

## MANAGEMENT AND INITIATIVES TOWARDS SUSTAINABLE COASTAL DEVELOPMENT IN MALAYSIA: EXPERIENCE FROM RECLAMATION ACTIVITIES IN MALACCA

*(PENGURUSAN DAN INISIATIF KE ARAH KELESTARIAN PEMBANGUNAN  
KAWASAN PINGGIR PANTAI DI MALAYSIA: DARI PENGALAMAN AKTIVITI  
PENAMBAKAN DI MELAKA)*

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### Abstract

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In the last two decades, the world coastal development has caused the growing demand for land especially in the developed areas. This has caused an increase of pressure to coastal ecosystems. Like any other countries, the land reclamation had become the best method in Malaysia to extend shoreline areas for the economic growth. This technique is widely used in countries facing land scarcity. However, due to its poor management, it has caused another impact on the nearest marine environment and the local community. The rapid development on accommodations and infrastructures in Malacca has made the state government to approve the reclamation projects in the coastal area. Nevertheless, the project has brought adverse impacts to the coastal and socio-cultural environment as such as threatening in hawk's bill sea turtle landing. The initiatives to form policies to conserve and protect the coastal zone have been started in the early 20<sup>th</sup> century and Malaysia management initiative was a problem-based and reactive approach to resource degradation and international commitments. In fact, the demand to protect and conserve the coastal resources and marine environments were under the 6<sup>th</sup> and 9<sup>th</sup> Malaysia Plan. The purpose of this study is to review the present law associated with coastal reclamation with the latest updates from the government's initiatives to achieve sustainable coastal development in Malaysia. This paper also will respond to the need of more information on the status of coastal reclamation and their adverse impact in Malaysia and Malacca as a case study.

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**Keywords:** sustainable, coastal management, coastal development, reclamation, Malacca, Malaysia

### Abstrak

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*Sejak dua dekad kebelakangan ini, pembangunan di kawasan pinggir pantai di dunia telah mengalamipembangunan yang pesat akibat permintaan guna tanah yang semakin meningkat terutamanya di kawasan negara membangun. Ini telah menyebabkan peningkatan tekanan ke atas ekosistem pantai. Seperti mananegara lain, penambakan tanah telah menjadi kaedah terbaik di Malaysia untuk memperluas kawasan pinggir pantai demi menampung pertumbuhan ekonomi. Teknik ini digunakan secara meluas di negara-negara yang mengalami masalah kekurangan tanah. Walau bagaimanapun, disebabkan pengurusannya tidaklestari, ia telah memberi kesan yang negatif kepada persekitaran marin yang berhampiran dan masyarakat setempat. Perkembangan pesat terhadap penginapan dan infrastruktur di Melaka telah menjadikan kerajaan negeri meluluskan*

*projek penambakan di kawasan pantai. Walau bagaimanapun, projek ini telah membawa kesan negatif kepada persekitaran pinggir pantai dan sosio-budaya seperti mengancam pendaratan penyu karak. Inisiatif untuk membentuk dasar untuk memulihara dan melindungi zon pinggir pantai telah dimulakan sejak awal abad ke-20 dan inisiatif pengurusan yang di Malaysia adalah berasaskan pendekatan reaktif kepada masalah kemerosotan sumber dan komitmen antarabangsa. Malah, permintaan untuk melindungi dan memelihara sumber daya pinggir dan persekitaran laut berada di bawah Rancangan Malaysia ke-6 dan ke-9. Tujuan kajian ini adalah mengkaji semula undang-undang yang sedia ada yang berkaitan dengan penambakan pantai dan inisiatif kerajaan untuk mencapai pembangunan pesisir pantai di Malaysia. Makalah ini juga akan menanggapi keperluan lebih banyak maklumat tentang status penambakan pantai dan kesan buruknya di Malaysia dan Melaka sebagai kajian kes.*

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**Kata Kunci:** kelestarian, pinggir pantai, pengurusan pantai, pembangunan pantai, penambakan, Melaka, Malaysia

## INTRODUCTION

Coastal development in the world has created the need for more land especially the ground nears to the developed areas since the last two decades. The small countries like Singapore, Hong Kong, and Japan reclaim their coastal zones to solve the ground shortage (Ramly, S, 2008). Such reclamation is due to the increasing number of population as well as the demand for development of infrastructures, residential areas, recreational, tourism attractions, and the center of commercials and business.

As most of the developed areas are by the coastline, one of the options to create more land is by reclaiming coastal areas which include land below the seawater level. Therefore, coastal reclamation has become the best technique to overcome land shortage for tourism, industrial, and residential purpose since most of the developed cities in the world are nearby the coastal areas. In this regard, land reclamation has been a common practice to create valuable land for development. Moreover, it is a method of creating new land in areas covered with water and has been a common practice to reduce the increasing pressure in the coastal regions (Seasholes, 2003).

## THE STATUS OF COASTAL RECLAMATION IN MALAYSIA

Malaysian coastal area is estimated to consist of about 510, 510 km<sup>2</sup> with different types of coastline configuration and characteristic (Ismail, 2011). The east coast of Peninsular Malaysia mainly consists of sandy beaches while the west coast has coastal plain primarily from marine clay interspersed by sandy beaches and rocky shores (Ismail, 2011). As most of the developed areas in Peninsular Malaysia are located near the coastline, one of the options to create more land is by reclaiming the coastal areas which dominated with sandy beaches and mud flats (Ghazali, 2006). Unfortunately, from the engineering point of view such lands are not suitable sites for civil construction. Thus, reclamation of coastal land will usually offer problems such as instability of the reclaimed platform and long term excessive settlement.

In Malaysia, coastal reclamation is widely practiced in the state of Penang, Malacca, and Johor. The coastal reclamation had started since the 8th century in Kedah for wet-rice cultivation (Ghazali, 2006). Moreover, in the 19th century, the Chinese immigrants in Batu Kawan Island created new land for sugar cultivation. In 1950, the Department of Irrigation and Drainage constructed earthen dike along the coast of Peninsular Malaysia to reclaim the areas for agricultural purposes (Chong and Sasekumar, 2002). In 1957, Sabah and Malacca were reported to have started a landfill reclamation type to extend their foreshore for the commercial use (Bahrain and Teh, 1991). In 1970's, large-scale coastal reclamation implementation occurred in Penang, Malacca, Port Dickson, Kota Kinabalu, and Johor for extending and developing those cities along the coastal areas (Chong and Sasekumar, 2002; Bahrain and Teh, 1991).

Coastal reclamation has become the main option to extend Malaysia coastal foreshores due to the transformation of the nation's economy from the agriculture-based to the manufacturing-based in which most of the industrial areas are nearby the coastal zone (Ghazali, 2006). Figure 1 shows the large scale reclamation projects that have been proposed in various states in Malaysia as reported by Department of Irrigation and Drainage of Malaysia. It shows that reclamation has become the main option for the coastal state to extend their coastal area for coastal development especially for coastal use.

Table 1. Propose large scale reclamation projects that had been proposed in various states in Malaysia (reported by Department of Irrigation and Drainage Malaysia)

Location	Area (ha)	Average Water Depth	Fill Quantity (M3)	Project Cost (RM)
Perlis Coastal Reclamation Project	2,430	2 – 4	N.A.	N.A.
Kedah Coastal Reclamation Project	16,300	2 – 4	N.A.	30 Billion
Lekir and Bagan Datoh, Perak	12,400	N.A.	N.A.	N.A.
Negeri Sembilan	960	N.A.	N.A.	N.A.
Malacca	2,300	N.A.	N.A.	N.A.
West Coast of Sabah	3,760	6 – 10	490 million	12 Billion

### Coastal Reclamation Projects in Malacca

As a recognized World Heritage list of United Nations Educational Scientific and Cultural Organization (UNESCO), Malacca has attracted more tourists every year. The rapid development and the demand for accommodations and infrastructures at the coastal areas in the Malacca City have made the state government's approval on the reclamation projects in the coastal zone for the purpose of tourism infrastructures, hotels, residential houses, marina bays and a maritime museum. Indeed, Malacca has started coastal reclamation for commercials and industrial spaces since 1957 with the extensions of their foreshores (Bahrain and Teh, 1991). Since 1991, Malacca, as well as Penang and Sabah, have been the pioneers in developing reclaimed coastal islands. In fact, Malacca has proposed more than 2,300 hectares of reclamation areas until 2006 (Ghazali, 2006).

Table 1 shows the reclaimed areas in Malacca from 1993 until 1997 while the rest are still ongoing projects. From 2004 until 2011, the Malacca state government and the Department of Environmental have approved other offshore development and reclamation of coastal zone projects for example along Jalan Tengkeru to Pekan Tanjung Kling, Kota Laksamana until Pekan Tanjung Keling, the coastal area of Jalan Ujong Pasir to Pulau Melaka and Melaka Tengah especially along Pantai Klebang.

### Pressures and Adverse Impacts of Coastal Reclamation Activities

Unfortunately, unplanned coastal developments and high numbers of reclamation site projects have strong possibility to result in severe socio-environmental impacts. In fact, such impacts can have adverse effects on the marine environment itself. The environmental effects on species, habitats, and ecosystem processes require further monitoring and assessment. The reclamation activities which normally take place along the coast influence the coastal and near-shore marine habitats. In this regard, the marine habitats become permanently lost as the land is under the reclamation from the sea. The land reclamation may also influence the habitat types of coastal and terrestrial origin such as sand dunes and freshwater bodies.

Furthermore, the coastal development and land reclamation can also have impacts on the socio-economic at the coastal areas itself. For example, loss of public access to the beach, recreational beaches, resettlement of coastal village, and restriction on local fishermen's fishing activities, loss of the fishery ground and cockle spot, and the loss of small business activities.

Table 2. Reclamation projects in Malacca coastline

Type	Project duration	Area	Location
Commercial	1993-1997	31.97 ha	Taman Melaka Raya (most valuable properties in Melacca)
Mix development	1993-1997	21.35 ha	Taman Kota Laksamana
Mix development	1993 and abandoned	9.32 ha	Pulau Berkembar Pulau Melaka. Total proposed to develop is 50 areas but only 9.32 hectares reclaimed and developed
Mix development	2014 and on going (temporary stop)	246.00 ha	Melaka Gateway (Pulau Melaka)
Mix development	2014 and on going	202.70 ha	Pantai Klebang
Oil, Gas and Shipping	Proposed	250.00 ha	Kuala Linggi river mouth

<sup>a</sup>(modified from BERNAMA (BERNAMA, 2015)], DOE (Department of Environment Malaysia, 2016), and (Husin et al., 2009).

Table 2 shows the possible coastal reclamation impacts at the coastal areas. The reclamation projects will alter the condition and ecosystem of the coastal zone (Dahuri et. al., 2001; Fortes, 2001). For example, coastal reclamation impacts in the United Kingdom where the land reclamation on estuaries and coasts has been carried out since the Roman times (Barnes, 1991). These works are extensive and progressive in the United Kingdom throughout the centuries accounting for much of the estuarine habitat loss [13] (Healy and Hickey, 2002). Out of the 155 estuaries in the United Kingdom, 136 (88%) have lost habitats due to land reclamation for agricultural purposes (Flemming and Nyandwi, 1994).

Undeniably, the land reclamation projects bring adverse impacts to the coastal environment and social-cultural environment. For example, permanent loss of protected habitats for marine species including the significant negative effects on hawksbill turtle, changes in coastal currents, increasing of noise, and reduction of air quality which occur during the construction phases. The benthos organisms and habitats are also affected by the sand extraction and elevated fine silt concentrations.

For example, in Malacca, the reclamation activities have decreased the numbers of turtle landings due to the changes of the shoreline. In fact, the rapid development along the Malacca coastline has destroyed the hawksbill turtle nesting habitats (BERNAMA, 2015; Mortimer et. el., 1993).

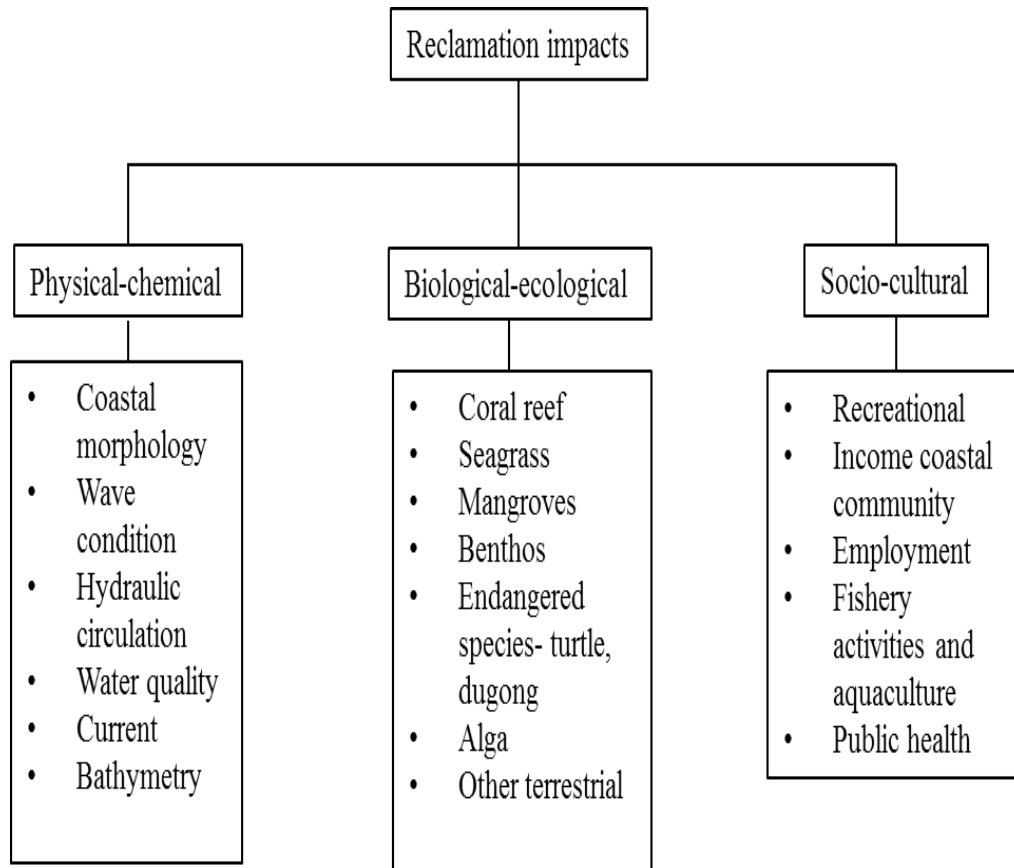


Figure 1. Possible coastal reclamation impacts at the coastal area

Moreover, the reclaimed land will also reduce the coastal fishing grounds, mainly for local artisanal fishermen. Sahabat Alam Malaysia (SAM) reports that more than 100 coastal fishermen at Sungai Lereh near Tanjung Kling, Melaka face difficulty going out to the sea due to the estuary has become shallow cause by coastal reclamation (New Strait Times, 2016). The organization also claim that coastal reclamation has increased marine pollution and sedimentation, and destroyed the spawning and nursery grounds for many marine species. Thus, the fishermen catch has declined and resulted in the decrease in daily income from RM100 to RM30.

## THE MANAGEMENT OF COASTAL RECLAMATION IN MALAYSIA

### Legal Framework and Regulation

There is no specific legal framework which governs the coastal reclamation area in Malaysia except under the Environment Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987. Furthermore, Section 34A (1) of the Environmental Quality Act, 1974 states that; -

*“The minister, after consulting with the Council, may by order prescribed any activity, which may have a significant environmental impact as prescribed activities Moreover, Section 34A (2) of the Environmental Quality Act, 1974 provides that; -*

*Any person intending to carry out any of the Prescribed Activities shall, before any approval for the carrying out of such activity is granted by the relevant approving authority, submit a report to the Director-General. The report shall be in accordance with the guidelines prescribed by the Director-General and shall contain an assessment of the impact such*

*activity will have or is likely to have on the environment and the proposed measures that shall be undertaken to prevent, reduce or control the adverse impact on the environment."*

The provision of Section 34A (2) provides that coastal reclamation involving more than 50 hectares project need to submit an Environmental Impact Assessment report (EIA) which is a legal requirement as a planning tool to evaluate the environmental consequences of major projects or development activities. The objective of such an EIA report is to provide in details the significant impacts that may arise from any activity and ensure that development activities will be preceded in an acceptable manner (Jay, Jones, Slinn and Wood, 2007).

In fact, the EIA report will be under the review by the Director-General of the Department of Environment (DOE) before any project starts. The DOE has introduced an EIA Guidelines for Coastal and Land Reclamation 2008 for the consultants to limit the environmental degradation. It is necessary that the report provides a detailed evaluation report of costs and benefits of the proposed development area as opposed to the advantages of the long-term sustainability of the coastal resources and the quality of human settlement for the local community.

Apart from Environmental Quality Act 1987 that require development project in coastal area to provide assessment report, there are also procedure mention in General Administrative Circular No. 5 of 1987 that requires all proposed development project in the coastal area including land reclamation to be referred to the Coastal Engineering Technical Center (CETC) of the Coastal Engineering Division at Department of Irrigation and Drainage (DID) for comments and evaluations.

Beside, an Environmentally Sensitive Areas Planning prepared by Department of Town and Country Planning of Malaysia for any development proposed at the sensitive area such as the coastal area. This guideline includes all the regulation needed before the project proponents proposed their proposal. Sequenced of activities need to be follow by the project proponents before their planning approved and reviewed by technical agencies and expert from various backgrounds.

This had approved that Malaysia had prepared several of strategies and initiatives in order to achieved sustainable development especially in coastal area. All the adverse impacts in planning the coastal development areas especially the land reclamation project can be minimize and avoid if all technical agencies, planners, and other stakeholders work hand in hand to achieve the sustainable development in coastal areas.

### **The Initiatives for the Coastal Zone Management**

Coastal reclamation has become the main issue for the coastal development in Malaysia. Despite the creation of more land for economic activities, coastal reclamation has brought direct and indirect impact to the coastal environment such as siltation and erosion problems. In overcoming this issue, some initiatives have been taken at the policy and planning levels to provide and implement the necessary instruments for the state and local governments to limit the environmental impacts of coastal reclamation projects in Malaysia.

The initiative in forming policies to conserve and protect the coastal zone management has started since the early 20th century (Mokhtar and Aziz, 2003). The evolution of the coastal management initiatives in Malaysia is a problem-based and reactive approach to resource degradation and international commitments (Mokhtar and Aziz, 2003; Basiron, 2002). Table 2 shows the series of coastal zone management initiatives in Malaysia since 1984. Based on Table 2, several policies and initiatives associate with coastal management in the country.

However, more initiatives need to be formed to control the growth of the coastal reclamation activities. In fact, the need to protect and conserve the coastal resources and marine environment are among the core plans under the Sixth Malaysia Plan until Ninth Malaysia Plan.

## FUNDAMENTAL ISSUES OF THE LAND RECLAMATION MANAGEMENT IN MALACCA

### Coastal Reclamation Legal Framework

Even though Malaysia has made great effort and number of initiatives at the policy and planning levels to protect the coastal environment, there is no specific legal framework and agency particularly to govern the coastal reclamation areas. The only way to control and protect the coastal and marine environment is by proposing the EIA report for the activities prescribed under the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987.

Although the EIA process prevents the environmental damage, its efficacy in practice is questionable (Memoon, 2000). Despite the fact that it is compulsory for each reclamation project to provide the EIA evaluations before the beginning of any project, most of the EIA reports do not present all the relevant aspects extensively. Furthermore, such EIA reports do not provide alternatives management and monitoring during and after the reclamation projects. Many EIA reports for coastal development are inadequate, and some include inaccuracies (Vun, and M Nordin, 2004). Only 27% of EIA reports are under good reviews and have satisfactory methods along with the emphasize studies of local ecology adjacent to the proposed project location. Some EIA reports are lack of public involvement especially from the community of the project area and also the environment experts. Good EIA report should assess and evaluate the scope and extend the impacts caused by the project on the surrounding terrestrial and marine environment and highlight the impact on the marine water quality, ocean sediments, and marine organism [22] (Wang, Liu, Li and Su, 2014). This assessment must be done extensively and involves all the stakeholders related to the coastal reclamation project. If this evaluation is implemented properly, a long-term EIA works to assist the measurement and to avoid serious impacts on the environment (Wang, Liu, Li and Su, 2014).

Table 3. The series of coastal zone management initiatives in Malaysia since 1984 (modified from Mokhtar& Aziz) (Mokhtar and Aziz, 2003).

Date	Initiative
1984-1985	National Coastal Erosion Study
1986-1992	South Johore coastal resource management project with United State Agency for International development (USAID)
1987	Government circular on coastal development
1987	Environment Impact Assessment Order 1987
1991-1996	National Coastal Resources Management Policy
1993	National Conservation Strategies prepared by WWF
1995	Study towards developing a National Integrated Ocean Policy by Maritime Institute of Malaysia
1996	National Aquaculture Guidelines
1997	Town and Country Planning Department Guidelines on Coastal Development
1997	Department of Irrigation and Drainage Guidelines on Coastal Zone Management
1997	Integrated Management Plan for sustainable use of Johore Mangrove Forests
1997	Environment Profile of the Malacca Straits under the GEF/UNDP/IMO Regional Programme
1997-2000	Pilot Integrated coastal zone management projects in Sabah, Sarawak, and Penang
1998-2000	Pilot integrated coastal zone management projects in Sabah, Sarawak, and Penang
1998-present	Drafting the National Wetlands Policy
1999	Department of Environmental Guideline for environmental impact assessment in coastal zone development projects
1999-present	National coastal zone policy initiative

2001-present	Preparation of an Integrated Shoreline Management Plan for beach conservation and restoration
2001-2004	Integrated Coastal Management pilot study in Klang, Selangor under the GEF/UNDP/IMO/PEMSEA Regional Programme

For example, reclamation projects at Pantai Klebang, and Malacca Gateway which have been conducted since 2014 are using a 17-year-old macro EIA report of 1997 (BERNAMA, 2015). These projects have been subjected to stop work order in March 2015 due to series of controversies. The issues are such as the absence of Social Impact Assessment (SIA), old EIA report, lack of participation and discussion with the stakeholders especially the local community (particularly the Portuguese community), as well as the lack of compensation discussion between the reclamation project company and the fishermen (BERNAMA, 2015; The Star, 2014).

### **Lack of Authority Coordination**

Malaysian government agencies are organized in different sectors and serve according to their assigned responsibilities in accordance with the legislation. The issue between the Federal and State governments exists where there is no formal coordination procedure in identifying coastal and marine environment problems which sometimes fall under the different jurisdictional responsibilities of several agencies (Nordin, 2006). This constitutional framework saddles the authority of land administration on the state governments (MacMorrow and Abdul Tulip, 2001) thus limiting the ability of the federal government to enforce the environmental conservation laws in the states.

Besides such constitutional conflict, there is a need for environmental education to enable all the relevant parties to harmonize the economic development goals with the environmental conservation objectives (Macintosh and Ashton, 2002). However, it must be bear in mind that the achievements of the Malaysian coastal restoration and preservation targets in the long term require the strong political will (Chong, 2006) by the government both at federal and state levels.

### **Compensation for the Ecosystem Loss and Local Community**

According to Oslo and Paris Conventions Commissions (2008) (OSPAR Commission, 2008), the compensation for the loss of nature value is highly requested by the European Union, as shown by the case of Maasvlakte 2 reclamation project in Rotterdam, Netherland. For every 20 km<sup>2</sup> loss of shallow sea habitat, the compensation of 200 km<sup>2</sup> marine reserved is created, where seabed disturbing activities including recreation, fishing, and extraction of shells are restricted to improve 10 % of the nature value of this reserve.

Unfortunately, in Malaysia, there is no consideration on the issues of compensation for the loss of marine ecosystem. For example, in Malacca, reclamation project has destroyed the natural marine environment, including the hawksbill nesting habitat and nursery ground for marine habitat. In this regard, the local fishermen who have to go fishing in the shallow coastal water should obtain compensation as the reclamation project disturbs their fishing activity with heavy siltation and sedimentation.

## **CONCLUSION**

As a recognized World Heritage list of UNESCO, Malacca has attracted more tourists every year. The rapid development and the demand for accommodations and infrastructures in the Malacca City have made the state government's approval on the reclamation projects in the coastal zone for the purpose of tourism infrastructures, hotels, residential houses, marina bays and a maritime museum. Unfortunately, unplanned coastal developments and high numbers of reclamation site projects have strong possibility to result in severe socio-environmental impacts. In fact, such



impacts can have adverse effects on the marine environment itself. The environmental effects on species, habitats, and ecosystem processes require further monitoring and assessment.

At the early stage, coastal reclamation is just an alternative way to supply the demand of land shortage whereby the coastal and marine ecosystem have time to readjust with the small and moderate changes and restore. However, modern technology and demand for the more stable land area near to the coastal zone increase the number of hectares of coastal reclamation. This mega coastal development does not only contribute serious impacts to the marine environment but also to the local community. Even though EIA reports have been prepared and reviewed for the impacts of the coastal development, problems still exist due to insufficient of extensive study and stakeholders' participation. Nevertheless, Malaysia is still giving more efforts in planning initiatives the coastal management and conservation to achieve sustainable coastal development as mentioned in Chapter 17 of Agenda 21. In the meantime, such initiative promotes the establishment of ocean management regimes which pursue the protection and sustainable development of the marine and coastal environment and its resources. This had approved that Malaysia had prepared several of strategies and initiatives in order to achieved sustainable development especially in coastal area. All the adverse impacts in planning the coastal development areas especially the land reclamation project can be minimize and avoid if all technical agencies, planners, and other stakeholders work hand in hand to achieve the sustainable development in coastal areas.

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