REHABILITATION OF MANGROVE FOREST IN MALAYSIA

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Introduction

Mangrove forest is an important ecosystem that brings multiple benefits to the society. It serves as an important habitat and nursery for aquatic marine animals especially fish. It also provides raw materials for construction industry and charcoal production and also sequesters atmospheric carbon dioxide (Siikamäki *et al.*, 2012). It also provides protective function from the ocean waves and strong winds. The 2004 tsunami has demonstrated the protective function of mangrove forest where it is able to reduce the impact of the destructive force of the tsunami waves (Tanaka *et al.*, 2006).

Malaysia has a total 578,693 ha of mangrove forest and most of these mangrove forests are protected in the permanent forest reserve manage sustainable using the Sustainable Forest Management System (SFM). In terms of area distribution, Sabah has the largest mangrove forest which accounts for 58.1 percent of the total area of mangrove forest reserve area in Malaysia (Table 1).

Figure 1. Mangrove forest has multiple functions which benefit human.

Figure 2. Mangrove crabs and oyster can be found in mangrove forest.

	Area (ha)	%
Peninsular Malaysia	105,693	18.26
Sabah	341,000	58.93
Sarawak	132,000	22.81
Total	578,693	100

Table 1. Mangrove forest distribution and percentage in Malaysia.

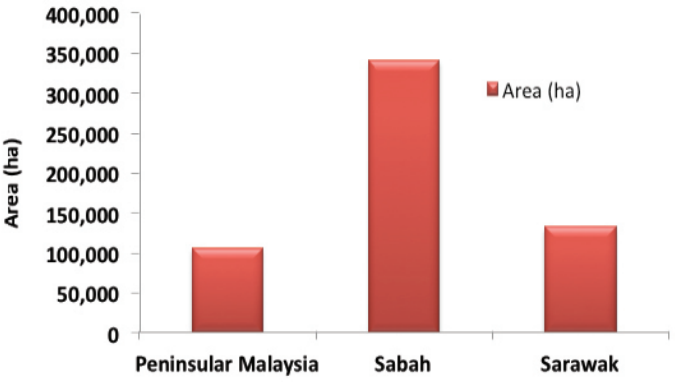

Figure 3. Mangrove forest areas in Malaysia.

Mangrove areas are facing threats resulting from many human activities such as conversion of mangrove forest to other land uses such as shrimp farming , urbanization (Valiela *et al.*, 2001) and climate change (Ward *et al.*, 2016). In 2004 tsunami, many mangroves areas especially north of Peninsular Malaysia were damaged by the tsunami waves. Realising the importance of mangrove ecosystem as aquatic habitat and in protecting the coastal areas from tsunami, in 2005, the Malaysian Government launched a programme to plant mangrove and suitable species in the selected coastal areas (Abdul Rahman, 2016). This program called Planting Mangrove and Suitable Tree Species at National Coastal Areas Programme is implemented with the help of various government agencies, local communities and non-governmental organisations. Since the inception of this programme, a total of 2,743.80 ha have been rehabilitated by the planting of various mangrove and suitable species.

These rehabilitated mangrove areas have seen an increased in macrofauna such as gastropod (Harinder *et al.*, 2016) and coastal bird community (Wong, 2016). This encouraging results show that rehabilitating mangrove forest improves habitat and encourage fauna to inhabit the area.

The planting of mangrove along the coast should be continued since it brings many benefits and services to the nation. Monitoring and regular maintenance of the rehabilitated areas are also important in ensuring the planted trees grow well and regenerate. The involvement of public and local community in the planting mangrove programme will ensure its success and sustainability of the programme.

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