COASTAL DEVELOPMENTS IN MALAYSIA – SCOPE, ISSUES AND CHALLENGES

DATO' IR.HJ.SHAHRIZAILA BIN ABDULLAH

1993

COASTAL DEVELOPMENTS IN MALAYSIA - SCOPE, ISSUES AND CHALLENGES

by

TAN SRI DATO' IR. SHAHRIZAILA BIN ABDULLAH

Director General
Department of Irrigation and Drainage
Malaysia

1. INTRODUCTION

1.1 Malaysia covers a land area of 332,556 km^2 comprising two regions, Peninsular Malaysia and the States of Sarawak and Sabah. The territorial waters of Malaysia total about 150,000 km^2 while the EEZ extends another 450,000 km^2 (based on the 200 nautical miles or 312 km limit). In addition, there are about 1007 islands located in the coastal waters of Malaysia of which 544 are located in Peninsular Malaysia, 397 in Sabah and 66 in Sarawak.

1.2 Malaysia has about 4,800 km of coastline comprising two distinctly different physical formations, namely the mangrove-fringed mud flats and sandy beaches. The east coast of Peninsular Malaysia consists of straight sandy formations in the north and a series of hook- or spiral-shaped bays to the south. The west coast of Peninsular Malaysia, however, comprises mainly muddy formations, with limited areas of pocket sandy beaches. In Sarawak and Sabah, the coastlines are about equally divided between sandy beaches and mud coast.

1.3 The coastal zone is broadly defined as the areas where terrestrial and marine processes interact. These include the coastal plains, deltaic areas, coastal wetlands, estuaries and lagoons. It is difficult to demarcate a fixed geographical limit on the coastal zone due to the complex interaction and inter-dependence of fluvial and coastal processes.

2. COASTAL RESOURCES AND ITS ECONOMIC-ENVIRONMENTAL SIGNIFICANCE

The coastal zone of Malaysia has a special socio-economic and environmental significance. It supports a large percentage of the population and it is also the center of economic activities encompassing urbanisation, agriculture, fisheries, aquaculture, oil and gas exploitation, transportation and communication, recreation, etc. For the discussions which follow, the coastal resources have been quantified based on a fixed width of 5 km as the landward limit of the coastal zone.

2.1 Land Area

The coastal zone covers a land area of about 4.43 million hectares or 13% of the total land mass in Malaysia. The above can be further divided into 1.18 million hectares in Peninsular Malaysia, 1.00 million hectares in Sabah and 2.25 million hectares in Sarawak, accounting for 9%, 13% and 18% respectively of the land areas in these regions. Based on the landuse maps updated in 1984, it had been estimated that 26.7 % of the area is under agriculture, 69 % under forest cover and the balance (4 %) has been utilised for urban, residential and other purposes (Darus Ahmad, 1994). Out of the above forest-covered areas, swamp forests accounted for 2.5 million hectares or 57 % of the coastal zone.

2.2 Urban and Residential Development

It has been reported that about 70 % of the total population live in the coastal zones. There are 22 urban settlements along the coastline with population ranging from 10,000 to 300,000. In addition, there are another 12,400 rural settlements/ villages identified in the coastal zone of Peninsular Malaysia. According to the Department of Statistics (1982), coastal locations which support a large population of urban dwellers include Melaka and Penang (more than 80 %), Johor (76 %), Kelantan (69%) and Pahang (66 %). The population density of Penang at 860 persons per sq. km is comparable to the most densely settled parts of the Netherlands. The trend of urban concentration in coastal locations is expected to be further sustained as a direct result of population increase and the projected industrial development in the years to come.

2.3 Agriculture Development

The coastal land under agriculture has been estimated at 1.183 million hectare based on the 1984 landuse survey. The major crops cultivated were rubber, coconut, padi, oil palm with a distribution as follows :-

	Area (Ha)	Percentage %
Rubber	226,104	19.2
Coconut	225,235	19.0
Padi	181,045	15.3
Oil Palm	125,295	10.6
Mixed horticulture	98,243	8.3
Others	326,840	27.6

Agriculture is a major contributor of the national GDP, besides the generation of employment opportunities. Despite the fact that its share of the GDP has been declining from 29 % in 1970 to 18.7 % in 1990, the absolute output or value of the agriculture sector (includes fisheries and forestry) is still increasing.

2.4 Fisheries and Aquaculture

The mangrove wetlands, nearshore waters, islands and coral reefs areas support a viable marine fisheries industry. The estimated total resource potential in the inshore areas up to the 12 nautical mile limit is 588,000 tonnes while there is another largely untapped potential of about

400,000 tonnes in the EEZ. The annual marine fish landings in 1990 reached 950,000 tons with an annual growth rate of about 7.8 %. The retail value of fish landings amounted to about 2 % of GDP in 1990.

The local aquaculture industry has also been expanding rapidly in response to the increasing demand for fish, prawns and cockles, both for local consumption and export. By 1988, 25,000 hectares of coastal land had been developed for aquaculture, mostly from ex-mangrove swamps. Aquaculture production totalled 63,500 tonnes in 1988 and has been projected to reach 200,000 tons by the year 2000.

2.5 Industry

The contribution of the manufacturing sector to the national GDP has been projected to increase from 27% in 1990 to 37% by the year 2000. Manufacturing is expected to contribute about 81 % of the total exports by the year 2000. In Peninsular Malaysia, industrial development will continue to expand in existing areas, particularly in the Klang Valley, Penang, South Johor, the coastal strips of the east coast centred on Paka-Kemaman, Bintulu, etc. A greater spill-over of industrial development into the states of Perlis, Kedah, Perak, Negeri Sembilan and Melaka is also foreseen. Coastal areas are preferred sites for industrial development because of the existence of good support infrastructures such as roads, ports and other amenities and resources which include power, energy, raw material and labour supply. There are 33 industrial estates located within the coastal zones of which 28 are found in Peninsular Malaysia, 3 in Sabah and 2 in Sarawak.

2.6 Transportation and Communication

Malaysia enjoys a high level of trade with other countries. The expanding GDP, spurred by a remarkable growth in the manufacturing sector in recent years has imposed a heavy burden on existing port facilities. In 1990, the total imports totalled RM 49.2 billion while the export reached RM 49.5 billion. Exports have been increasingly at an average rate of about 8 % during the period from 1980 to 1990.

There are 103 ports in Malaysia, out of which 54 are located in Peninsular Malaysia, 36 in Sarawak and 13 in Sabah. The major ports are Port Klang, Penang, Kuantan, Pasir Gudang (Johor), Bintulu, Kuching, Kota Kinabalu. In 1987, over 70 million metric tonnes of cargo were handled by these ports. As the country moves towards industrialisation, total shipping is forecasted to increase at a rate of 7 - 9 % per year.

2.7 Oil and Gas

Oil and gas accumulations are found in the offshore regions off the east coast of Peninsular Malaysia, Sarawak and Sabah. The production of crude oil in Peninsular Malaysia reached a level of about 360,000

barrels per day in 1991 while the natural gas reserve has been estimated at 27.4 trillion standard cubic feet. In 1993, the export of crude oil and gas had been valued at about RM 10 billion accounting for about 8.5 % of the total export earning of the country.

2.8 Mineral Resources

Mineral resources are of limited occurrence in the coastal zones of Malaysia. Some of the minerals that are found in the coastal zones are tin, gold, platinum, chromite, copper, aluminium, silica sand, coal, clays and construction materials. Mining activities are undertaken in a small scale for an aggregated area of about 2000 ha. The increase in coastal reclamation projects in recent years has led to a considerable increase in nearshore and offshore sand mining activities for which careful assessment and monitoring of environmental impact is warranted.

2.9 Tourism Potential

The tourism industry is now the third largest foreign exchange earner after manufacturing and oil/gas. The major assets for support of tourism development in this country include sandy beaches, scenic offshore islands, coral reef and nature habitat. The offshore islands of Langkawi, Pulau Perhentian, Pulau Redang and Tioman are rapidly gaining popularity as international-class tourist destinations. In 1990, there were some 6.0 million tourists visiting the country. By 1995, the tourist volume is expected to reach 8 million. Despite the above, the maximum exploitation of the country's potential to attract more tourists has yet to be attained. During the period of 1986-1990, the total investment in hotel and approved tourism-related projects amounted to about RM 2.6 billion.

2.10 Nature Habitat

Mangrove swamps comprise one of the most productive ecosystems on earth. They are important spawning, nursery and habitat areas for many economically important species of finfish and prawns. It was reported that about 42 % of the capture fisheries along the west coast of Peninsular Malaysia were mangrove-related species. Mangrove swamps also support endangered species of wildlife such as the proboscis monkey, crocodile, stork, etc. The accreting mudflats of Matang, Kelang and the Rejang delta represent the richest feeding grounds for migratory birds and resident water birds such as herons, egrets and storks. Peat swamp forests are also used by endangered mammals like rhinoceros.

In support of the concept of protection of important ecological, wildlife and scientific resources, specific areas both within and outside the coastal zones have already been gazetted as national parks, forest reserves and wildlife sanctuaries. To date, a total of 44 islands have also been gazetted as marine parks for the protection of aquatic flora and fauna.

3. THE MAJOR ISSUES IN COASTAL RESOURCE UTILISATION AND MANAGEMENT

3.1 COASTAL EROSION AND RIVER MOUTH SILTATION

3.1.1 The problem of coastal erosion attracted serious attention of the Government in the early 1980s, largely as a result of public complaints and pressures. In response, The Government commissioned the National Coastal Erosion Study in 1984/1985 (Economic Planning Unit, 1985). The study revealed that about 1390 km or 29 % of the coastline were subjected to erosion. Depending on the economic consequence of coastal erosion, these erosion sites were classified under three categories, namely critical, significant and acceptable. Currently, there are 62 sites totalling some 197 km which have been classified as critical erosion areas for which protection works are urgently required to mitigate further loss of valuable land and properties. The study has clearly pointed out that a primary cause of coastal erosion is poor siting, planning and design of coastal development projects and activities. Hence in addition to the above short term measures, it also stresses on the need to implement long term strategies emphasising on proper planning, regulation and control of future developments in the coastal zones.

3.1.2 In contrast to the problem of coastal erosion, the problem of siltation is affecting a large number of river mouths and ports/ harbours. A large number of river mouths are suffering from inadequate draft for navigation as a result of siltation and increase in size of vessels. The National River Mouths Improvement Study (JICA, 1994) has identified a total of 35 river mouths where conditions are critical meaning that inadequate water depth for navigation has resulted in serious economic losses to the local fishing communities. The commercial ports of Klang, Bintulu, Kuantan, Kuala Perlis and Kuala Kedah are also suffering from siltation problem (Abd. Rahim Abd. Aziz, 1994). For Port Klang, the average annual maintenance dredging requirement has been estimated at 226,000 m^3 per year while as much as 500,000 m^3 per year of maintenance dredging is required for each of the ports of Kuala Perlis and Kuala Kedah.

3.2 RESOURCE DEPLETION / DEGRADATION

3.2.1 In the forestry sector, there are mounting pressures to convert mangrove and peat forests into aquacultural and agricultural land. Up to now, approximately 297,973 ha. of peat swamp forests and 11,500 ha. of mangrove have been cleared, mainly for agriculture.

3.2.2 The nearshore fishery industry has been experiencing a gradual decline of fishing resources, largely contributed by the loss of mangroves and other wetlands which function as the breeding ground of a large variety of fish species and prawns. The other contributing factor is overfishing which depletes the stock of available resources.

3.2.3 Wildlife in the coastal zone is threatened by the loss of their natural habitats due to development, pollution, poaching and human disturbances.

3.2.4 Coral reefs are threatened with degradation, mainly by human activities such as recreation. The other major cause of coral reef degradation is sedimentation resulting from land clearing associated with agricultural, forestry, urban development and mining activities both within the coastal zone and in the hinterland catchment.

3.3 WATER QUALITY DETERIORATION

3.3.1 The results of water quality sampling by Department of Environment revealed that total suspended solids (TSS) resulting from land clearing and earthwork activities, have shown a significant increase in recent years. Based on monitoring of TSS for the period 1985 -1991, the coasts of Peninsular Malaysia were found to be seriously affected by TSS with the east coast being 2 to 3 times more polluted than west coast. In the east coast, 81% of the samples analysed exceeded the interim standard for marine quality of 50 mg/l for TSS while along the west coast, 57% of samples exceeded this standard.

3.3.2 Escherichia coli (E. coli) contamination is a serious problem in the coastal waters of Peninsular Malaysia. The west coast is more contaminated than the east coast. Results of tests on E. coli population carried out between 1985 to 1991 showed that 60% of the samples in the west coast exceeded the proposed interim standard for marine quality of 100 MPN/100 ml.

3.3.3 Heavy metal contamination is also significant in the coastal waters of Perak, Pulau Pinang, Selangor, Negri Sembilan where mercury level exceeding the Interim Standard for marine quality has been reported in some areas. Significant level of lead has also been reported along the coasts of Johor, Perak, Pulau Pinang and Kelantan.

3.3.4 Malaysian waters off the coast are also polluted by oil and grease originating from oil spills from vessels and boats, and the cleaning of these vessels. Between 1985 to 1991, there were 28 oil spills in the Straits of Malacca and 52 in the South China Sea. The Straits of Malacca is one of the busiest sea lanes in the world with an average of 3000 ships per month passing the Straits.

3.3.5 For rivers, the major sources of pollution generally originate from activities in agriculture development, agrobased industries (principally palm oil and rubber), manufacturing industries and housing/ settlement development. Unfortunately, coastal waters form the eventual recipient of pollutants found in rivers.

4. ENVIRONMENTAL LAWS AND ADMINISTRATIVE GUIDELINES

4.1 The Environment Quality Act (1974) and the subsequent Environment Quality (Amendment) Act (1985) are federal laws

which impose regulatory control on all development activities based on the consideration of potential impact on the environment. These laws are therefore in support of the concept of sustainable development and sound coastal zone management. The Environmental Impact Assessment Order of 1987 (Prescribed Activities) spells out a list of development activities which require mandatory submission of EIA reports for the prior approval of the Department of Environment. Examples of projects in coastal zone which fall under within the list of prescribed activities are -

- Land development schemes for converting forest to agricultural land which involve an area of more than 500 ha
- Drainage of mangrove swamps which involves an area of more than 100 ha
- Conversion of mangrove swamps for industrial, housing or agriculture for areas exceeding 50 ha.
- Reclamation of coastal area which involves an area of more than 50 ha.
- Aquaculture projects which involve clearing of mangrove swamps of more than 50 ha.
- Clearing of mangrove swamps in islands surrounded by national marine parks.
- Sand mining covering an area of more than 50 ha
- Construction of coastal resorts or hotels exceeding 80 rooms
- Construction of recreational facilities in islands surrounded by gazetted marine parks.
- Construction of port or expansion of existing port involving an increase of more than 50% in handling capacity
- Construction of pipelines exceeding 50 km in length on shore or offshore.

4.2 Beside laws, administrative guidelines have also been introduced by the government to streamline or rationalise planning practices although these guidelines do not have the status of law. An example of this is the General Circular No.5 of 1987 issued by the Prime Minister's Department requiring all developments in the coastal zone to be referred to the Coastal Engineering Technical Center of the Department of Irrigation and Drainage for comment. Through this Circular, DID has provided advice to approving authorities for development applications in coastal areas by pointing out the potential impact, in

particular, from the consideration of risk of coastal erosion and overall stability of the directly affected or adjacent shorelines. In 1993 alone, the Coastal Engineering Center has processed and provided comments on some 150 development applications in coastal areas.

5 THE CHALLENGES AHEAD

5.1 The country is expected to step into an accelerated pace of socio-economic development in line with the VISION 2020 objective of achieving the status of an advanced country by the year 2020. The above VISION statement emphasises on the dual objectives of economic advancement as well as quality living for which a clean and healthy environment is generally regarded as a non-compromisable attribute.

5.2 With the GDP forecasted to double every 10 years under the above VISION 2020, one would expect coastal lands to come under the inexorable process of development in various forms - industrial, urban, residential, recreational, agriculture, port development etc. On the other hand, environmental consideration requires that some of the coastal systems be conserved to serve important ecological functions. Hence, there is a need to formulate and implement a clear policy that sets out the principle and guidelines for resolving the conflicting interests of economic development and environmental preservation. If this is not carried out, the natural coastal systems will continue to come under intense pressure from the diverse demand of society for various forms of development.

5.3 In general, with a few exceptions, all the problems and issues related to management of coastal resources fall within the purview of existing agencies. There are agencies at the Federal, State and Local levels responsible for planning and managing each of the resources found in the coastal zone. What is lacking is coordination and integration between these groups so that interdependencies and conflicts between resource uses can be recognised at the planning stage and hence taken into account in the development of holistic, integrated plans for the management and sustainable utilisation of these resources to meet long term objectives.

5.4 It is also the general opinion that there are adequate legal provisions for the management of coastal resources and related development activities with perhaps the exception of aquaculture, sand mining and groundwater management. However, appropriate amendments may be required on a number of existing legislations such as the National Forestry Act of 1984, the Fisheries Act of 1985, the Land Conservation Act of 1976, the Town and Country Planning Act of 1976, the Street, Drainage and Building Act of 1976 and the Sewage and the Industrial Regulations of 1979 in order to address current

weaknesses and to introduce a higher level of integration in the application of these legislations for the planning and management of the individual coastal resources or activities.

5.5 The formulation and implementation of integrated coastal zone management plan should involve full public participation from all sectors and levels of the society. This is to ensure that the resulting plan would have incorporated the views of all concerned parties to facilitate its eventual adoption and implementation. As a parallel programme, there is a need to introduce a public awareness programme to make the general population better understand and appreciate the values of coastal systems covering such aspects as the role and sensitivity of mangroves, wetlands, wildlife sanctuaries and biological diversity. The merits and effectivensss of the above approach involving public participation have in fact been proven in a USAID-ASEAN funded pilot project known as the South Johor Coastal Resources Management Study (MOSTE, 1992).

5.6 In support of the concept of sustainable development in coastal areas, the Economic Planning Unit had embarked on the preparation of a National Coastal Resources Management Policy in early 1992 (Hiew Kim Loi, 1994). This represents a major initiative by a Central Agency to bring together the inputs and expertise of all the relevant government agencies towards the common goals and objectives of integrated coastal resources planning and management. In the light of anticipated rapid development in the coastal areas, the policy statement must be finalised and put into action quickly. This is particular relevant in those coastal areas where there are already clear signs of environmental distress resulting from the lack of or adhoc planning of development projects and resource management practices. Typical examples of such problems are coastal erosion, water quality deterioration and irreversible damage to sensitive environment and eco-systems.

5.7 The effective implementation of the proposed coastal resources management policy requires that the role of the Federal and State agencies be clearly defined. At this stage, it is foreseen that the role of Federal Government would comprise of overall coordination, formulation of general framework and guidelines, manpower training, technical and financial support necessary for the implementation of the programme. On the other hand, the relevant State-level agencies are responsible for the planning, managing and licensing of coastal resources utilisation within the overall framework and guidelines established at the national level. In addition, adequate budgetary provisions must be provided at both the State and Federal levels to facilitate the implementation of the programme.

5.8 There is a need to strengthen the capacity and capability of government officials who are entrusted with the responsibilities of formulating and implementing integrated coastal resources management policy and plans. This would require well-designed programmes for staff training as well as promotion of indigeneous research to address gaps of knowledge which are specific to local situations or scenarios. It is also necessary and beneficial to institute a properly coordinated long term coastal engineering data collection programme to build up a comprehensive database to support the various planning, design and decision making activities related to coastal engineering development and resource management.

6. CONCLUSIONS

6.1 The coastal zone represents a unique environment which requires special attention in its planning, development and management. While the coastal zone is generally rich in resources which can be harnessed for the socio-economic growth of the country, it is important to recognise that the sustainable development or utilisation of these resources must be founded on an approach that gives due consideration to the importance and sensitivity of the coastal processes and environment.

6.2 Integrated coastal resources management is a pressing concern as well as a necessity, particularly in the light of increasing incidence of coastal erosion, river mouth siltation, natural resources depletion and environmental degradation in many of the more developed coastal areas of the country. While the Government is currently implementing various short term measures to address specific issues and problems in coastal areas, it recognises the necessity to implement long term strategies and plans emphasizing on proper planning and control of future developments in the coastal zone.

6.3 The formulation of a national coastal resources management policy is the first step towards a rational and integrated approach in coastal zone management. This poses a real challenge to professionals from various disciplines who have to work together towards this common objective of planning for sustainable development. The successful implementation of this policy, however, requires sincerity and commitment from all the concerned parties at the federal, state and local levels, and including the participation of the general public.

REFERENCES

Abd. Rahim Abd Aziz, " The Dredging Scenario in Malaysia", Paper presented in Asian and Australasian Ports and Harbours Conference and Exhibition, 20-22 September 1994.

Darus Ahmad, " Coastal Resources in Malaysia and its Socio-Economic Significance", Paper presented in Seminar on Coastal Zone

Management, Kuala Lumpur, 10-11 January 1994

Department of Environment, "Environmental Impact Assessment- Procedure and Requirements in Malaysia", January 1991.

Economic Planning Unit, Malaysia (EPU), " National Coastal Erosion Study : Phase I Report " , the Government of Malaysia, September 1985.

Hiew Kim Loi, "Coastal Zone Management in Malaysia - The Need for an Integrated Approach", paper presented in Seminar on Coastal Zone Management, Kuala Lumpur, 10-11 January 1994.

Japan International Cooperation Agency, " The National River Mouths Study - Final Report" submitted to Government of Malaysia, July 1994

Ministry of Science, Technology and the Environment (MOSTE), " The Coastal Resources Management Plan for South Johor, Malaysia", ICLARM Contribution No. 782, 1992.

Shahrizaila bin Abdullah " Coastal Erosion Management in Malaysia", Keynote address in IEM/ICE Joint Conference in Coastal Engineering in National Development, 4-6 March 1991, Kuala Lumpur

Teh Tiong Sa & Voon Phin Keong, " Background Paper on Impact of Sea Level Rise on the Coastal Zone of Malaysia", Report prepared for Economic Planning Unit, Malaysia under Malaysian National Conservation Strategy Project, 1992.