.). Mangrove lands are always described as an 'eyesore' (Kamaruzaman & Dahlan, 2008) and 'wasteland' (Choudhury, n.d.) that carries meaningless existence of it. However, awareness of mangrove loss has opened the eyes of many profound researchers and other stakeholders worldwide.

As a matter of fact, knowledge on this issue has been increasing recently and has led more efforts and actions in protecting the ecosystem. Rehabilitation and restoration programs are initiated and increasingly organized by either local authorities or international commitment organizations. Rehabilitation is defined as an act of getting the

ecosystem back into its' original condition through many means (Field, 1996 in Macintosh et al., 2002). In restoring the system, there are numbers of action which helps the ecosystem to heal. Among these actions, tree planting is the most widely used methods. However, this effort might be jeopardized by the action of just planting the trees without proper site assessment, evaluation and tree-handling technique. Other methods that one could use in restoring mangrove forest or by habitat creation through converting the tarnished area to a suitable substitute (Stevenson *et al.*, 1999 in Macintosh *et al.*, 2002).

3.1. Threats and changes in mangrove areas

Arriving in the millennium year in 2000, a powerful anthropogenic change is seen where number of people is increasing drastically from 1.5 billion to 6.0 billion (Valiela, *et al.*, 2009). Thus demand for energy, food, water and other resources have increased unreasonably in certain regions of the world. Human living in an aggregated manner requires greater demands on resources while consuming more significant amount of energy due to the need for transportation, heating, cooling and water supply and so on. In some parts of the world, a large area of the natural environment is sacrificed for the building of the built environment.

Numbers of researchers came to an agreement and supported the issue of mangroves continue to disappear all over the world. In general, mangrove forests are under heavy human pressure. Beside human influences, they are also suffering from environmental stress factors. Some estimation was done by the researcher saying that with the current annual loss rate, some region might ultimately lose the beauty of this ecosystem. Habitat destruction through human encroachment has been the primary cause of mangrove loss. The damage is known by man either knowingly or unknowingly of the mangrove values. Resulted from this loss, fishery sources, livelihood, biodiversity are reported to be continuously declining. The cause of mangrove destruction varies for each country. Some countries are impacted by aquaculture activities, high demand for land for housing and industries, agriculture conversion, commercial logging, charcoal and fuelwood industries and land reclamation for urban development.

3.2. Public awareness of environmental issue

Public awareness of both the biological and economical importance of natural resources and the need for proper management is crucial in order to improve the environmental quality as a whole. According to Scoullos and Brouma (2002), the best way to obtain a good level of public awareness and participation is by respecting institutionalised and voluntary rules agreed by understanding dialogue, participation and partnership. In addition, Sayers (2006) suggest that to raise awareness is by informing and educating people about a topic or issue with the intention of influencing their positive attitudes, behaviours and beliefs towards the achievement of a definite purpose of goal in the subject matter. In the local context, it is undeniable a fact that public awareness is very important in the environmental related issues (Wong, 2006). Wong (2006) says that the increasing level of awareness of the local community is the first step in empowering the local participation in planning and managing their natural resources. A study in Kuala Selangor mentions about the importance of awareness among the local residents to get involved in conserving the natural resources (Mazni Adibah and Zainora, 2015).

4. Mangroves in Southeast Asia

Asia consists of 25 countries spanning from the Arabian Peninsula to the subtropics of China and Japan and the humid tropical in the Southeast Asia. Asia has the largest mangrove distribution with high biodiversity in the South and Southeast Asia (FAO, 2007).

There are several best-managed mangrove forests in Asia. Malaysia with Matang Mangrove Forest Reserve is among the listed best-managed mangrove in the world. Irian Jaya, Kalimantan and Sumatra in Indonesia was identified and classified to own the greatest extent of mangrove distribution globally. Mangrove in Southeast Asia equals to more than 4.6 million hectares in 2005 (FAO, 2007). Indonesia holds the record with the largest extent of mangrove in the region (Refer table 1).

5. Mangroves in Malaysia

Until the year 2008, the total forested area in Malaysia is recorded to 19.52 million hectares or about 59.5 percent of the total area (Forest Department Peninsular Malaysia; Forest Department Sabah & Forest Department Sarawak in Forest Research Institute Malaysia, 2012). Out of that value, about 0.58 million hectares are mangrove with the dominance in Sabah.

Mangroves in Peninsula Malaysia are found wild in the sheltered coastlines of Kedah, Perak, Selangor, and Johor; that was bordered by the Straits of Malacca. Perak holds the record for the highest area covered with mangrove forest. In the east coast of Peninsula Malaysia, mangroves are documented sheltering the estuaries of the Kemaman River in Terengganu and Bear River in Pahang (Forest Research Institute Malaysia, 2012).

Peninsula Malaysia is bordered by the South China Sea in the east, Straits of Johor in the South, Straits of Melaka in the West and Malaysia-Thailand land border in the North. These coastlines run about 1,972 kilometers all the way. 72 per cent of the Peninsula west shores are made up of mud coasts while sandy beaches are on others (Forest Research Institute Malaysia, 2012). Most mangroves in Malaysia are documented to habit in the west coast as it is calmer from waves and winds (Refer table 2). Differs to the east coast where on pockets of mud are found in mangrove ecosystem.

Table 1. Trends and status of mangroves in Asia (1980-2005)

Country/ area	Most recent reliable estimates		1980	1990	Annual Change 1980- 1990		2000	Annual Change 1990- 2000		2005	Annual Change 2000-2005	
	Ha.	Ref. Year	Ha.	Ha.	Ha.	%	Ha.	Ha.	%	Ha.	Ha.	%
Brunei Darussalam	18,418	1996	18,400	18,400	0	0	18,400	0	0	18,400	0	0
Cambodia	72,835	1997	91,200	82,400	-880	-1.0	73,600	-880	-1.1	69,200	-880	-1.2
Indonesia	3,062,300	2003	4,200,000	3,500,000	-70,000	-1.8	3,150,000	-35,000	-1.0	2,900,000	-50,000	-1.6
Malaysia	564,971	2005	674,000	642,000	-3,200	-0.5	586,500	-5,250	-0.8	565,000	-4,900	-0.8
Myanmar	518,646	1999	555,500	536,100	-1,940	-0.3	516,700	-1,940	-0.4	507,000	-1,940	-0.4
Philippines	247,362	2003	295,000	273,000	-2,200	-0.8	250,000	-2,300	-0.9	240,000	-2,000	-0.8
Singapore	500	1990	1,790	500	-129	-12.0	500	0	0	500	0	0
Thailand	244,085	2000	280,000	250,200	-2,980	-1.1	244,100	-610	-0.2	240,000	-820	-0.3
Timor Leste	1,802	2000	4,250	3,000	-125	-3.4	1,800	-120	-5.0	1,800	0	0
Vietnam	157,500	2000	265,150	213,500	-5,655	-2.3	157,500	-5,600	-3.0	157,000	-100	-0.1

(Source: Amended from Food and Organization, 2007)

Table 2. Forest type and distribution in Malaysia by 2008 (Million Ha)

Region	Land Area	Natural Forest			Plantation Forest	Total Forested Area	% of Total land Area
		Dry inland	Peat Swamp	Mangroves			
Pen. Malaysia	13.16	5.40	0.30	0.10	0.08	Pen. Malaysia	13.16

Sabah	7.37	3.83	0.12	0.34	0.11	Sabah	7.37
Sarawak	12.30	7.92	1.12	0.14	0.06	Sarawak	12.30
Total	32.83	17.15	1.52	0.58	0.25	Total	32.83

(Source: Forest Research Institute Malaysia, 2012)

5.1. Efforts done in mangrove rehabilitation

Recognising the critical urge to stabilize the coastal region which holds the potential to be moved by the tsunami, the Ministry of Natural Resources and Environment (NRE) has organised a “National Task Force Committee of Planting Mangroves and Other Suitable Species Operation in Shorelines of the Country” on the February 7th, 2005. They are to monitor the progress and rehabilitation planting programs throughout the country. Under the 9th Malaysian Plan, the Government has allocated an amount of fund specified in the rehabilitation of mangrove on the coastlines. Small budget was then approved for conducting R&D in the related matter.

Various activities are practiced and witnessed from the Non-Government bodies. Nevertheless, their actions are not as clearly understood as the actions, policies and interventions done by the regime. NGO are most likely seen the joining and organizing rehabilitation programs in several required areas. For instance, in Kuala Gula, Ecological Mangrove Rehabilitation Workshop is created due to the penury of a tree planting reforestation there (GEC & MAP-Indonesia, 2009). A workshop was organized by Mangrove Action Project (MAP), Global Environment Centre (GEC) and sponsored by the Force on Nature and Foundation on June 12-15th, 2009 (GEC & MAP-Indonesia, 2009) (Refer figure 1).

Organizing event by the community is not well recorded and documented. Somehow the participations of communities are seen in some of the organized activities by the government or NGOs. They participated as the as volunteers and as the local guide for the incoming visitors and volunteers.



Fig. 1. Evaluating the current substrate condition before rehabilitation works carried on during high and low tide

(Source: GEC & MAP-Indonesia, 2009)

5.2. Case study of Matang Mangrove Forest Research

Malaysia is proud to announce and acknowledge the treasure of Matang Mangrove Forest Reserve (MMFR) as the Best Managed Forest District in Malaysia in 1996/1997 (Malaysian Timber Council, 2009). It is situated on the northwestern coast of Peninsula Malaysia and under the jurisdiction of Larut Matang and Kerian, Perak. More than 70 percent of the total forest area is classified under productive forest while less than 30 percent are the non-productive or protected area (Malaysian Timber Council, 2009).

Management of MMFR is divided and guided by the Perak State Forest Department based on the ten years Working Plan and Detailed Control Maps (Malaysian Timber Council, 2009). Until 2014, management of MMFR

has evolved in many levels. Hence, this has not only allowed in supplying raw material for charcoal production, but also all year round fishing activity. The ultimate aim of MMFR management is to go sustainable.

6. Findings of study

In the first cross-tabulation is a relation between the respondent's gender, a multi-option question on responsible taking care of the mangrove forest and have they ever visited mangrove forests in Malaysia. The result shows that a total of 46 respondents choosing “public” and have been visiting mangrove forest at a minimum once a year. It shows that they who have visited mangrove forest agreed to the matter of fact that environment needs the care and awareness of the public also, instead of waiting the concern given by the government. No doubt that the government has massive things to deal with it. However, far from assuming that mangrove is out of Government’s jurisdiction. It is a good management where the public could help, hand-in-hand alongside with the Government as well the Non-Government bodies in protecting our mangrove forest. On two separate occasions, those respondents who have not yet visited mangrove forest, chooses Government’s responsibility in protecting the environment with 25 respondents; nine males and 16 females (Refer table 3). Governments are precisely responsible for appointing laws and enforcement of certain legislation; including penalizing those who offended the rules and regulations.

Secondly, from the cross tabulation between education level, visited mangrove forest or not and the awareness of the matter. Highest number of awareness among the respondents is among those who visited mangrove forests at the minimum of once a year. Out of that figure, 27 respondents are recorded to have “moderate awareness” on the mangrove degradation issue, followed up by the 19 respondents with “total awareness” (Refer table 4). The highest frequency of “not aware” of this matter is among those who have not visited mangrove forests; with 13 out of 31 respondents, and can be classified as having zero knowledge of mangrove forest. In relation to the literature review, the result demonstrates that education is very essential to elevate the level of local residents. Respondents with secondary education level, however, dominating the number of interviewees which has been visiting mangrove forest. They can be classified as having a minimum knowledge of mangrove forest.

On the other hand, a cross-tabulation data is made between reasons of mangrove depletion, visiting the mangrove forest and gender. Table 5 shows that a total of 42 respondents chooses illegal logging from 69 respondents who have visited mangrove forest. They have eventually witnessed and experienced the situation and considered as illegal logging as the main factor of mangrove degrading. A number of 34 respondents also agreed that urbanization also contributed to the depletion (Refer table 5). Overall, agriculture is seen as an unimportant factor. However, in some countries, they cut down mangrove forests in giving ways and land for agricultural activities.

As a matter of fact, public awareness of mangrove forest is still on the brink. People are not entirely aware of the fact that we are losing more mangrove forest than what we plant in terms of rehabilitating the source. Respondents have suggested and agreed to the statement that the public need more exposure and education on mangrove forest. Thus, this indicates that efforts from various players such as the government and Non-Government, alongside the locals are essential in ensuring the protection of our valuable mangrove forest for the future generations. Consequently, the public felt that enforced legislation by the legal body is crucial to support mangrove management practice.

Table 3. A cross-tabulation between gender, responsibilities and visiting mangrove forest

Have/not visited mangrove forest.			Responsibilities			Total
			Public	Government	Non-Government	
YES	GENDER	MALE	17	28	19	38
		FEMALE	29	17	16	34
	Total	46	45	35	72	
NO	GENDER	MALE	5	9	5	9
		FEMALE	15	16	6	22

Total	20	25	11	31
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Table 4. A cross-tabulation between awareness, education level and visiting mangrove forest

Have/not visited mangrove forest.		Awareness on mangrove degradations issue				Total
		Totally	Moderate	Weak	Not	
		Aware	Awareness	Awareness	Aware	
YES	EDUCATION NON-SCHOOLING	2	0	0	0	2
	PRIMARY	10	5	3	3	21
	SECONDARY	7	21	11	7	46
	TERTIARY	0	1	1	1	3
	Total	19	27	15	11	72
NO	EDUCATION NON-SCHOOLING	0	0	1	0	1
	PRIMARY	0	0	0	2	2
	SECONDARY	1	8	6	11	26
	TERTIARY	0	1	1	0	2
	Total	1	9	8	13	31

Table 5. A cross-tabulation between reasons of mangrove degradation, visiting mangrove forest and gender

Have/not visited mangrove forest.			Reason of mangrove degradation					Total
			Urbanization	Aquaculture	Agriculture	Water Pollution	Illegal Logging	
YES	GENDER	MALE	18	17	3	17	23	37
		FEMALE	16	8	3	16	19	32
	Total		34	25	6	33	42	69
NO	GENDER	MALE	5	5	2	4	4	9
		FEMALE	7	6	2	6	13	21
	Total		12	11	4	10	17	30

7. Recommendations

7.1. Awareness aspects

Residents are part of the ecosystem. Therefore, it is necessary to understand the socioeconomic condition of the locals, especially their use of mangrove areas. The primary role of the locals is to determine the success level of the projects. The local authorities should encourage the local people in participating in any forest rehabilitation projects. In raising the awareness of the residents, workshops on awareness are seen to be effective. The aim of the workshop is to raise the awareness of all stakeholders on the importance of mangrove re-vegetation programs. Through this kind of efforts and programs, communities were able to understand the purpose of re-vegetation ideology and concept and their role in protecting the replanted area.

7.2. Education aspects

Contributing to the education of the country is seen as a good deed. Future generations will further use the knowledge into an excellent path. One institution could contribute to education with good cooperation among international organisations to exchange ideas and experience in the field of the mangrove ecosystem and its management.

In addition outdoor education is seen to provide direct contact with the ecosystem, either as parts or organised trips or extra-curricular out of school period. The aim is to allow direct exposure and observation in the mangrove natural setting within an appropriate learning structure and guidance. Although this technique seems limiting the target audience, however, the effectiveness is exceptional.

8. Conclusion

Throughout the study, it has been argued that the lack of local community awareness is considered as the main problem in weakening the local community participation in mangrove management. The outcome of this study has demonstrated clearly that the lack of awareness efforts leads to less information being received by the local witch eventually cause poor participation in mangrove management in Kuala Selangor. Thus, public understanding and awareness in regards to the mangrove biological and economy values are vital to ensuring the proper administration of this resource. The importance of environmental education is considered as the potential tool to elevate the residents' knowledge, understanding and awareness on the mangrove ecosystem. It is hoped that this research has contributed to the body of knowledge as well as this is also related to the achievement of sustainable development, concerning the future generations. Stewardship of the mangrove ecosystem and good management depends wholly on this generation and next generation to come. The younger generation must, therefore, take the lead and show some interest in caring the environment for a safer, healthier and brighter future.

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