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Green Technology for Sustainable Development: Practice and Experience of Malaysia on Mangrove Forest

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Abstract

Mangrove forests are important economically and ecologically. In Malaysia, mangrove forests are managed for charcoal, fire wood, and tissue. Due to human disturbance- increasing population or hurricanes –like tsunami, the situation in the rest of the world is similar; most mangrove trees fall beneath the axe or in storms long before reaching their maximum size. Mangroves are one of the most productive wetlands globally and can be found in the intertidal zones along tropical and subtropical areas famous in southeast Asian coastlines. Mangroves are vital in providing breeding and nursery grounds for commercially and recreationally important angle. Mangroves also help to protect coastlines from erosion, storm damage, wave action, and tsunamis. The mangrove ecosystem consists of several significant components, including forest, soil, and the marine ecosystem. To generalize the practice and experience of Mangroves forest management of Malaysia the study has been conducted. Mangrove Forest in Malaysia, Government Initiatives, NGOs Efforts, Private Sector Involvement, and Involvement of Local Community are analysed from the available sources.

Keywords: Government initiatives, Malaysia, Mangrove Forest, Private, and community involvement,

Background

Mangrove forest is a form of vegetation that connects the terrestrial forest with the sea and be referred as "the forest between the land and the sea". Mangroves are most abundant in tropical Asia, Africa, and the Islands of the Southwest Pacific. According to Spalding et al (2010), Malaysia is one of the top twelve countries with the largest extents of mangroves in the world. Mangrove forests support a diverse range of flora and fauna and are important breeding ground for a vast array of organisms. Besides, mangrove forest also serves as a refuge and nursery for marine life, a stop-over point for migratory birds and essential for sustaining a viable fishing industry. Generally, mangrove forests constitute an important coastal ecosystem and are among the world's most

productive ecosystem (Kathiresan & Bingham 2001).

Mangrove forest is an ecosystem that provides a wide range of ecosystem-functional benefits, from watershed protection, production of raw material for construction and industry to regulation of environmental quality, prevention of soil erosion and maintenance of biodiversity. Though, mangrove ecosystems in Southeast Asia are facing a number of threats, including those from human activities in coastal areas and climate change. Converting to aquaculture ponds, pollution, development projects and sea level rise have been major challenges to sustainable management of mangrove ecosystem services.

Objective and Methodology

To generalize the practice and experience of Mangroves forest management of Malaysia the study has been conducted. Mangrove Forest in Malaysia, Government Initiatives, NGOs Efforts, Private Sector Involvement, and Involvement of Local Community are analysed from the available sources. Mangroves are vital in providing breeding and nursery grounds for commercially and recreationally important angle. Mangroves also help to protect coastlines from erosion, storm damage, wave action, and tsunamis. The mangrove ecosystem consists of several significant components, including forest, soil, and the marine ecosystem.

Mangrove Forest in Malaysia

Mangrove forests provide many market and non-market products as it serves as a breeding ground for various flora and fauna as well as organisms. However, this valuable resource is under increasing pressure from overexploitation, development and pollution in Malaysia because loss of mangrove area worldwide has been drastic. The largest mangrove forest in Malaysia is Sabah in East Malaysia followed by Sarawak, while Perak for Peninsular Malaysia. Mangrove forests covers about 38% of the total mangrove found in Peninsular Malaysia, followed by Johor, Selangor, Pahang, Kedah, Terengganu, Negeri Sembilan, Pulau Pinang, Melaka, Kelantan, and Perlis. It is obvious that Perak, Johor and Selangor dominate in terms of mangrove coverage. These states all reside on the western coast of Peninsular Malaysia, except some districts of Johor that face the east. Out of 1,972-km length of the coastline, about 61% is covered by mangroves, 26% by coconut and other trees, 10% by grass and the remaining 3% is uncovered. In the west coast of Peninsular Malaysia, mangroves dominate about 66%, 12% is uncovered and the rest is covered by grass, coconut palms and casuarinas trees (FRIM, 2012).

There are several reports that indicate the total extents of mangroves. Each report indicates a different figure for the respective year of publication. It is difficult to obtain an accurate estimate of mangrove areas for the following reasons:

Every report gives a figure that is based on the year of the study, which leads to varying figures as the mangroves change over the years. Mangrove areas in many developing countries such as Malaysia are not spared from land acquisition and conversion for economic reasons. There is no standard methodology used by different studies to estimate mangrove areas. As a result, it is difficult to make a comparison between studies

There is also no clear- cut demarcation between the extents of water bodies and mangrove land

due to tidal inundation. The spatial resolution of satellite imagery used to estimate the extents also play an important role in the outcome of the analysis where coarser resolution images often lead to over estimation of mangrove areas There is no clear distinction of the boundary between back mangrove species and salt marsh and hence both areas are normally included as mangrove areas. (FRIM, 2012).

Government Initiatives

After the tsunami tragedy in 2004, the realisation on the critical need to stabilise shoreline areas that could potentially be affected by tsunamis in the future. Hence, a National Task Force Committee of Planting Mangroves and Other Suitable Species Operation in Shorelines of the Country was formed on 7 February 2005 by the Ministry of Natural Resources and Environment (NRE) to monitor the progress and implementation of planting programmes throughout the coastal region in the country. In 2005 the Malaysian Government intensified efforts to plant mangrove and suitable species along degraded or eroded coastlines. Due to the commitments in protecting and conserving the coastal forests, a fund of RM40 million was approved and allocated for replanting mangrove and mangrove associated species along the Malaysian coastlines by the government under the 9th Malaysia Plan. A RM8 million of the approved total budget was allocated for conducting projects on research and development related to mangroves (O. Hamdan et al, 2012). One good example is the government's initiative to provide budget allocation under the RMK9 development budget to undertake the Mangrove Rehabilitation Project in the entire Malaysia. Under the initiative, a total of about RM8 million has been provided to the Forestry Department and FRIM to undertake various research and development activities related to the mangroves. The project has been implemented successfully, among others the development of innovative planting techniques for mangrove species in the high-risk coastal areas (Raja Barizan et al. 2009). Under this initiative also, the Forestry Department has been focusing on the rehabilitation of degraded mangrove areas throughout the country and up to the end of October 2010, about 2,150 ha with over 5.8 million seedlings had successfully been planted since year 2005. In the effort to ensure the long-term survival of mangrove forests, the government has also gazetted a total area of 89,626 ha of mangrove forests as PRF. In addition, there are also other mangrove forests that have been gazetted as protected forests including the gazettement of four mangrove forests as Ramsar Sites in Malaysia. The mangrove conservation needs an active involvement of all parties; namely, government, NGOs, local communities, private sectors in ensuring a successful implementation of the planned strategies to protect the mangrove future for future well-being for all (O. Hamdan et al, 2012).

NGOs Efforts

The Malaysian Government has embarked on a programme of mangrove planting along the coastline since 2005 and it is one of the efforts taken by the government of Malaysia to protect its coastal areas as well as to enhance conservation efforts. The replanting of mangroves effort was faced with challenges such as being destroyed by animals such as cows, goats etc, vandalism due to visitor's negligence. These problems can be mitigated with the involvement of the local community and consultation from the local community as they can play their roles accordingly to ensure the smooth and success of mangrove replanting activities. Most of the local people are keen and would like to be involved in the conservation activities because it can affect their livelihood and at the same time they can learn new knowledge on the replanting of mangrove techniques etc. It is very important

for the local communities or school children to participate in the implementation of the project "Planting Mangroves and Other Suitable Species Operation in Shoreline of the Country". The local community involvement would be able to embed the awareness and the feeling of ownership of the mangroves among the local people. It is like in Nepal in Karnali forest, designd for visit Nepal (Badal, 2019). The government should and can encourage them to participate directly in the planting activities during the public awareness campaigns organised by the state forest departments together with the NGOs or local authorities. Besides that, the communities can take part in the planting programmes organized by NGOs which are funded by the project. The government can introduce tax exemption to companies who took additional initiatives in promoting environmental activities as well as promoting environmental-friendly products to the public.

Private Sector Involvement

Companies and corporation interested in exercising their Corporate Social Responsibility (CSR) or Corporate Environmental Responsibility (CER) obligations can participate in mangrove planting and rehabilitation activities rationalize their obligations through donations in support of the community service projects, environmental educations and awareness programmes and management of ecotourism activities. These programmes are normally organized by various NGOs or the local authorities. A donation for the planting programmes normally includes the cost of purchasing seedlings for planting. Private companies can create awareness through their organisation's promotional activities along with promoting their products with the intention to create the awareness on the importance of environmental and at the same time imprinting an eco-warrior to the society. Recognition can be gained from various national and international environmental bodies and associations. The effort and investment made by these private companies can be viewed as a win-win scenario for all stakeholders. Nevertheless, MNCs can also give back to the society by what is known as CSR. Private companies can assist and support the government environmental project such as replanting activities by providing various aspects of assistance such as financially, research and development in inventing eco-friendly products, campaign of planting trees etc. Among the actively participating corporations in the mangrove conservation programmes are Sime Darby, Shell Sdn Bhd Malaysia, Digi and Petronas.

Involvement of Local Community

After the tsunami tragedy in 2004, the Malaysian Government implemented replanting programmes along the coastal areas around the country with the purpose of preserving the coastal areas. Other than that, there are various awareness programmes introduced to the local community on the mangrove replanting activities. Local awareness and support are vital in determining the success any of the replanting projects. The involvement of local communities in planting mangroves along the coastal area is very important in raising awareness if the importance of environmental conservation. It is also important in creating a caring attitude among local people towards conservation efforts. There is a need for the local community involvement for in order to mitigate the various challenges faced for the mangrove replanting activities. For example, vandalism is bound to happen for example, sign boards were damaged in place of the replanted areas, unfenced mangroves trees planted were damaged by vehicles and camping activities, the tree stems were used for BBQ and as fishing rods. Other than that, the replanted area was used as picnic ground, the fence wires were used as alternatives to grills in BBQ, the nets fencing the replanting areas were used as swings by local

villagers. Apart from that, there is also damage done by farm animals such as goats and cows. Human negligence is also one of the causes of fires in the replanting areas due burning of weeds in the replanted areas and causing damage to the trees. Other than workshops, the study found that awareness raising could also be carried out in other forms such as printed materials such as posters, flyers, leaflets, billboards, messages in daily-used products such as t-shirts, bags, school programmes where children can bring the intended message back home to their family as well as outdoor education programme such as hand-on contact with the nature/ ecosystems. Apart from that, the importance of environment to human can be included in the primary school curriculum so that the environmental awareness can be cultivated from young.

Conclusion

Mangrove forest is part of a very important ecosystem and it needs to be preserved, protected and conserved with the help of the various parties such as the local communities, the government, the visitors etc. The local authorities should involve the local people by encouraging them to take part in the forest management planning at various stages of implementation. The current issues of climate change are high on the socio-economic-politic agenda and continuously being debated worldwide. Global warming, carbon release, sea-level rise, coastal erosion and greenhouse gases (GHG) are among the topics which are being discussed. These phenomena happen as a result of direct or indirect development activities including the conversion of forested areas such as mangrove forest into other land uses. A lot has been said of the importance to conserve and protect our natural forest not only for future socio-economic development but most importantly for the environment and human wellbeing. Malaysia is fortunate in the sense that the government has realized this importance and has taken necessary actions to ensure forest resources such as mangrove forest are being managed on sustainable basis.

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